FOR MBBS AND BDS CLINICAL EXAMINATIONS

Questions and model answers on the common long and short cases of general surgery

SURGICAL VIVA VOCE

Long & Short Cases

Clinical Questions with Model Answers



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Based on Bailey & Love's Short Practice of Surgery, 28th Ed.

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Dedication

To the loving memory of my parents,
whose prayers and sacrifices made everything possible.

To my teachers,
who taught me surgery and showed me how to teach it.

To my wife, Prof. Dr. Tayyaba Majeed,
for her constant love, patience and support.

To my son, Hamis Mahmood,
my pride and my joy.

To my colleagues,
for their friendship and cooperation over the years.

To my students,
whose questions inspired every page of this book.

And to my patients,
from whom I have learned the most.

Prof. Dr. Zahid Mahmood

Preface

The clinical viva is the moment where a student's knowledge meets the examiner face to face. Many students who know their surgery well still falter at the bedside because they have never practised answering questions aloud, in the order and depth an examiner expects.

This book collects the questions that are actually asked in MBBS and BDS clinical examinations on the common long and short cases of general surgery. Each chapter takes one disease and works through it the way an examiner does: history and examination, surgical anatomy, pathology, differential diagnosis, investigations, management, complications, recent advances, and finally the difficult questions that separate a good candidate from an average one.

Part C covers the general surgery topics that are asked in almost every viva, whatever the case: shock, burns, wounds and wound healing, fluids and electrolytes, surgical infections, acute abdomen and head injury. These are especially important for BDS students.

Answers are deliberately short. They are written to be spoken in a viva, not copied into an essay. Every answer follows Bailey & Love's Short Practice of Surgery, 28th Edition, so that students can turn to the parent text for detail.

Prof. Dr. Zahid Mahmood
Lahore

How to Use This Book

Tags	Every question carries a tag. [BDS + MBBS] questions are core for both groups. [MBBS] questions are for MBBS students; BDS students may skip them.
Difficulty	★ = basic, asked of every candidate. ★★ = intermediate, expected of a good candidate. ★★★ = hard, the examiner's favourite for distinction.
Order	Questions follow the sequence of a real viva. Practise answering aloud, then check the model answer.
Recent Advances	Every chapter has five questions on recent developments, trials and new techniques, which examiners increasingly ask.
Quick Recall	Each chapter ends with a one-page summary to revise in the last minutes before the examination.

Ten-second rules for the viva

- Start every answer with a direct one-line reply, then expand. Examiners interrupt; make your first sentence count.
- When asked for causes or a list, give a classification first. It shows understanding and buys you thinking time.
- Say "I would like to" rather than "I will" when describing examination or management at the bedside.
- If you do not know, say so honestly and move on. Guessing confidently and wrongly costs more marks.
- Always mention patient safety: consent, chaperone, airway, and communication with the patient.
- Know the common things well. Most viva marks come from the commonest diseases and the commonest complications.

Format of Case Presentation

1. Biodata	Name, age, sex, occupation, residence, date of admission.
2. Presenting complaint	In the patient's own words, with duration, e.g. "swelling in front of the neck for 3 years".
3. History of presenting complaint	Onset, progression, associated symptoms, symptoms of complications and spread, relevant negatives.
4. Past, drug, family, personal history	Previous surgery, medical illness, drugs, allergies, family history of similar disease.
5. General physical examination	Built, pallor, jaundice, lymph nodes, pulse, BP, temperature, respiratory rate.
6. Local examination	Inspection, palpation, percussion, auscultation, with relevant special tests.
7. Systemic examination	Chest, abdomen, CNS, spine as relevant to spread or fitness.
8. Summary and provisional diagnosis	Two or three lines, ending with your diagnosis and differentials.

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CHAPTER

1

PART A: LONG CASES

Thyroid Swelling

Multinodular goitre, solitary nodule, thyrotoxicosis and thyroid cancer

Sample Case Presentation

Mrs. A, a 38-year-old housewife from a sub-mountainous area, presents with a swelling in front of the neck for 4 years, slowly increasing in size, with difficulty in swallowing solids for 3 months. There are no toxic symptoms and no change in voice. On examination there is a 6 × 5 cm nodular swelling in the anterior neck that moves upward on swallowing but not on protrusion of the tongue. The lower border is palpable, the trachea is central, and no cervical lymph nodes are palpable. The pulse is 78 per minute. My provisional diagnosis is non-toxic multinodular goitre, with differentials of thyroid neoplasm and Hashimoto's thyroiditis.

History and Clinical Examination

Q1. What will you ask in the history of a patient with a thyroid swelling?

BDS + MBBS
★☆☆

- Duration, rate of growth and any sudden increase (haemorrhage into a nodule or malignancy).
- Pressure symptoms: dyspnoea, stridor, dysphagia, change of voice.
- Symptoms of hyperthyroidism (weight loss, heat intolerance, palpitations, tremor) and hypothyroidism (weight gain, cold intolerance, lethargy).
- Residence in an iodine-deficient area, drugs (lithium, amiodarone), previous neck irradiation.
- Family history of thyroid cancer or MEN syndromes.

Q2. Why does a thyroid swelling move with deglutition?

BDS + MBBS
★☆☆

The thyroid is enclosed by the pretracheal fascia and attached to the cricoid cartilage and trachea by the suspensory ligament of Berry. As the larynx rises during swallowing, the gland moves up with it.

Q3. Name other neck swellings that move with swallowing.

BDS + MBBS
★★☆

Thyroglossal cyst (also moves on tongue protrusion), subhyoid bursa, pretracheal and prelaryngeal lymph nodes, and a laryngocele.

Q4. How will you differentiate a thyroglossal cyst from a thyroid swelling clinically?

BDS + MBBS
★☆☆

Both move with swallowing, but a thyroglossal cyst also moves upward on protrusion of the tongue because it is attached to the foramen caecum through the tract. It is usually midline and near the hyoid.

Q5. What are the eye signs of thyrotoxicosis?

BDS + MBBS
★★☆

- Lid retraction (Dalrymple's sign) and lid lag on downward gaze (von Graefe's sign).
- Exophthalmos: sclera visible below the cornea.
- Joffroy's sign: absent forehead wrinkling on upward gaze.
- Möbius' sign: failure of convergence. Stellwag's sign: infrequent blinking.
- Ophthalmoplegia and chemosis in severe disease.

Q6. What is Pemberton's sign?

MBBS
★★☆

When the patient raises both arms above the head, the face becomes congested and cyanosed with distress. It indicates a retrosternal goitre obstructing the thoracic inlet.

Q7. How will you assess retrosternal extension clinically?

BDS + MBBS
★★☆

The lower border of the swelling cannot be reached, there is dullness on percussion over the manubrium, the trachea may be deviated, distended neck veins may be seen, and Pemberton's sign may be positive.

Q8. What clinical features suggest malignancy in a thyroid swelling?

BDS + MBBS
★☆☆

A hard, irregular, fixed swelling, rapid growth, hoarseness of voice (recurrent laryngeal nerve involvement), stridor, palpable cervical lymph nodes, and history of neck irradiation or family history of thyroid cancer.

Surgical Anatomy and Embryology

Q9. Describe the blood supply of the thyroid gland.

BDS + MBBS
★☆☆

- Superior thyroid artery: first branch of the external carotid artery.
- Inferior thyroid artery: from the thyrocervical trunk of the subclavian artery.
- Thyroidea ima artery in about 10%, from the brachiocephalic trunk or aortic arch.
- Venous drainage: superior and middle thyroid veins to the internal jugular vein; inferior thyroid veins to the brachiocephalic veins.

Q10. Which nerves are related to the thyroid arteries and why is this important?

BDS + MBBS
★★☆

The external branch of the superior laryngeal nerve runs close to the superior thyroid artery, so the upper pole vessels are ligated close to the gland. The recurrent laryngeal nerve is related to the inferior thyroid artery, so the gland is dissected on its capsule and the nerve is identified before ligating branches.

Q11. Describe the course of the recurrent laryngeal nerve. What is a non-recurrent nerve?

MBBS
★★★

The right nerve hooks around the subclavian artery; the left hooks around the arch of the aorta. Both ascend in the tracheo-oesophageal groove and enter the larynx behind the cricothyroid joint. A non-recurrent laryngeal nerve occurs on the right in about 0.5–1% of people, usually with an aberrant right subclavian artery, and arises directly from the vagus in the neck.

Q12. What is the tubercle of Zuckerkandl and why is it important?

MBBS
★★★

It is a posterior projection of the lateral lobe. The recurrent laryngeal nerve usually lies deep (medial) to it, so it is a reliable landmark for finding the nerve during thyroidectomy.

Q13. Describe the development of the thyroid and its anomalies.

BDS + MBBS
★★☆

The thyroid develops from the foramen caecum at the base of the tongue and descends in the midline as the thyroglossal duct. Anomalies include lingual thyroid, thyroglossal cyst and fistula, pyramidal lobe, ectopic thyroid and retrosternal thyroid.

Q14. Where are the parathyroid glands and what is their blood supply?

BDS + MBBS
★★☆

The superior glands lie on the posterior surface of the upper part of the lobe at the level of the cricoid cartilage and are fairly constant in position. The inferior glands are more variable, usually near the lower pole. Both are mainly supplied by the inferior thyroid artery, so this artery's branches are ligated close to the gland.

Pathology and Classification

Q15. Classify goitre.

BDS + MBBS
★☆☆

- Simple: diffuse hyperplastic, multinodular.
- Toxic: diffuse (Graves' disease), toxic multinodular, toxic adenoma.
- Neoplastic: benign (follicular adenoma) and malignant.
- Inflammatory: autoimmune (Hashimoto's), granulomatous (de Quervain's), fibrosing (Riedel's), infective.
- Others: amyloid, dyshormonogenesis.

Q16. How does iodine deficiency cause a goitre?

BDS + MBBS
★☆☆

Low iodine leads to low thyroxine production. The pituitary secretes more TSH, which causes diffuse hyperplasia of the gland. With fluctuating stimulation, some areas become nodular and others involute, producing a multinodular goitre.

Q17. Classify thyroid cancer and give the relative frequency.

BDS + MBBS
★☆☆

- Differentiated: papillary (about 75–80%) and follicular (about 10%).
- Medullary carcinoma from parafollicular C cells (about 5%).
- Anaplastic carcinoma (under 5%).
- Lymphoma (uncommon, often on background of Hashimoto's).

Q18. What are the histological features of papillary carcinoma? How does it spread?

MBBS
★★☆

Papillae with Orphan Annie eye nuclei (ground-glass), nuclear grooves and psammoma bodies. It spreads mainly by lymphatics to cervical nodes; blood spread is late. Follicular carcinoma spreads by blood to lung and bone.

Q19. What is special about medullary carcinoma?

MBBS
★★★

It arises from parafollicular C cells and secretes calcitonin and CEA, which are used as tumour markers. About 25% are familial (MEN 2A, MEN 2B or familial medullary carcinoma) due to RET proto-oncogene mutation. Carriers are offered prophylactic total thyroidectomy. Phaeochromocytoma must be excluded before surgery.

Differential Diagnosis

Q20. What is the differential diagnosis of a solitary thyroid nodule?

BDS + MBBS
★☆☆

A dominant nodule in a multinodular goitre (the commonest), follicular adenoma, thyroid cyst, carcinoma, and focal thyroiditis.

Q21. Give the differential diagnosis of a midline neck swelling.

BDS + MBBS
★☆☆

Thyroglossal cyst, swelling of the thyroid isthmus, sublingual dermoid, subhyoid bursa, enlarged submental or prelaryngeal lymph node, and lipoma.

Q22. How will you differentiate primary (Graves') from secondary (toxic nodular) thyrotoxicosis?

BDS + MBBS
★★☆

Graves' disease affects younger patients with a diffuse smooth goitre, eye signs and sometimes pretibial myxoedema. Toxic multinodular goitre affects older patients with a long-standing nodular goitre; cardiac features such as atrial fibrillation dominate and eye signs are absent.

Q23. Which features of a nodule increase the risk of malignancy?

BDS + MBBS
★★☆

Male sex, age under 20 or over 60, history of neck irradiation, family history, hard or fixed nodule, rapid growth, vocal cord palsy and cervical lymphadenopathy.

Investigations

Q24. What investigations will you do for a thyroid swelling?

BDS + MBBS
★☆☆

Thyroid function tests (TSH, free T4 and T3), ultrasound of the neck, and ultrasound-guided FNAC of suspicious nodules. Further tests depend on the findings: isotope scan, CT, antibodies, and laryngoscopy before surgery.

Q25. What ultrasound features suggest malignancy in a thyroid nodule?

BDS + MBBS
★★☆

Hypoechoic solid nodule, microcalcification, irregular margins, taller-than-wide shape, increased central vascularity, and abnormal cervical lymph nodes. These are scored using systems such as TIRADS.

Q26. What is the Bethesda system of reporting thyroid cytology?

MBBS
★★★

- I: non-diagnostic, repeat FNAC.
- II: benign, observe.
- III: atypia of undetermined significance, repeat or molecular testing.
- IV: follicular neoplasm, diagnostic lobectomy.
- V: suspicious for malignancy and VI: malignant, surgery.

Q27. Why can FNAC not differentiate a follicular adenoma from a follicular carcinoma?

BDS + MBBS
★★☆

Both look similar on cytology. Carcinoma is diagnosed only by capsular or vascular invasion, which needs histology of the whole nodule. Hence a follicular neoplasm is treated with diagnostic hemithyroidectomy.

Q28. What is the role of a radioisotope scan?

BDS + MBBS
★★☆

It is used mainly when TSH is suppressed, to tell a hot (hyperfunctioning) nodule from a cold one and to distinguish Graves' (diffuse uptake) from toxic nodular goitre. A hot nodule is rarely malignant; a cold nodule needs FNAC.

Q29. When is CT scan indicated and what precaution is needed?

MBBS
★★★

For retrosternal goitre, tracheal compression or deviation, and staging of a large or fixed malignant tumour. Iodinated contrast should be avoided where radioiodine therapy is planned, as it blocks uptake for weeks.

Q30. Why is laryngoscopy done before thyroidectomy?

BDS + MBBS
★★☆

To document vocal cord movement before surgery. A pre-existing silent palsy may be present, which suggests malignancy and is important both for surgical planning and medicolegally.

Management

Q31. What are the indications for surgery in a multinodular goitre?

BDS + MBBS
★☆☆

Pressure symptoms, retrosternal extension, cosmetic reasons, suspicion of malignancy, and toxicity not controlled by other means.

Q32. How will you prepare a thyrotoxic patient for thyroidectomy?

BDS + MBBS
★★☆

The patient must be made euthyroid with an antithyroid drug such as carbimazole. A beta-blocker (propranolol) controls the cardiac effects. Some surgeons add Lugol's iodine for 10 days before surgery to reduce vascularity. Operating on a toxic patient risks thyroid storm.

Q33. What are the treatment options for Graves' disease?

BDS + MBBS
★★☆

- Antithyroid drugs for 12–18 months: first line, but relapse is common.
- Radioiodine: for older patients and relapse; avoided in pregnancy and active eye disease.
- Total thyroidectomy: large goitre, eye disease, pregnancy failing drugs, patient preference, suspicion of malignancy.

Q34. Name the types of thyroidectomy.

BDS + MBBS
★☆☆

Hemithyroidectomy (lobectomy with isthmusectomy), subtotal thyroidectomy, near-total thyroidectomy, total thyroidectomy, and Dunhill's operation (total lobectomy on one side, subtotal on the other).

Q35. How will you manage a papillary carcinoma of the thyroid?

MBBS
★★★

- Small low-risk tumours may be treated by lobectomy.
- Total thyroidectomy for larger tumours, extrathyroidal spread, nodal or distant metastases.
- Neck dissection (central and/or lateral compartment) for involved nodes.
- Radioiodine ablation in higher-risk patients.
- Thyroxine to suppress TSH; follow-up with serum thyroglobulin and ultrasound.

Q36. How is a retrosternal goitre removed?

MBBS
★★☆

Most can be delivered through a standard cervical collar incision because the blood supply comes from the neck. Sternotomy is needed only rarely, for very large or recurrent goitres or malignancy.

Q37. What follow-up is needed after total thyroidectomy?

BDS + MBBS
★☆☆

Lifelong levothyroxine (about 1.6 micrograms/kg/day), serum calcium in the early postoperative period, TSH check after about 6 weeks with dose adjustment, and voice assessment.

Q38. What important side-effect of carbimazole should the patient be warned about?

BDS + MBBS
★★☆

Agranulocytosis. The patient must stop the drug and get an urgent blood count if a sore throat, mouth ulcer or fever develops.

Complications

Q39. List the complications of thyroidectomy.

BDS + MBBS
★☆☆

- Immediate: reactionary haemorrhage, airway obstruction, recurrent laryngeal nerve palsy, thyroid storm.
- Early: hypocalcaemia, wound infection, seroma.
- Late: hypothyroidism, recurrent goitre, hypertrophic or keloid scar.

Q40. How will you manage reactionary haemorrhage after thyroidectomy?

BDS + MBBS
★★★

It is a life-threatening emergency because the haematoma compresses the airway. Open the skin and strap muscle sutures at the bedside immediately to release the clot, then take the patient to theatre to secure the bleeding vessel. Clip removers or scissors must be kept at the bedside.

Q41. What happens in unilateral and bilateral recurrent laryngeal nerve palsy?

BDS + MBBS
★★☆

Unilateral palsy causes a hoarse, weak voice and ineffective cough. Bilateral palsy leaves both cords near the midline, producing stridor and airway obstruction that needs reintubation or tracheostomy.

Q42. What are the features and treatment of post-thyroidectomy hypocalcaemia?

BDS + MBBS
★★☆

Perioral and fingertip tingling, muscle cramps, positive Chvostek's and Trousseau's signs, and tetany. Severe cases are treated with 10 ml of 10% calcium gluconate IV slowly; mild cases with oral calcium and vitamin D (alfacalcidol).

Q43. What is thyroid storm and how is it treated?

MBBS
★★★

An acute exacerbation of thyrotoxicosis, usually from operating on an inadequately prepared patient. It causes hyperpyrexia, tachycardia, arrhythmia, agitation and cardiac failure. Treatment: oxygen, cooling, IV fluids, beta-blocker, carbimazole or propylthiouracil, Lugol's iodine, hydrocortisone, and intensive care.

Q44. What happens if the external branch of the superior laryngeal nerve is injured?

BDS + MBBS
★★☆

The cricothyroid muscle is paralysed, so the voice becomes weak and tires easily and high-pitched notes are lost. It matters most in singers and public speakers.

Recent Advances

Q45. What is thermal ablation of benign thyroid nodules?

BDS + MBBS
★★☆

Radiofrequency or microwave ablation under ultrasound guidance shrinks symptomatic benign solid nodules (confirmed by two benign FNACs) without surgery or a scar, preserving thyroid function. Ethanol ablation is preferred for mainly cystic nodules.

Q46. What is active surveillance for papillary microcarcinoma?

BDS + MBBS
★★★

Low-risk papillary carcinomas under 1 cm, without nodes, extrathyroidal extension or high-risk location, may be followed with periodic ultrasound instead of immediate surgery. Most do not progress, and those that grow can still be operated on safely.

Q47. How does molecular testing help indeterminate nodules?

BDS + MBBS
★★★

Gene panels on FNAC material (e.g. BRAF, RAS, TERT, fusion genes) for Bethesda III and IV nodules estimate the risk of malignancy, allowing many patients with low-risk results to avoid diagnostic surgery.

Q48. What technologies reduce nerve and parathyroid injury during thyroidectomy?

BDS + MBBS
★★☆

Intraoperative nerve monitoring (intermittent or continuous) of the recurrent laryngeal nerve, and near-infrared autofluorescence imaging, which makes parathyroid glands glow, with indocyanine green angiography to assess their blood supply.

Q49. What are the newer treatments for advanced thyroid cancer?

BDS + MBBS
★★★

Tyrosine kinase inhibitors such as lenvatinib and sorafenib for radioiodine-refractory differentiated cancer, selective RET inhibitors (selpercatinib, pralsetinib) for RET-altered medullary cancer, and BRAF/MEK inhibitors for BRAF-mutated anaplastic cancer. Remote-access approaches such as transoral (TOETVA) thyroidectomy avoid a neck scar in selected patients.

Examiner's Favourite (Hard Questions)

Q50. What is a "lateral aberrant thyroid"?

MBBS
★★★

Thyroid tissue found in a lateral cervical lymph node. It is almost always a metastasis from papillary carcinoma, not true ectopic thyroid.

Q51. Why is thyroxine given in a TSH-suppressive dose after surgery for differentiated carcinoma?

MBBS
★★★

> Differentiated thyroid cancer cells express TSH receptors, and TSH stimulates their growth. Suppressing TSH reduces the risk of recurrence in higher-risk patients.

Q52. Can a thyroid swelling fail to move with swallowing?

BDS + MBBS
★★★

> Yes: when fixed by infiltrating carcinoma, in Riedel's thyroiditis, or when a very large or retrosternal goitre is held at the thoracic inlet.

Q53. What is the significance of serum thyroglobulin after total thyroidectomy?

MBBS
★★★

> After total thyroidectomy and ablation there should be no thyroglobulin-producing tissue, so a rising level indicates recurrent or metastatic differentiated carcinoma. Anti-thyroglobulin antibodies must be checked, as they make the assay unreliable.

Quick Recall

- ✓ Moves with swallowing = attached to larynx by pretracheal fascia and Berry's ligament.
- ✓ Investigations: TFTs → ultrasound → FNAC (Bethesda). Isotope scan if TSH suppressed.
- ✓ Papillary: commonest, lymphatic spread, best prognosis. Follicular: blood spread, needs histology.
- ✓ Medullary: C cells, calcitonin, RET, MEN 2. Exclude phaeochromocytoma first.
- ✓ Never operate on a toxic patient: carbimazole + propranolol until euthyroid.
- ✓ Neck haematoma: open the wound at the bedside first, theatre second.
- ✓ Bilateral RLN palsy = stridor. Hypocalcaemia = tingling, Chvostek, Trousseau, IV calcium gluconate.

CHAPTER

2

PART A: LONG CASES

Carcinoma Breast

Breast lump, triple assessment and management of breast cancer

Sample Case Presentation

Mrs. B, a 52-year-old postmenopausal woman, presents with a painless lump in the right breast for 5 months, gradually increasing in size. She noticed retraction of the nipple 1 month ago. Her menarche was at 11 years and menopause at 50; she has two children and breastfed both. Her mother had breast cancer. On examination there is a 4 × 3 cm hard, irregular, non-tender lump in the upper outer quadrant, tethered to the skin but not fixed to the pectoralis major. Two mobile, firm lymph nodes are palpable in the right axilla. There is no hepatomegaly or bony tenderness. My provisional diagnosis is carcinoma of the right breast, clinically T2 N1 M0.

History and Clinical Examination

Q1. What will you ask in the history of a patient with a breast lump?

BDS + MBBS
★☆☆

- Age, duration, rate of growth, pain, nipple discharge or retraction, skin changes.
- Menstrual and reproductive history: menarche, menopause, parity, age at first full-term pregnancy, breastfeeding, OCP or HRT use.
- Family history of breast or ovarian cancer; previous breast disease or biopsy.
- Symptoms of metastasis: bone pain, cough, breathlessness, jaundice, headache.

Q2. How will you examine the breast?

BDS + MBBS
★☆☆

With a female chaperone and consent. Inspect with the patient sitting, arms by the side, arms raised, and hands pressed on the hips. Palpate lying down with the arm behind the head, quadrant by quadrant with the flat of the hand, including the nipple and axillary tail. Then examine both axillae, the supraclavicular fossae and the opposite breast.

Q3. What is peau d'orange?

BDS + MBBS
★☆☆

Orange-peel appearance of the skin due to lymphatic obstruction causing dermal oedema. The skin is held down at the hair follicles and sweat ducts, which appear as pits.

Q4. How will you differentiate tethering from fixity?

MBBS
★★☆

Tethering is attachment of the lump to the skin through Cooper's ligaments, producing dimpling while the skin can still be moved partly. Fixity to the pectoralis major is tested by asking the patient to press her hands on her hips: the lump's mobility is reduced when the muscle contracts. Fixity to the chest wall (ribs, intercostals, serratus) means the lump does not move even with the muscle relaxed.

Q5. What are the causes of nipple retraction?

BDS + MBBS
★★☆

> Carcinoma (recent, unilateral, nipple pulled to one side), duct ectasia (slit-like retraction), congenital, fat necrosis, and previous surgery or abscess.

Q6. Name the groups of axillary lymph nodes and how to examine them.

BDS + MBBS
★☆☆

> Anterior (pectoral), posterior (subscapular), lateral (humeral), central and apical groups. The right axilla is examined with the left hand and vice versa, with the patient's arm supported and relaxed.

Q7. What are the causes of nipple discharge?

BDS + MBBS
★★☆

> Bloody: duct papilloma (commonest), carcinoma, duct ectasia. Green or multicoloured: duct ectasia, fibrocystic disease. Milky: lactation, galactorrhoea (prolactinoma, drugs). Purulent: infection.

Q8. Why will you examine the chest, abdomen and spine in a breast cancer patient?

MBBS
★☆☆

> To look for metastases: pleural effusion and lung secondaries, hepatomegaly and ascites, and spinal tenderness from bone secondaries. This determines the stage and treatment.

Surgical Anatomy

Q9. Describe the extent and position of the breast.

BDS + MBBS
★☆☆

> It extends from the 2nd to 6th rib vertically and from the sternal edge to the mid-axillary line. The axillary tail (of Spence) passes into the axilla. It lies on the pectoralis major, serratus anterior and external oblique.

Q10. Describe the lymphatic drainage of the breast and the levels of axillary nodes.

BDS + MBBS
★★☆

> About 75% drains to the axillary nodes, the rest to internal mammary and supraclavicular nodes. Axillary levels are defined by the pectoralis minor: level I lateral to it, level II behind it, and level III medial to it (apical).

Q11. What are Cooper's ligaments?

BDS + MBBS
★☆☆

> Fibrous suspensory ligaments running from the deep fascia to the skin. When infiltrated by cancer they shorten and pull the skin in, causing dimpling.

Q12. Which nerves are at risk during axillary surgery and what is the effect of injury?

MBBS
★★☆

- Long thoracic nerve: winging of the scapula (serratus anterior).
- Thoracodorsal nerve: weakness of latissimus dorsi.
- Intercostobrachial nerve: numbness of the inner upper arm.
- Medial and lateral pectoral nerves: atrophy of the pectoral muscles.

Q13. Describe the blood supply of the breast.

MBBS
★★☆

> Perforating branches of the internal thoracic artery, the lateral thoracic and thoracoacromial branches of the axillary artery, and the lateral branches of the posterior intercostal arteries.

Q14. What are Rotter's nodes?

MBBS
★★★

Interpectoral lymph nodes lying between the pectoralis major and minor. They may be involved in breast cancer and are removed during a radical dissection.

Pathology and Classification

Q15. What are the risk factors for breast cancer?

BDS + MBBS
★☆☆

Female sex, increasing age, early menarche, late menopause, nulliparity, late first pregnancy, not breastfeeding, HRT, obesity after menopause, alcohol, previous breast cancer or atypical hyperplasia, chest irradiation, family history and BRCA1/2 mutation.

Q16. Classify breast carcinoma.

BDS + MBBS
★☆☆

- Non-invasive: ductal carcinoma in situ (DCIS) and lobular in situ neoplasia (LCIS).
- Invasive: invasive ductal carcinoma of no special type (about 75%), invasive lobular, and special types (tubular, mucinous, medullary, papillary).
- Special clinical forms: inflammatory carcinoma and Paget's disease of the nipple.

Q17. What are the molecular subtypes of breast cancer?

MBBS
★★☆

Luminal A (ER positive, HER2 negative, low Ki-67; best prognosis), luminal B (ER positive, higher Ki-67 or HER2 positive), HER2-enriched, and triple-negative/basal-like (worst prognosis).

Q18. Give the T staging of breast cancer.

MBBS
★★☆

T1: up to 2 cm. T2: more than 2 cm up to 5 cm. T3: more than 5 cm. T4: any size with extension to the chest wall (4a), skin ulceration, nodules or peau d'orange (4b), both (4c), or inflammatory carcinoma (4d).

Q19. What is Paget's disease of the nipple? How does it differ from eczema?

BDS + MBBS
★★☆

An eczema-like change of the nipple caused by malignant cells from an underlying DCIS or invasive cancer. Paget's starts on the nipple and spreads to the areola, is usually unilateral and destroys the nipple. Eczema starts on the areola, is often bilateral and itchy, and spares the nipple.

Differential Diagnosis

Q20. What is the differential diagnosis of a breast lump?

BDS + MBBS
★☆☆

Fibroadenoma (15–25 years), fibrocystic change and cyst (35–50 years), carcinoma (over 40 years), fat necrosis (history of trauma), breast abscess, phyllodes tumour, and lipoma.

Q21. What are the clinical features of a fibroadenoma?

BDS + MBBS
★☆☆

A young woman with a smooth, firm, rubbery, well-defined, highly mobile lump ("breast mouse") with no skin involvement or nodes.

Q22. How will you differentiate a phyllodes tumour from a fibroadenoma?

MBBS
★★☆

> Phyllodes tumours occur in older women (around 40), grow rapidly to a large size, stretch the overlying skin with dilated veins, and show a leaf-like stromal pattern on histology. They are treated by wide local excision with a clear margin because they tend to recur.

Q23. How will you differentiate inflammatory carcinoma from a breast abscess?

MBBS
★★☆

> Inflammatory carcinoma occurs in non-lactating women, involves more than a third of the breast with diffuse redness and peau d'orange, is not very tender, has no fluctuation and does not respond to antibiotics. Biopsy confirms the diagnosis.

Investigations

Q24. What is triple assessment?

BDS + MBBS
★☆☆

> Clinical examination, imaging (mammography and/or ultrasound) and tissue diagnosis (core needle biopsy). Each is scored, and any suspicious result needs further work-up.

Q25. What are the mammographic features of carcinoma? Why is ultrasound preferred under 35?

BDS + MBBS
★★☆

> Spiculated mass, clustered microcalcification and architectural distortion. Young breasts are dense, so mammography is less sensitive and ultrasound is the first imaging under 35 years.

Q26. Why is core needle biopsy preferred over FNAC?

MBBS
★★☆

> It gives histology, distinguishes invasive from in-situ cancer, and allows grading and receptor studies (ER, PR, HER2), all of which guide treatment.

Q27. What receptor studies are done and why?

MBBS
★★☆

> Oestrogen and progesterone receptors and HER2 status (immunohistochemistry, with FISH for equivocal HER2), plus Ki-67. They predict response to hormonal therapy and anti-HER2 therapy, and indicate prognosis.

Q28. When will you do staging investigations?

MBBS
★★☆

> In locally advanced cancer, clinically positive nodes, or symptoms suggesting metastasis: CT of chest, abdomen and pelvis, bone scan, LFTs and calcium. PET-CT is used in selected cases. Routine staging is not needed in small, node-negative tumours.

Q29. What is sentinel lymph node biopsy?

MBBS
★★★

> The sentinel node is the first node to receive lymph from the tumour. It is identified with radioisotope and/or blue dye and removed for histology. If negative, axillary clearance is avoided. It is used in clinically node-negative patients.

Q30. What is the BI-RADS classification?

MBBS
★★★

A system for reporting breast imaging: 0 incomplete, 1 negative, 2 benign, 3 probably benign (short-interval follow-up), 4 suspicious (biopsy), 5 highly suggestive of malignancy, 6 biopsy-proven malignancy.

Management

Q31. What is breast-conserving surgery and what are its contraindications?

BDS + MBBS
★★☆

Wide local excision of the tumour with a clear margin followed by radiotherapy to the breast. Contraindications: multicentric disease, large tumour relative to breast size, diffuse microcalcification, previous chest radiotherapy, persistently positive margins, and patient preference.

Q32. Name the types of mastectomy.

BDS + MBBS
★☆☆

Simple (total) mastectomy, modified radical mastectomy (Patey: pectoralis minor removed; Auchincloss: both pectorals preserved), radical mastectomy (Halsted, now obsolete), skin-sparing and nipple-sparing mastectomy.

Q33. How will you manage the axilla?

MBBS
★★☆

Clinically node-negative: sentinel lymph node biopsy. Proven node-positive: axillary lymph node clearance, or axillary radiotherapy in selected patients with limited sentinel node disease.

Q34. What hormonal treatment is used and what are its side effects?

MBBS
★★☆

Tamoxifen in premenopausal women, aromatase inhibitors (anastrozole, letrozole) in postmenopausal women, for 5–10 years in ER-positive disease. Tamoxifen increases risk of endometrial cancer and thromboembolism; aromatase inhibitors cause osteoporosis and joint pains.

Q35. What is the role of trastuzumab?

MBBS
★★☆

It is a monoclonal antibody against HER2, used in HER2-positive cancer with chemotherapy. Its main side effect is cardiotoxicity, so cardiac function is monitored with echocardiography.

Q36. What are the indications for neoadjuvant chemotherapy?

MBBS
★★☆

Locally advanced and inflammatory cancer, downsizing a tumour to allow breast-conserving surgery, and HER2-positive or triple-negative cancers where response guides further treatment.

Q37. What are the indications for radiotherapy after mastectomy?

MBBS
★★☆

Large tumours (T3, T4), four or more positive nodes (and often one to three), positive margins, and inflammatory carcinoma.

Q38. What options are available for breast reconstruction?

MBBS
★☆☆

Implant or tissue expander, latissimus dorsi myocutaneous flap, and abdominal flaps (pedicled TRAM or free DIEP flap). Reconstruction can be immediate or delayed.

Complications

Q39. What are the complications of modified radical mastectomy?

BDS + MBBS
★☆☆

Seroma (commonest), haematoma, wound infection, flap necrosis, lymphoedema of the arm, nerve injuries, shoulder stiffness, phantom breast and psychological effects.

Q40. How will you prevent and manage lymphoedema of the arm?

BDS + MBBS
★★☆

Avoid unnecessary axillary clearance (use sentinel node biopsy). Advise the patient to avoid injections, cannulas and BP measurement on that arm and to protect it from injury. Management: limb elevation, exercise, compression garments, manual lymphatic drainage and prompt antibiotics for cellulitis.

Q41. How is a seroma after mastectomy managed?

MBBS
★☆☆

By repeated aseptic needle aspiration. Drains and flap fixation sutures reduce its incidence.

Q42. What is winging of the scapula after axillary surgery?

MBBS
★★☆

Injury to the long thoracic nerve of Bell paralyses the serratus anterior, so the medial border of the scapula lifts off the chest wall when the patient pushes against a wall.

Q43. What is Stewart–Treves syndrome?

MBBS
★★★

Lymphangiosarcoma arising in a chronically lymphoedematous arm after mastectomy and axillary clearance, usually years later. It has a poor prognosis.

Recent Advances

Q44. How have the Z0011 and AMAROS trials changed axillary surgery?

MBBS
★★★

Z0011 showed that women with one or two positive sentinel nodes treated by breast-conserving surgery and whole-breast radiotherapy do not benefit from axillary clearance. AMAROS showed that axillary radiotherapy controls the axilla as well as clearance with less lymphoedema.

Q45. What is the role of genomic assays such as Oncotype DX?

MBBS
★★★

In ER-positive, HER2-negative early breast cancer, a multigene recurrence score predicts the benefit of chemotherapy. Many women with a low or intermediate score can safely avoid chemotherapy (TAILORx).

Q46. What are CDK4/6 inhibitors?

MBBS
★★★

Oral drugs (palbociclib, ribociclib, abemaciclib) that block cell-cycle progression. Combined with endocrine therapy, they improve survival in hormone receptor-positive advanced breast cancer, and abemaciclib or ribociclib are used as adjuvant therapy in high-risk early disease.

Q47. What newer systemic therapies are used in triple-negative and BRCA-associated cancer?

MBBS ★★★

Pembrolizumab added to neoadjuvant chemotherapy improves response and survival in early triple-negative cancer (KEYNOTE-522). PARP inhibitors such as olaparib benefit BRCA mutation carriers, and antibody–drug conjugates (trastuzumab deruxtecan, sacituzumab govitecan) are used in advanced disease.

Q48. What is hypofractionated radiotherapy for breast cancer?

MBBS ★★☆

Giving whole-breast radiotherapy in fewer, larger fractions, such as 26 Gy in 5 fractions over one week (FAST-Forward), with similar control and side effects to longer courses, saving patient time and cost.

Examiner's Favourite (Hard Questions)

Q49. What is the Nottingham Prognostic Index?

MBBS ★★★

NPI = 0.2 × tumour size (cm) + histological grade (1–3) + lymph node stage (1–3). A lower score indicates a better prognosis.

Q50. What are the features of male breast cancer?

MBBS ★★★

It is rare and associated with BRCA2, Klinefelter's syndrome and high oestrogen states. It presents as a hard subareolar lump with early nipple and skin involvement. Most are ER positive. Treatment is mastectomy with axillary staging and tamoxifen.

Q51. How will you manage breast cancer in pregnancy?

MBBS ★★★

Diagnosis by ultrasound and core biopsy. Mastectomy can be done in any trimester. Chemotherapy is safe in the second and third trimesters. Radiotherapy, tamoxifen and trastuzumab are deferred until after delivery.

Q52. Why does triple-negative breast cancer have a poor prognosis?

MBBS ★★★

It does not respond to hormonal or anti-HER2 therapy, tends to be high grade, affects younger women and BRCA1 carriers, and recurs early, with chemotherapy as the main systemic option.

Quick Recall

- ✓ Triple assessment: clinical + imaging + core biopsy.
- ✓ Ultrasound under 35; mammography over 35.
- ✓ Axillary levels are defined by pectoralis minor (I lateral, II behind, III medial).
- ✓ Peau d'orange = lymphatic obstruction. Dimpling = Cooper's ligaments.
- ✓ Clinically N0: sentinel node biopsy. Node positive: axillary clearance.
- ✓ ER positive: tamoxifen (premenopausal), aromatase inhibitor (postmenopausal). HER2: trastuzumab.
- ✓ Commonest complication of MRM: seroma. Long thoracic nerve injury: winged scapula.

CHAPTER

3

PART A: LONG CASES

Obstructive Jaundice

Choledocholithiasis, carcinoma head of pancreas and periampullary tumours

Sample Case Presentation

Mr. C, a 60-year-old retired clerk, presents with yellow discolouration of the eyes for 6 weeks, progressively deepening, with itching all over the body, dark urine and pale stools. He has lost about 8 kg in weight and has poor appetite. There is no history of abdominal pain, fever or previous biliary colic. On examination he is deeply jaundiced with scratch marks on the skin. A smooth, non-tender, globular swelling is palpable below the right costal margin, moving with respiration, consistent with a distended gallbladder. There is no ascites and no supraclavicular lymph node. My provisional diagnosis is obstructive jaundice due to carcinoma of the head of the pancreas, with periampullary carcinoma as the main differential.

History and Clinical Examination

Q1. What will you ask in the history of a jaundiced patient?

MBBS ★☆☆

- Onset, duration and progression; painless or painful; continuous or fluctuating.
- Pruritus, dark urine, pale (clay-coloured) stools.
- Fever with rigors (cholangitis), weight loss and anorexia (malignancy).
- Previous biliary colic, cholecystectomy or biliary surgery.
- Alcohol, drugs, blood transfusion, injections, contact with hepatitis, travel.

Q2. What is Charcot's triad? What is Reynolds' pentad?

MBBS ★☆☆

Charcot's triad of acute cholangitis: fever with rigors, jaundice and right upper quadrant pain. Reynolds' pentad adds hypotension and mental confusion, indicating suppurative cholangitis with septic shock.

Q3. State Courvoisier's law and its exceptions.

MBBS ★★☆

In the presence of jaundice, a palpable gallbladder is unlikely to be due to stones; it suggests malignant obstruction such as carcinoma of the head of the pancreas. Stones cause chronic inflammation, so the gallbladder becomes fibrosed and cannot distend. Exceptions include double impaction (stones in both the cystic duct and the CBD) and a pancreatic calculus obstructing the ampulla.

Q4. Why does the patient have pruritus, dark urine and pale stools?

MBBS ★☆☆

Retained bile salts deposit in the skin and cause itching. Conjugated bilirubin is water soluble and is excreted in urine, making it dark. No bile reaches the gut, so stercobilin is absent and the stools become pale.

Q5. What will you look for on general and abdominal examination?

MBBS ★☆☆

Depth of jaundice, scratch marks, pallor, cachexia, left supraclavicular node (Virchow's), signs of chronic liver disease, hepatomegaly, palpable gallbladder, epigastric mass, ascites, and a rectal shelf (Blumer's) on digital rectal examination.

Q6. What is the significance of a Sister Mary Joseph nodule?

MBBS ★★☆

A metastatic nodule at the umbilicus, from spread of intra-abdominal malignancy (stomach, pancreas, ovary, colon) along the ligamentum teres or lymphatics. It indicates advanced, usually incurable disease.

Q7. Why does the skin look greenish in long-standing obstructive jaundice?

MBBS ★★☆

Prolonged retention leads to oxidation of bilirubin to biliverdin in the tissues, giving a greenish tinge.

Q8. What features suggest stones rather than malignancy as the cause?

MBBS ★★☆

Stones: younger patient, often female, biliary colic, fluctuating jaundice, fever with rigors, impalpable gallbladder. Malignancy: older patient, painless progressive jaundice, weight loss, palpable gallbladder.

Surgical Anatomy

Q9. What are the boundaries and contents of Calot's triangle?

MBBS ★☆☆

Bounded by the cystic duct, the common hepatic duct and the inferior surface of the liver. It contains the cystic artery and the cystic lymph node (of Lund), and often the right hepatic artery.

Q10. Describe the parts of the common bile duct.

MBBS ★☆☆

About 7.5 cm long, formed by the union of the cystic and common hepatic ducts. Parts: supraduodenal, retroduodenal, pancreatic (in a groove on the head of the pancreas), and intraduodenal, where it joins the pancreatic duct at the ampulla of Vater, surrounded by the sphincter of Oddi.

Q11. What is the normal diameter of the CBD on ultrasound?

MBBS ★★☆

Up to about 6 mm; it may be slightly larger in the elderly and after cholecystectomy. A wider duct suggests obstruction.

Q12. Describe the blood supply of the CBD and its surgical importance.

MBBS ★★★

Mainly by small axial arteries running at the 3 and 9 o'clock positions, arising from the retroduodenal and right hepatic arteries. Excessive dissection around the duct damages them and can cause an ischaemic stricture.

Q13. What is Hartmann's pouch?

MBBS ★★☆

A dilatation at the neck of the gallbladder where stones commonly lodge. It may become adherent to the common hepatic duct.

Q14. What anatomical variations are dangerous during cholecystectomy?

MBBS ★★★

A tortuous right hepatic artery looping into Calot's triangle (caterpillar or Moynihan's hump), an accessory or aberrant right hepatic duct, a short or absent cystic duct, and a low insertion of the cystic duct running parallel to the CBD.

Pathology and Classification

Q15. Classify the causes of obstructive jaundice.

MBBS ★☆☆

- In the lumen: CBD stones, worms (ascaris), blood clot.
- In the wall: benign stricture, cholangiocarcinoma, primary sclerosing cholangitis, choledochal cyst.
- Outside the wall: carcinoma head of pancreas, periampullary carcinoma, chronic pancreatitis, nodes at the porta hepatis, Mirizzi syndrome.

Q16. Briefly describe bilirubin metabolism.

MBBS ★☆☆

Haem from red cells is converted to unconjugated bilirubin, which is carried bound to albumin to the liver and conjugated with glucuronic acid. Conjugated bilirubin passes in bile to the gut, where bacteria convert it to urobilinogen; part is excreted in stool as stercobilin and part reabsorbed and excreted in urine.

Q17. What is Mirizzi syndrome?

MBBS ★★☆

Obstruction of the common hepatic duct by a stone impacted in Hartmann's pouch or the cystic duct, causing external compression and inflammation; in later stages a cholecystobiliary fistula forms.

Q18. What are periampullary tumours? Why is their prognosis better than pancreatic cancer?

MBBS ★★☆

Tumours arising within 1 cm of the ampulla: from the ampulla itself, the distal CBD, the duodenum, or the head of pancreas. Ampullary, duodenal and distal bile duct tumours obstruct the duct early, present with jaundice while small and are more often resectable.

Q19. Why is a jaundiced patient a high surgical risk?

MBBS ★★☆

Coagulopathy from vitamin K malabsorption, renal failure (hepatorenal syndrome from endotoxaemia), sepsis and cholangitis, poor wound healing, and malnutrition.

Differential Diagnosis

Q20. How will you differentiate pre-hepatic, hepatic and post-hepatic jaundice?

MBBS ★☆☆

Pre-hepatic (haemolytic): unconjugated bilirubin, normal coloured stool, urobilinogen in urine, no bilirubin in urine. Hepatic: raised transaminases, mixed bilirubin. Post-hepatic (obstructive): conjugated bilirubin, markedly raised ALP and GGT, bilirubin in urine, pale stools.

Q21. What are the causes of fluctuating (intermittent) jaundice?

MBBS ★★☆

CBD stone acting as a ball valve, periampullary carcinoma (the tumour sloughs and the obstruction is temporarily relieved), and choledochal cyst.

Q22. What is the differential diagnosis of a palpable gallbladder?

MBBS ★★☆

> Mucocele (stone in the cystic duct, without jaundice), empyema, carcinoma of the gallbladder, and a distended gallbladder due to malignant distal CBD obstruction (Courvoisier).

Q23. Give the differential diagnosis of painless progressive jaundice in an elderly patient.

MBBS ★☆☆

> Carcinoma head of pancreas, periampullary carcinoma, cholangiocarcinoma, carcinoma gallbladder infiltrating the ducts, and metastatic nodes at the porta hepatis.

Investigations

Q24. What blood investigations will you do?

MBBS ★☆☆

> Liver function tests (raised conjugated bilirubin, ALP and GGT, mildly raised transaminases), prothrombin time/INR, full blood count, urea, creatinine and electrolytes, blood glucose, hepatitis B and C screening, and blood cultures if febrile.

Q25. What is the first imaging investigation and what will it show?

MBBS ★☆☆

> Ultrasound abdomen: dilated intra- and extrahepatic ducts confirm obstruction and show the level, stones in the gallbladder or CBD, a pancreatic mass, and liver metastases.

Q26. Compare MRCP and ERCP.

MBBS ★★☆

> MRCP is non-invasive and gives excellent images of the biliary tree with no risk of pancreatitis; it is diagnostic only. ERCP is invasive but therapeutic: it allows sphincterotomy, stone extraction, stenting, brush cytology and biopsy.

Q27. What is the role of CT scan in a suspected pancreatic head tumour?

MBBS ★★☆

> Contrast-enhanced triphasic (pancreatic protocol) CT is the key staging test. It shows the tumour, its relation to the superior mesenteric vessels and portal vein, nodal spread and liver metastases, and so decides resectability.

Q28. What is the role of endoscopic ultrasound?

MBBS ★★☆

> It detects small tumours not seen on CT, assesses vascular invasion, and allows fine-needle aspiration or biopsy. It also detects small CBD stones.

Q29. Why is CA 19-9 not reliable for diagnosing pancreatic cancer in a jaundiced patient?

MBBS ★★★

> It is falsely raised in benign biliary obstruction and cholangitis, and is not produced by people who are Lewis antigen negative. It is more useful for prognosis and follow-up after the jaundice is relieved.

Q30. What are the complications of ERCP?

MBBS ★★☆

> Acute pancreatitis (commonest), bleeding after sphincterotomy, duodenal or bile duct perforation, and cholangitis.

Management

Q31. How will you prepare a jaundiced patient for surgery?

MBBS ★★☆

- Correct coagulopathy: vitamin K injections, fresh frozen plasma if needed.
- Adequate IV hydration and urine output monitoring to prevent hepatorenal failure; avoid nephrotoxic drugs.
- Prophylactic antibiotics, especially if the biliary tree has been instrumented.
- Correct anaemia, electrolytes and nutrition; control blood sugar.

Q32. How will you manage acute cholangitis?

MBBS ★★☆

Resuscitate with IV fluids, take blood cultures, start broad-spectrum antibiotics and correct coagulopathy. Most respond; if not, or if severe, urgent biliary drainage is needed, preferably by ERCP with sphincterotomy or stenting, otherwise percutaneous transhepatic drainage.

Q33. How will you manage CBD stones in a patient with gallstones?

MBBS ★☆☆

ERCP with sphincterotomy and stone extraction followed by laparoscopic cholecystectomy, or a single-stage laparoscopic cholecystectomy with CBD exploration in experienced hands.

Q34. What is a Whipple's operation?

MBBS ★★★

Pancreaticoduodenectomy: removal of the head of the pancreas, duodenum, distal CBD, gallbladder and (in the classic operation) the distal stomach, with regional lymph nodes. Reconstruction is by pancreaticojejunostomy, hepaticojejunostomy and gastrojejunostomy. A pylorus-preserving variant is commonly used.

Q35. When is a pancreatic head tumour considered unresectable?

MBBS ★★★

When there are distant metastases (liver, peritoneum), encasement of the superior mesenteric artery or coeliac axis, or unreconstructable involvement of the portal vein or superior mesenteric vein. Borderline tumours may be considered after neoadjuvant chemotherapy.

Q36. How will you palliate unresectable pancreatic cancer?

MBBS ★★☆

Jaundice: endoscopic self-expanding metal stent, or surgical biliary bypass (hepaticojejunostomy). Duodenal obstruction: duodenal stent or gastrojejunostomy. Pain: analgesia and coeliac plexus block. Systemic chemotherapy in fit patients.

Q37. Is routine preoperative biliary drainage indicated before Whipple's?

MBBS ★★★

No. It increases infective complications. It is reserved for cholangitis, very high bilirubin, delay before surgery, severe pruritus, and patients receiving neoadjuvant chemotherapy.

Q38. What is a T-tube and when is it removed?

MBBS ★★☆

A T-shaped latex tube placed in the CBD after open exploration to decompress the duct and allow a later cholangiogram. A T-tube cholangiogram is done before removal, usually after about 10–14 days once a mature tract has formed.

Complications

Q39. What are the complications of surgery in a jaundiced patient?

MBBS ★☆☆

Bleeding, acute renal failure, sepsis, wound dehiscence and incisional hernia, and liver failure.

Q40. What are the complications of Whipple's operation?

MBBS ★★★

Pancreatic fistula (most important), delayed gastric emptying, post-pancreatectomy haemorrhage, bile leak, intra-abdominal abscess, and later exocrine and endocrine insufficiency.

Q41. How is bile duct injury during cholecystectomy prevented?

MBBS ★★☆

By achieving the critical view of safety before clipping: Calot's triangle cleared of fat and fibrous tissue, the lower third of the gallbladder separated from the liver bed, and only two structures seen entering the gallbladder. In difficult cases, subtotal cholecystectomy is safer.

Q42. What is hepatorenal syndrome in obstructive jaundice?

MBBS ★★★

Renal failure in a jaundiced patient, mainly due to endotoxins absorbed from the gut in the absence of bile salts, causing renal vasoconstriction, worsened by hypovolaemia. Prevented by good hydration and maintaining urine output.

Q43. How will you manage a retained CBD stone seen on T-tube cholangiogram?

MBBS ★★☆

ERCP with sphincterotomy and stone extraction, or extraction through the mature T-tube tract under radiological guidance after about 6 weeks.

Recent Advances

Q44. What is EUS-guided biliary drainage?

MBBS ★★★

When ERCP fails, the bile duct is drained under endoscopic ultrasound guidance by placing a stent between the duodenum and the CBD (choledochoduodenostomy) or between the stomach and the left hepatic duct, avoiding percutaneous drainage.

Q45. What is cholangioscopy?

MBBS ★★★

Direct endoscopic visualisation of the bile ducts through the ERCP scope (single-operator cholangioscopy). It allows laser or electrohydraulic lithotripsy of large, difficult stones and targeted biopsy of indeterminate strictures.

Q46. How has the treatment of pancreatic cancer changed?

MBBS ★★★

Adjuvant modified FOLFIRINOX is now standard for fit patients after resection, and neoadjuvant chemotherapy (with or without radiotherapy) is used for borderline resectable tumours to increase the chance of a margin-negative resection.

Q47. What are lumen-apposing metal stents?

MBBS ★★☆

Short, wide, dumb-bell-shaped stents placed under EUS guidance to join two lumens, used for EUS-guided gastroenterostomy in malignant gastric outlet obstruction, drainage of pancreatic collections and gallbladder drainage in unfit patients.

Q48. What is the trend in pancreatoduodenectomy?

MBBS ★★☆

Centralisation to high-volume centres reduces mortality, and laparoscopic and robotic Whipple procedures are performed in selected centres, together with enhanced recovery programmes and risk scoring for pancreatic fistula.

Examiner's Favourite (Hard Questions)

Q49. Why is vitamin K given by injection and not orally?

MBBS ★★★

Vitamin K is fat soluble; its absorption needs bile salts, which do not reach the gut in obstructive jaundice. It is therefore given parenterally.

Q50. What is a Klatskin tumour?

MBBS ★★★

A cholangiocarcinoma at the confluence of the right and left hepatic ducts (hilar cholangiocarcinoma), classified by Bismuth–Corlette. It presents with painless jaundice and a non-palpable gallbladder.

Q51. What is a choledochal cyst and how is it treated?

MBBS ★★★

Congenital cystic dilatation of the bile ducts, classified by Todani (type I fusiform is commonest). It carries a risk of cholangiocarcinoma, so it is excised with Roux-en-Y hepaticojejunostomy rather than drained.

Q52. Which is better for palliation of jaundice: stent or surgical bypass?

MBBS ★★★

Endoscopic stenting has lower early morbidity and shorter hospital stay, so it is preferred in patients with short life expectancy. Surgical bypass gives more durable relief and is considered when unresectability is found at laparotomy in a fit patient.

Quick Recall

- ✓ Obstructive jaundice: conjugated bilirubin, high ALP and GGT, dark urine, pale stools, pruritus.
- ✓ Charcot: fever, jaundice, pain. Reynolds: + shock + confusion.
- ✓ Courvoisier: palpable gallbladder + jaundice = probably not stones.
- ✓ Ultrasound first, then MRCP (diagnostic) or ERCP (therapeutic); CT to stage pancreas.
- ✓ Prepare: vitamin K, hydration, urine output, antibiotics.
- ✓ Whipple's for resectable head of pancreas and periampullary tumours.
- ✓ Critical view of safety prevents bile duct injury.

CHAPTER

4

PART A: LONG CASES

Inguinal Hernia

Indirect and direct inguinal hernia, complicated hernia and repair

Sample Case Presentation

Mr. D, a 55-year-old labourer, presents with a swelling in the right groin for 2 years that appears on standing and straining and disappears on lying down. It has gradually increased and now reaches the scrotum. He has a chronic smoker's cough and no urinary symptoms. On examination there is a 7 × 5 cm swelling in the right inguinoscrotal region with an expansile cough impulse. It is reducible, and I cannot get above it. On reduction and occlusion of the deep ring, the swelling does not reappear on coughing. The testis is separately palpable. My provisional diagnosis is right-sided reducible indirect inguinal hernia (complete type), probably containing bowel.

History and Clinical Examination

Q1. What will you ask in the history of a groin swelling?

BDS + MBBS
★☆☆

- Duration, how it started, increase on straining, coughing or standing, and whether it reduces on lying down.
- Pain, sudden irreducibility, vomiting, constipation and abdominal distension (obstruction).
- Predisposing factors: chronic cough, constipation, prostatism, heavy lifting, previous surgery.
- Previous repair (recurrent hernia).

Q2. How will you examine a patient with an inguinal hernia?

BDS + MBBS
★☆☆

Examine standing, then lying. Inspect both groins and the scrotum, check the cough impulse, see whether you can get above the swelling, reduce it and note how, test with deep ring occlusion, palpate both testes, examine the opposite side, and examine the abdomen, chest and prostate for predisposing causes.

Q3. What is the deep ring occlusion test?

BDS + MBBS
★☆☆

After the hernia is reduced, the deep ring (1.25 cm above the mid-point of the inguinal ligament) is pressed with the thumb and the patient coughs. If the swelling does not reappear, it is an indirect hernia; if it appears medial to the thumb, it is direct.

Q4. How will you differentiate a direct from an indirect inguinal hernia clinically?

BDS + MBBS
★☆☆

Indirect: younger patient, oblique swelling, often reaches the scrotum, controlled by deep ring occlusion, reduces upward, outward and backward. Direct: older patient, globular swelling near the pubic tubercle, rarely enters the scrotum, appears medial to the occluding finger, reduces straight back on lying down.

Q5. Why can you not get above an inguinoscrotal hernia, while you can get above a hydrocele?

BDS + MBBS ★☆☆

A hernia arises from the abdomen through the inguinal canal, so it has no upper limit in the scrotum. A hydrocele is confined to the scrotum around the testis, so its upper border can be felt.

Q6. When will a cough impulse be absent in a hernia?

BDS + MBBS ★★☆

When the hernia is obstructed or strangulated, when contents are adherent to the sac (irreducible), when the neck is narrow and blocked, and in a very small hernia that is not visible.

Q7. How will you tell whether the hernia contains bowel or omentum?

BDS + MBBS ★☆☆

Enterocele: soft, elastic, resonant on percussion, gurgles on reduction, and the first part is difficult to reduce while the last part goes in easily. Omentocele: doughy, dull on percussion, and the first part reduces easily while the last part is difficult.

Q8. What are the signs of strangulation?

BDS + MBBS ★☆☆

A tense, tender, irreducible swelling with no cough impulse, red or discoloured overlying skin, and signs of intestinal obstruction, with fever and tachycardia.

Surgical Anatomy

Q9. Describe the boundaries of the inguinal canal.

BDS + MBBS ★☆☆

- Anterior wall: external oblique aponeurosis, reinforced laterally by internal oblique.
- Posterior wall: transversalis fascia, reinforced medially by the conjoint tendon.
- Roof: arching fibres of internal oblique and transversus abdominis.
- Floor: inguinal ligament, with the lacunar ligament medially.

Q10. Where are the deep and superficial inguinal rings?

BDS + MBBS ★☆☆

The deep ring is an opening in the transversalis fascia 1.25 cm above the mid-point of the inguinal ligament, lateral to the inferior epigastric vessels. The superficial ring is a triangular defect in the external oblique aponeurosis above and medial to the pubic tubercle.

Q11. What are the boundaries of Hesselbach's triangle?

BDS + MBBS ★☆☆

Laterally the inferior epigastric artery, medially the lateral border of the rectus abdominis, and inferiorly the inguinal ligament. A direct hernia comes through this triangle.

Q12. What are the contents of the spermatic cord?

BDS + MBBS ★☆☆

Three arteries (testicular, cremasteric, artery to the vas), three nerves (genital branch of genitofemoral, sympathetic fibres, ilioinguinal nerve lying on the cord), the vas deferens, the pampiniform plexus, lymphatics and the remnant of the processus vaginalis.

Q13. Which nerves can be injured during inguinal hernia repair?

BDS + MBBS ★★☆

Ilioinguinal, iliohypogastric and the genital branch of the genitofemoral nerve, giving numbness or chronic groin pain. In laparoscopic repair, the lateral femoral cutaneous and femoral branch of genitofemoral nerves are at risk.

Q14. What is the embryological basis of an indirect inguinal hernia?

BDS + MBBS ★★☆

The processus vaginalis is a peritoneal diverticulum that accompanies the testis into the scrotum. It normally obliterates; if it remains patent, it forms the sac of a congenital indirect hernia.

Pathology and Classification

Q15. What is a hernia? What are its parts?

BDS + MBBS ★☆☆

A protrusion of a viscus or part of a viscus through an abnormal opening in the wall of its containing cavity. Its parts are the sac (neck, body and fundus), its coverings and its contents.

Q16. Classify hernias clinically.

BDS + MBBS ★☆☆

Reducible, irreducible, obstructed (bowel obstructed but blood supply intact), strangulated (blood supply compromised), and inflamed.

Q17. What are the types of indirect inguinal hernia?

BDS + MBBS ★☆☆

Bubonocele (limited to the inguinal canal), funicular (the sac ends above the testis, along the cord), and complete or inguinoscrotal (reaches the bottom of the scrotum, with the testis in the sac).

Q18. What is a sliding hernia?

BDS + MBBS ★★☆

A hernia in which a retroperitoneal viscus (caecum on the right, sigmoid colon on the left, or bladder) forms part of the wall of the sac. The viscus must not be dissected off the sac, or it will be injured.

Q19. What are Richter's, Littre's, Maydl's and Amyand's hernias?

BDS + MBBS ★★☆

- Richter's: only part of the circumference of the bowel wall is trapped, so it may strangulate without obstruction.
- Littre's: the sac contains a Meckel's diverticulum.
- Maydl's: a W loop in the sac, where the central loop inside the abdomen strangulates.
- Amyand's: the sac contains the appendix.

Differential Diagnosis

Q20. What is the differential diagnosis of a swelling in the groin?

BDS + MBBS ★☆☆

Inguinal hernia, femoral hernia, enlarged inguinal lymph nodes, saphena varix, psoas abscess, ectopic or undescended testis, lipoma of the cord, encysted hydrocele of the cord, and femoral artery aneurysm.

Q21. How will you differentiate an inguinal from a femoral hernia?

BDS + MBBS
★☆☆

By the relation of the neck to the pubic tubercle: an inguinal hernia emerges above and medial to the tubercle, a femoral hernia below and lateral to it. Femoral hernias are commoner in women and more likely to strangulate.

Q22. How will you differentiate an encysted hydrocele of the cord from a hernia?

BDS + MBBS
★★☆

An encysted hydrocele is a smooth, oval, fluctuant and transilluminant swelling that is irreducible and has no cough impulse. It moves down when the testis is pulled downward (traction test).

Q23. What is a saphena varix and how is it distinguished from a femoral hernia?

BDS + MBBS
★★☆

A dilatation of the termination of the long saphenous vein. It disappears on lying down, has a cough impulse and a fluid thrill (Cruveilhier's sign) on coughing, and is associated with varicose veins. A Doppler ultrasound confirms it.

Investigations

Q24. Is any investigation needed to diagnose an inguinal hernia?

BDS + MBBS
★☆☆

The diagnosis is clinical. Ultrasound (and occasionally MRI) is used when the diagnosis is uncertain, for occult hernia, groin pain without a lump, or in obese patients.

Q25. What investigations will you do before elective repair?

BDS + MBBS
★☆☆

Full blood count, blood sugar, urea and creatinine, viral markers, and in older patients an ECG and chest X-ray, to assess fitness for anaesthesia.

Q26. How will you investigate the cause of the hernia?

BDS + MBBS
★★☆

Chest X-ray and spirometry for chronic cough, assessment of prostate (ultrasound, PSA, uroflowmetry) for straining at micturition, and evaluation of constipation, including colonoscopy if there is a change of bowel habit in older patients.

Q27. What investigations are needed in a strangulated hernia?

BDS + MBBS
★★☆

Full blood count, urea and electrolytes, blood gas with serum lactate, blood grouping and cross-match, and an erect abdominal X-ray if obstruction is suspected. These must not delay surgery.

Management

Q28. What is the treatment of an inguinal hernia?

BDS + MBBS
★☆☆

Surgical repair is the definitive treatment. Watchful waiting is acceptable in elderly men with minimal symptoms, but most eventually come to surgery.

Q29. Define herniotomy, herniorrhaphy and hernioplasty.

BDS + MBBS ★☆☆

Herniotomy: excision of the sac only (used in children). Herniorrhaphy: herniotomy plus repair of the posterior wall with sutures (e.g. Shouldice). Hernioplasty: reinforcement of the posterior wall with prosthetic mesh (e.g. Lichtenstein).

Q30. Describe the main steps of Lichtenstein repair.

BDS + MBBS ★★☆

Incision above and parallel to the inguinal ligament; open the external oblique; mobilise the cord; deal with the sac (an indirect sac is excised or inverted, a direct sac inverted); place a polypropylene mesh over the posterior wall, stitched to the inguinal ligament below and the conjoint area above, with the tails around the cord at the deep ring; close the external oblique.

Q31. What are the laparoscopic methods of inguinal hernia repair and their indications?

BDS + MBBS ★★☆

TAPP (transabdominal preperitoneal) and TEP (totally extraperitoneal). Both place a mesh in the preperitoneal space covering the myopectineal orifice. They are preferred for bilateral and recurrent hernias after open repair, and give quicker recovery.

Q32. How is an inguinal hernia treated in a child?

BDS + MBBS ★☆☆

By herniotomy alone, as the posterior wall is normal. It is done early because the risk of incarceration is high, especially in premature infants.

Q33. How will you manage a strangulated inguinal hernia?

BDS + MBBS ★★☆

Resuscitation with IV fluids, nasogastric decompression, catheterisation, antibiotics, and emergency surgery. The sac is opened, contents inspected, and the constricting ring divided. Non-viable bowel is resected with anastomosis, and the hernia repaired (mesh is avoided if there is contamination).

Q34. How will you decide whether strangulated bowel is viable?

BDS + MBBS ★★☆

Viable bowel regains its pink colour and shiny peritoneal sheen, shows peristalsis and has pulsating mesenteric vessels after release and warm packs. Black, dull, flabby bowel with no peristalsis or pulsation is non-viable.

Q35. What is taxis and what are its dangers?

BDS + MBBS ★★★

Gentle manual reduction of an irreducible hernia. Dangers: reduction of gangrenous bowel into the abdomen, rupture of bowel, and reduction en masse (sac and contents reduced together while still strangulated at the neck). It is not done when strangulation is suspected.

Complications

Q36. What are the complications of inguinal hernia repair?

BDS + MBBS ★☆☆

- Early: haematoma, scrotal swelling, urinary retention, wound infection.
- Late: chronic groin pain, recurrence, ischaemic orchitis and testicular atrophy, mesh infection, injury to the vas.

Q37. What causes chronic groin pain after hernia repair?

BDS + MBBS ★★☆

Entrapment or injury of the ilioinguinal, iliohypogastric or genital nerves by sutures, mesh or fibrosis. Prevented by identifying and protecting the nerves.

Q38. What is ischaemic orchitis?

BDS + MBBS ★★☆

Thrombosis of the pampiniform venous plexus due to excessive dissection of the cord, causing a painful, swollen testis a few days after surgery, which may progress to atrophy.

Q39. What are the causes of recurrence?

BDS + MBBS ★★☆

Technical errors (missed sac, inadequate mesh overlap, tension), infection, and persisting predisposing factors such as chronic cough, constipation and prostatism.

Q40. Why is a direct inguinal hernia less likely to strangulate?

BDS + MBBS ★★☆

Because its neck is wide and the sac is shallow, so contents slip in and out without becoming trapped.

Recent Advances

Q41. What do the international (HerniaSurge) guidelines recommend?

BDS + MBBS ★★☆

Mesh repair for adult inguinal hernias, with Lichtenstein or laparoscopic (TEP or TAPP) as the best evidence-based options, laparoscopic repair for bilateral and recurrent hernias, and laparoscopic repair in women because of the risk of an occult femoral hernia.

Q42. What is robotic inguinal hernia repair?

BDS + MBBS ★★☆

A transabdominal preperitoneal repair performed with a surgical robot, offering better dexterity for complex and recurrent hernias. It costs more, and its benefit over conventional laparoscopy is still being evaluated.

Q43. How are newer meshes and fixation methods reducing chronic pain?

BDS + MBBS ★★☆

Lightweight, large-pore meshes cause less fibrosis, and self-gripping meshes or glue fixation avoid sutures or tacks that can entrap nerves, reducing chronic groin pain.

Q44. What is the treatment of severe chronic pain after hernia repair?

BDS + MBBS ★★☆

After conservative measures and nerve blocks fail, triple neurectomy (ilioinguinal, iliohypogastric and genital branch of genitofemoral nerves), with removal of the mesh if needed, in specialised centres.

Q45. What is the current practice regarding day-case hernia surgery?

BDS + MBBS ★☆☆

Most elective inguinal hernia repairs are done as day cases, often under local anaesthesia for open repair, with enhanced recovery principles and early mobilisation.

Examiner's Favourite (Hard Questions)

Q46. What is the myopectineal orifice of Fruchaud?

BDS + MBBS
★★★

> An area of weakness in the groin bounded by the arching fibres of internal oblique and transversus above, the rectus abdominis medially, the iliopsoas laterally and the pectineal line below. All groin hernias (direct, indirect and femoral) pass through it, so laparoscopic mesh covers the whole orifice.

Q47. Why is an indirect inguinal hernia commoner on the right side?

BDS + MBBS
★★★

> The right testis descends later than the left, so the right processus vaginalis closes later and is more often patent.

Q48. What are the triangle of doom and triangle of pain in laparoscopic repair?

MBBS
★★★

> The triangle of doom lies between the vas deferens and the testicular vessels and contains the external iliac vessels. The triangle of pain lies lateral to the testicular vessels below the iliopubic tract and contains the lateral femoral cutaneous and genitofemoral nerves. Tacks are avoided in both.

Q49. What are the defence mechanisms of the inguinal canal?

BDS + MBBS
★★★

> The obliquity of the canal, the shutter action of the arching fibres of internal oblique and transversus, the ball-valve action of cremaster, and the slit-valve action of the external oblique crura at the superficial ring.

Quick Recall

- ✓ Deep ring: 1.25 cm above mid-point of inguinal ligament, lateral to inferior epigastric vessels.
- ✓ Hesselbach's triangle: inferior epigastric, rectus edge, inguinal ligament = direct hernia.
- ✓ Inguinal: above and medial to pubic tubercle. Femoral: below and lateral.
- ✓ Children: herniotomy only. Adults: Lichtenstein mesh. Bilateral/recurrent: laparoscopic.
- ✓ Strangulation: tense, tender, irreducible, no cough impulse = emergency.
- ✓ Viable bowel: colour, sheen, peristalsis, pulsation.
- ✓ Avoid taxis in suspected strangulation (reduction en masse).

CHAPTER

5

PART A: LONG CASES

Right Iliac Fossa Mass

Ileocaecal tuberculosis, appendicular mass, carcinoma caecum and Crohn's disease

Sample Case Presentation

Mr. F, a 28-year-old shopkeeper, presents with dull pain in the right lower abdomen for 4 months, evening fever, loss of appetite and weight loss of about 6 kg, with alternating constipation and diarrhoea. He had colicky pain with vomiting twice in the last month, relieved by itself. On examination he is thin and pale. There is a 6 × 5 cm firm, mildly tender, ill-defined mass in the right iliac fossa that does not move with respiration and is dull on percussion. The abdomen has a doughy feel. My provisional diagnosis is ileocaecal tuberculosis with subacute intestinal obstruction, with differentials of carcinoma caecum, Crohn's disease and appendicular mass.

History and Clinical Examination

Q1. What will you ask in the history of a patient with a right iliac fossa mass?

MBBS ★☆☆

- Duration and onset of the mass and pain; acute onset after periumbilical pain (appendicular mass).
- Fever, night sweats, weight loss, anorexia, cough, contact with TB.
- Change in bowel habit, colicky pain, vomiting, distension (subacute obstruction).
- Bleeding per rectum, symptoms of anaemia, family history of bowel cancer.
- In females: menstrual history, vaginal discharge, pelvic pain.

Q2. How will you examine an abdominal mass?

MBBS ★☆☆

Note its site, size, shape, surface, margins, consistency and tenderness; whether it moves with respiration; mobility; whether it is bimanually palpable or ballotable; percussion note; and auscultation. Then examine the hernial orifices, external genitalia, rectum (and vagina in females), and look for lymph nodes and spread elsewhere.

Q3. How will you tell whether a mass is in the abdominal wall or inside the abdomen?

MBBS ★★☆

Ask the patient to raise the head and shoulders off the bed to tense the recti (or raise both legs). A parietal mass remains palpable or becomes more prominent; an intra-abdominal mass becomes less distinct or disappears.

Q4. Which right iliac fossa masses are retroperitoneal?

MBBS ★★☆

Psoas abscess, enlarged iliac lymph nodes, pelvic or transplanted kidney, iliac artery aneurysm, and retroperitoneal tumours. They do not move with respiration and are fixed.

Q5. What are the clinical features of a psoas abscess?

MBBS ★★☆

A soft swelling in the iliac fossa that may extend below the inguinal ligament with cross-fluctuation, flexion deformity of the hip due to psoas spasm, and tenderness or deformity of the lumbar spine in Pott's disease.

Q6. What is the "doughy abdomen" and what does it suggest?

MBBS ★☆☆

A soft, rubbery feel of the abdomen due to matted bowel loops, thickened omentum and peritoneum. It is a classical sign of tuberculous peritonitis (plastic type).

Q7. Why must you examine the testes in a male with a lower abdominal mass?

MBBS ★★☆

An undescended or ectopic testis may lie in the iliac region and can become malignant, and a testicular tumour spreads to para-aortic and iliac nodes. An empty scrotum is an important clue.

Q8. What history suggests an appendicular mass?

MBBS ★☆☆

Periumbilical pain shifting to the right iliac fossa with fever, nausea and anorexia, followed after 3–5 days by a tender lump in the right iliac fossa.

Surgical Anatomy

Q9. Which structures can produce a mass in the right iliac fossa?

MBBS ★☆☆

Caecum, appendix, terminal ileum, mesenteric and iliac lymph nodes, right ovary and fallopian tube, psoas muscle, iliac vessels, right ureter, pelvic kidney and an undescended testis.

Q10. What are the positions of the appendix?

MBBS ★☆☆

Retrocaecal (commonest, about 65–75%), pelvic, subcaecal, pre-ileal, post-ileal and paracaecal. A retrocaecal appendix gives few abdominal signs; a pelvic appendix may cause diarrhoea and urinary symptoms.

Q11. Why does the inflamed appendix become gangrenous quickly?

MBBS ★★☆

The appendicular artery, a branch of the ileocolic artery, is an end artery. Once it thromboses due to inflammation, there is no collateral supply.

Q12. What is McBurney's point?

MBBS ★☆☆

The junction of the lateral and middle thirds of the line joining the anterior superior iliac spine to the umbilicus. It marks the usual site of maximum tenderness and of the base of the appendix.

Q13. Why is the ileocaecal region the commonest site of intestinal tuberculosis?

MBBS ★★☆

Abundant lymphoid tissue (Peyer's patches), physiological stasis of contents, increased absorption at this site, and close contact of the bacilli with the mucosa.

Pathology and Classification

Q14. What is an appendicular mass?

MBBS ★☆☆

An inflamed appendix walled off by the greater omentum, adherent bowel loops and the caecum, forming an inflammatory phlegmon. If pus collects within it, it becomes an appendicular abscess.

Q15. Classify abdominal tuberculosis.

MBBS ★★☆

- Intestinal: ulcerative, hypertrophic and ulcerohypertrophic.
- Peritoneal: wet (ascitic), dry (plastic, adhesive) and fibrotic (encysted).
- Nodal (mesenteric lymphadenitis) and solid organ tuberculosis.

Q16. Describe the pathology of hyperplastic ileocaecal tuberculosis.

MBBS ★★☆

Thickening of the bowel wall and caecum by granulomatous inflammation and fibrosis, producing a mass with narrowing of the lumen. The caecum is pulled up and contracted, and the ileocaecal valve becomes incompetent. Ulcers in ulcerative TB are transverse (girdle) because they follow the lymphatics.

Q17. How does carcinoma of the caecum usually present? Why?

MBBS ★★☆

With iron-deficiency anaemia, weakness and a right iliac fossa mass, rather than obstruction. The caecum has a wide lumen and liquid contents, so the tumour grows large before obstructing, and it bleeds occultly.

Q18. How will you differentiate TB from Crohn's disease histologically?

MBBS ★★☆

TB shows caseating, confluent granulomas with acid-fast bacilli, and positive culture or GeneXpert. Crohn's disease shows small non-caseating granulomas, transmural inflammation, fissuring ulcers and skip lesions.

Differential Diagnosis

Q19. Give the differential diagnosis of a right iliac fossa mass.

MBBS ★☆☆

Appendicular mass or abscess, ileocaecal tuberculosis, carcinoma caecum, Crohn's disease, amoeboma, iliac lymphadenopathy (lymphoma, TB, secondaries), psoas abscess, pelvic kidney, iliac artery aneurysm, and ovarian or tubal masses in females.

Q20. What additional causes will you consider in a female?

MBBS ★☆☆

Ovarian cyst or tumour, tubo-ovarian mass or abscess, ectopic pregnancy, and pedunculated fibroid.

Q21. An elderly patient has a right iliac fossa mass with anaemia. What is your diagnosis until proven otherwise?

MBBS ★★☆

Carcinoma of the caecum. Every elderly patient with iron-deficiency anaemia needs evaluation of the colon.

Q22. How will you differentiate ileocaecal TB from Crohn's disease clinically?

MBBS ★★☆

TB is commoner in our population, with fever, night sweats, pulmonary TB, ascites and a short history. Crohn's is more chronic and relapsing, with perianal disease, fistulae and skip lesions. The distinction matters because steroids for Crohn's can disseminate TB.

Investigations

Q23. What basic investigations will you do?

MBBS ★☆☆

Full blood count (anaemia, lymphocytosis), ESR and CRP, chest X-ray (pulmonary TB), urea and electrolytes, and stool examination for blood and amoebae.

Q24. What is the role of ultrasound?

MBBS ★☆☆

It shows a mass or abscess, matted bowel loops, thickened bowel wall, enlarged mesenteric nodes and ascites, and guides aspiration or drainage.

Q25. Which is the best imaging investigation and why?

MBBS ★★☆

Contrast-enhanced CT abdomen. It defines the mass and its organ of origin, shows abscess, bowel thickening, nodes with central necrosis (TB), ascites and metastases, and stages malignancy.

Q26. What is the role of colonoscopy?

MBBS ★★☆

It allows direct view of the caecum and terminal ileum and biopsy for histology, acid-fast staining, culture and GeneXpert. It differentiates TB, Crohn's disease and carcinoma.

Q27. What are the barium findings in ileocaecal tuberculosis?

MBBS ★★★

A pulled-up, contracted caecum, an obtuse ileocaecal angle, a narrowed terminal ileum (string sign), rapid emptying of the inflamed segment (Stierlin's sign), and a thickened, gaping ileocaecal valve with narrow terminal ileum (Fleischner's or inverted umbrella sign).

Q28. How will you investigate ascitic fluid in suspected abdominal TB?

MBBS ★★☆

It is an exudate with high protein, lymphocyte predominance and a raised adenosine deaminase level. AFB smear and culture are often negative, so peritoneal biopsy at laparoscopy may be needed.

Q29. When will you do a diagnostic laparoscopy?

MBBS ★★☆

When the diagnosis remains uncertain after imaging and endoscopy, especially for peritoneal TB: it shows tubercles on the peritoneum and allows biopsy.

Management

Q30. How will you manage an appendicular mass?

MBBS ★★☆

Conservatively by the Ochsner–Sherren regimen: bed rest, nil or liquids by mouth, IV fluids, IV antibiotics, analgesia and close monitoring of pulse, temperature, mass size and abdominal signs. Most resolve. Older patients need colonoscopy or CT later to exclude carcinoma; interval appendicectomy is selective.

Q31. How will you manage an appendicular abscess?

MBBS ★★☆

> IV antibiotics with ultrasound- or CT-guided percutaneous drainage. Surgical drainage is done if percutaneous drainage fails or is not possible.

Q32. What is the treatment of abdominal tuberculosis?

MBBS ★☆☆

> Antituberculous therapy for 6 months: isoniazid, rifampicin, pyrazinamide and ethambutol for 2 months, then isoniazid and rifampicin for 4 months. Surgery is reserved for complications.

Q33. What surgery is done for intestinal TB?

MBBS ★★☆

> For obstruction: stricturoplasty for short strictures or limited ileocaecal resection with anastomosis. For perforation: resection with anastomosis or stoma depending on contamination. ATT is given in all cases.

Q34. What is a right hemicolectomy? What is removed?

MBBS ★★☆

> Removal of the terminal ileum, caecum, appendix, ascending colon, hepatic flexure and proximal transverse colon with their mesentery and lymph nodes, after ligating the ileocolic, right colic and right branch of the middle colic vessels. An ileocolic anastomosis restores continuity.

Q35. What adjuvant treatment is given after resection of carcinoma caecum?

MBBS ★★☆

> Adjuvant chemotherapy (fluoropyrimidine with oxaliplatin) for node-positive (stage III) disease and high-risk stage II disease.

Q36. What are the principles of surgery in Crohn's disease?

MBBS ★★☆

> Surgery is for complications (stricture, fistula, abscess, failed medical treatment). Resect only the diseased segment with limited margins and use stricturoplasty to preserve bowel, because the disease can recur anywhere.

Q37. What should you do if you find a mass in the right iliac fossa at operation for presumed appendicitis?

MBBS ★★★

> Assess it carefully. If it is clearly malignant, a right hemicolectomy is done if the patient is fit and has consented; otherwise biopsy and close, and plan definitive surgery after staging. For a TB mass, take biopsies and nodes and avoid unnecessary resection.

Complications

Q38. When will you abandon the conservative treatment of an appendicular mass?

MBBS ★★☆

> If the pulse rises, the pain or tenderness increases, the mass enlarges, fever persists, or signs of peritonitis or abscess develop.

Q39. What are the complications of intestinal tuberculosis?

MBBS ★☆☆

> Intestinal obstruction (commonest), perforation, internal fistula, malabsorption, haemorrhage and malnutrition.

Q40. What are the complications of right hemicolectomy?

MBBS ★★☆

Anastomotic leak, prolonged ileus, wound infection, bleeding, and injury to the right ureter, duodenum or gonadal vessels.

Q41. What are the side effects of antituberculous drugs?

MBBS ★★☆

Hepatotoxicity (isoniazid, rifampicin, pyrazinamide), peripheral neuropathy (isoniazid, prevented with pyridoxine), optic neuritis (ethambutol), orange urine and drug interactions (rifampicin), and hyperuricaemia (pyrazinamide).

Q42. What is a paradoxical reaction during ATT?

MBBS ★★★

Temporary worsening of symptoms or new lesions (such as enlarging nodes or strictures causing obstruction) after starting ATT, due to immune recovery. It does not mean treatment failure.

Recent Advances

Q43. What is the role of antibiotics alone in acute appendicitis?

MBBS ★★☆

Trials such as CODA showed that uncomplicated appendicitis confirmed on CT can be treated with antibiotics first, but about a quarter to a third of patients later need appendicectomy, and appendicoliths increase failure. It is a shared decision with the patient.

Q44. What newer tests diagnose intestinal tuberculosis faster?

MBBS ★★☆

GeneXpert MTB/RIF Ultra on biopsy or fluid samples detects Mycobacterium tuberculosis DNA and rifampicin resistance within hours, much faster than culture.

Q45. What imaging is preferred for Crohn's disease of the terminal ileum?

MBBS ★★☆

MR enterography and intestinal ultrasound, which assess bowel wall thickening, strictures, fistulae and abscesses without radiation, important in young patients needing repeated imaging.

Q46. What biological treatments are used in Crohn's disease?

MBBS ★★★

Anti-TNF agents (infliximab, adalimumab), vedolizumab (anti-integrin), ustekinumab and risankizumab (anti-interleukin) and JAK inhibitors. Latent and active TB must be excluded before starting them, particularly in our region.

Q47. What is complete mesocolic excision?

MBBS ★★★

A right hemicolectomy in which the mesocolon is removed intact within its embryological plane with central ligation of the vessels at their origin, increasing lymph node yield and possibly improving survival in colon cancer.

Examiner's Favourite (Hard Questions)

Q48. How will you manage a carcinoid tumour found in the appendix?

MBBS
★★★

> Tumours under 1 cm at the tip are cured by appendicectomy. Tumours over 2 cm, at the base, with mesoappendiceal invasion or nodes need a right hemicolectomy. Those between 1 and 2 cm are assessed individually.

Q49. What is a mucocele of the appendix and why is it important?

MBBS
★★★

> A distended appendix filled with mucus, due to obstruction or a mucinous neoplasm. If it ruptures, mucin-producing cells can spread through the peritoneum (pseudomyxoma peritonei), so it must be removed intact.

Q50. What is an amoeboma?

MBBS
★★★

> A granulomatous mass of the caecum due to chronic amoebic infection, which mimics carcinoma. Biopsy shows trophozoites, and it resolves with metronidazole, avoiding unnecessary resection.

Q51. Why should steroids not be given until TB is excluded in suspected Crohn's disease?

MBBS
★★★

> Steroids suppress cell-mediated immunity and can cause disseminated tuberculosis. In our population, TB must be excluded by biopsy, GeneXpert and culture before starting immunosuppression.

Quick Recall

- ✓ Raise the head: wall mass stays, intra-abdominal mass disappears.
- ✓ Appendicular mass: Ochsner–Sherren regimen; abscess: percutaneous drainage.
- ✓ Ileocaecal TB: pulled-up caecum, obtuse angle, string sign, Fleischner sign.
- ✓ Ascitic fluid in TB: exudate, lymphocytes, raised ADA.
- ✓ Carcinoma caecum: anaemia + mass, rarely obstruction. Treat by right hemicolectomy.
- ✓ ATT: 2HRZE + 4HR. Surgery only for complications.
- ✓ Exclude TB before steroids for Crohn's.

CHAPTER

6

PART A: LONG CASES

Carcinoma Oesophagus and Stomach

Dysphagia, upper gastrointestinal malignancy and gastric outlet obstruction

Sample Case Presentation

Mr. G, a 62-year-old farmer and heavy smoker, presents with difficulty in swallowing for 3 months, first for solids and now for semi-solids, with the food sticking behind the lower sternum. He has lost 10 kg in weight and has occasional regurgitation of food. There is no hoarseness or cough on swallowing. On examination he is cachectic and pale. There is no supraclavicular lymph node, hepatomegaly or ascites. My provisional diagnosis is carcinoma of the lower third of the oesophagus, with differentials of carcinoma of the gastro-oesophageal junction, benign stricture and achalasia.

History and Clinical Examination

Q1. What will you ask in a patient with dysphagia?

MBBS ★☆☆

- Duration and progression; solids first then liquids (mechanical) or both from the start (motility disorder).
- Level at which food sticks, regurgitation, odynophagia.
- Weight loss, hoarseness, cough or choking on swallowing (tracheo-oesophageal fistula).
- Heartburn (reflux), caustic ingestion, smoking, alcohol, very hot drinks.

Q2. Define dysphagia and odynophagia.

MBBS ★☆☆

Dysphagia is difficulty in swallowing. Odynophagia is pain on swallowing, seen in oesophagitis (candida, herpes), ulceration and advanced carcinoma.

Q3. What are the symptoms of carcinoma stomach?

MBBS ★☆☆

New dyspepsia in a patient over 55, early satiety, anorexia, weight loss, anaemia, vomiting (pyloric tumours), dysphagia (cardia tumours), haematemesis or melaena, and an epigastric mass.

Q4. What signs indicate advanced or incurable gastric cancer?

MBBS ★★☆

Left supraclavicular node (Virchow's node, Troisier's sign), Sister Mary Joseph umbilical nodule, Blumer's rectal shelf, Krukenberg tumours of the ovaries, left axillary node (Irish node), hepatomegaly, ascites and jaundice.

Q5. What is a succussion splash and what does it indicate?

MBBS ★☆☆

A splashing sound heard on shaking the patient's abdomen more than 3–4 hours after a meal. It indicates gastric outlet obstruction with retained fluid in the stomach.

Q6. What is the significance of visible peristalsis from left to right in the upper abdomen?

MBBS ★★☆

It indicates gastric outlet obstruction, from peptic stricture of the pylorus or duodenum or carcinoma of the antrum.

Q7. What is the significance of hoarseness of voice in carcinoma oesophagus?

MBBS ★★☆

It suggests involvement of the recurrent laryngeal nerve (usually the left) by tumour or nodes, indicating locally advanced and usually unresectable disease.

Q8. What is Plummer–Vinson (Paterson–Kelly) syndrome?

MBBS ★★☆

Dysphagia due to a post-cricoid web, with iron-deficiency anaemia, glossitis and koilonychia, usually in middle-aged women. It is premalignant for post-cricoid carcinoma.

Surgical Anatomy

Q9. What are the anatomical constrictions of the oesophagus?

MBBS ★☆☆

At about 15 cm from the incisor teeth (cricopharyngeus), 25 cm (crossing of the aortic arch and left main bronchus), and 40 cm (passage through the diaphragm). Foreign bodies and strictures are common at these sites.

Q10. Describe the arterial supply of the stomach.

MBBS ★☆☆

Left gastric artery (from the coeliac trunk) and right gastric artery along the lesser curvature; right and left gastroepiploic arteries along the greater curvature; and short gastric arteries from the splenic artery to the fundus.

Q11. Why does an oesophageal anastomosis carry a higher risk of leak?

MBBS ★★☆

The oesophagus has no serosal layer, its longitudinal muscle holds sutures poorly, and its blood supply is segmental.

Q12. What is the difference between D1 and D2 lymphadenectomy?

MBBS ★★★

D1 removes the perigastric nodes along the curvatures. D2 also removes the nodes along the left gastric, common hepatic, coeliac and splenic arteries. D2 (with spleen and pancreas preservation) is the standard for curative gastric cancer surgery.

Q13. What maintains the competence of the lower oesophageal sphincter?

MBBS ★★☆

The intrinsic sphincter muscle tone, the crural diaphragm acting as a pinchcock, the intra-abdominal length of oesophagus, the acute angle of His and the mucosal rosette.

Pathology and Classification

Q14. Compare squamous cell carcinoma and adenocarcinoma of the oesophagus.

MBBS ★☆☆

Squamous carcinoma involves the upper and middle thirds and is linked to smoking, alcohol, hot drinks, achalasia, caustic stricture and Plummer–Vinson syndrome. Adenocarcinoma involves the lower third and junction and is linked to reflux, Barrett's oesophagus and obesity.

Q15. What is Barrett's oesophagus?

MBBS ★★☆

Replacement of the normal squamous lining of the lower oesophagus by columnar epithelium with intestinal metaplasia due to chronic reflux. It is premalignant for adenocarcinoma and needs endoscopic surveillance.

Q16. What are the risk factors for gastric cancer?

MBBS ★☆☆

Helicobacter pylori infection, diet high in salt and smoked or preserved food (nitrosamines), smoking, pernicious anaemia and atrophic gastritis, previous partial gastrectomy, adenomatous polyps, blood group A, and hereditary diffuse gastric cancer (CDH1 mutation).

Q17. What is the Lauren classification of gastric cancer?

MBBS ★★☆

Intestinal type: well formed glands, associated with H. pylori and intestinal metaplasia, older patients, better prognosis. Diffuse type: poorly cohesive signet ring cells infiltrating the wall, younger patients, worse prognosis; extensive form is linitis plastica.

Q18. What is early gastric cancer?

MBBS ★★☆

Cancer confined to the mucosa and submucosa, regardless of lymph node status. It has an excellent prognosis and is common in Japan because of screening.

Q19. How does gastric cancer spread?

MBBS ★☆☆

Direct to the pancreas, colon, liver and spleen; lymphatic to regional and distant nodes (Virchow's); blood to the liver; and transcoelomic across the peritoneum to the ovaries (Krukenberg), pelvis (Blumer's shelf) and umbilicus.

Differential Diagnosis

Q20. Classify the causes of dysphagia.

MBBS ★☆☆

- In the lumen: foreign body.
- In the wall: carcinoma, benign stricture (peptic, caustic), web, achalasia, diffuse spasm, scleroderma.
- Outside the wall: retrosternal goitre, mediastinal nodes, aortic aneurysm, pharyngeal pouch.
- Neurological: stroke, motor neurone disease, myasthenia gravis.

Q21. How will you differentiate achalasia from carcinoma?

MBBS ★★☆

Achalasia: younger patient, long history, dysphagia to both solids and liquids, regurgitation, little weight loss; barium shows a dilated oesophagus with a smooth bird's beak narrowing. Carcinoma: older, short progressive history, marked weight loss; barium shows an irregular stricture with shouldering (rat-tail).

Q22. What metabolic disturbance occurs in gastric outlet obstruction?

MBBS ★★☆

Hypochloraemic, hypokalaemic metabolic alkalosis due to vomiting of acid. As the kidney conserves sodium in exchange for hydrogen ions, a paradoxical aciduria develops.

Q23. What is the differential diagnosis of an epigastric mass?

MBBS ★☆☆

Carcinoma stomach, left lobe of liver, pancreatic tumour or pseudocyst, transverse colon tumour, abdominal aortic aneurysm, and para-aortic lymph nodes.

Investigations

Q24. What is the first investigation for dysphagia or suspected gastric cancer?

MBBS ★☆☆

Upper GI endoscopy with multiple biopsies. It shows the site, length and nature of the lesion and gives a histological diagnosis.

Q25. When is a barium swallow useful?

MBBS ★★☆

When endoscopy is not available, for suspected pharyngeal pouch, motility disorders such as achalasia, and to define a tracheo-oesophageal fistula or the length of a stricture.

Q26. How will you stage carcinoma oesophagus or stomach?

MBBS ★☆☆

CT of chest, abdomen and pelvis for local spread, nodes and metastases; endoscopic ultrasound for depth of invasion and nodes; PET-CT for occult metastases in oesophageal cancer; and staging laparoscopy for gastric and junctional tumours.

Q27. Why is staging laparoscopy done in gastric cancer?

MBBS ★★☆

To detect small peritoneal and liver surface metastases missed on CT, with peritoneal washings for cytology. It prevents unnecessary laparotomy in patients with incurable disease.

Q28. What is the role of endoscopic ultrasound?

MBBS ★★☆

It is the most accurate method of T staging and assessment of regional nodes, and allows fine-needle aspiration of suspicious nodes. It identifies early tumours suitable for endoscopic resection.

Q29. What blood investigations are needed before surgery?

MBBS ★☆☆

Full blood count, serum albumin and nutritional assessment, liver and renal function, electrolytes, coagulation profile, blood grouping, and pulmonary and cardiac function tests.

Q30. Why is HER2 testing done in advanced gastric cancer?

MBBS ★★★

About 15–20% of gastric and junctional adenocarcinomas overexpress HER2, and these benefit from adding trastuzumab to chemotherapy.

Management

Q31. How will you treat resectable carcinoma oesophagus?

MBBS ★★☆

Neoadjuvant chemoradiotherapy (e.g. CROSS regimen) or perioperative chemotherapy, followed by oesophagectomy with two-field lymphadenectomy. Definitive chemoradiotherapy is an option for squamous carcinoma, especially of the upper third.

Q32. Name the types of oesophagectomy.

MBBS ★★☆

Ivor Lewis (abdominal and right thoracic, two stage), McKeown (three stage: abdominal, thoracic and cervical), and transhiatal (abdominal and cervical, without thoracotomy). Minimally invasive approaches are increasingly used.

Q33. How will you palliate dysphagia in inoperable oesophageal cancer?

MBBS ★★☆

Self-expanding metal stent, external beam radiotherapy or brachytherapy, and chemotherapy. Nutritional support by feeding tube when needed.

Q34. What surgery is done for gastric cancer?

MBBS ★★☆

Distal tumours: subtotal (distal) gastrectomy with Billroth II or Roux-en-Y reconstruction. Proximal or diffuse tumours: total gastrectomy with Roux-en-Y oesophagojejunostomy. Both with D2 lymphadenectomy and adequate margins (about 5 cm for intestinal, more for diffuse type).

Q35. What is the role of perioperative chemotherapy in gastric cancer?

MBBS ★★☆

For tumours beyond T1, chemotherapy (such as the FLOT regimen) is given before and after surgery. It downstages the tumour and improves survival.

Q36. How is early gastric cancer treated?

MBBS ★★☆

Small, well-differentiated mucosal tumours without ulceration can be treated by endoscopic mucosal resection or endoscopic submucosal dissection. Others need gastrectomy.

Q37. How will you prepare a patient with gastric outlet obstruction for surgery?

MBBS ★★☆

Nasogastric aspiration and gastric lavage, IV normal saline with potassium to correct the alkalosis and dehydration, monitoring of urine output and electrolytes, correction of anaemia, and nutritional support (often parenteral or jejunal feeding).

Q38. How will you palliate an inoperable obstructing antral carcinoma?

MBBS ★★☆

Endoscopic duodenal stenting or surgical gastrojejunostomy, with palliative chemotherapy in fit patients. Bleeding can be controlled with radiotherapy or endoscopic therapy.

Complications

Q39. What are the complications of oesophagectomy?

MBBS ★★☆

Pneumonia and respiratory failure (commonest), anastomotic leak, conduit necrosis, chylothorax, recurrent laryngeal nerve palsy, atrial fibrillation, and late anastomotic stricture.

Q40. What is dumping syndrome?

MBBS ★★☆

Early dumping (within 30 minutes): rapid entry of hyperosmolar food into the jejunum draws fluid in, causing abdominal fullness, sweating, palpitations and faintness. Late dumping (1–3 hours): rapid glucose absorption causes excess insulin release and reactive hypoglycaemia. Treated by small, frequent, dry, low-sugar meals.

Q41. What nutritional problems follow total gastrectomy?

MBBS ★★☆

Vitamin B12 deficiency (loss of intrinsic factor, so lifelong injections are needed), iron deficiency anaemia, weight loss, calcium and vitamin D deficiency causing bone disease, and fat malabsorption.

Q42. What is duodenal stump blowout?

MBBS ★★★

Leakage from the closed duodenal stump after Billroth II or Roux-en-Y reconstruction, usually in the first week, causing peritonitis or a duodenal fistula. It is managed with drainage, nutritional support and sometimes re-operation.

Q43. How will you manage chylothorax after oesophagectomy?

MBBS ★★★

Chest drainage, nil by mouth with parenteral nutrition or a medium-chain triglyceride diet, and octreotide. If the output stays high, the thoracic duct is ligated surgically or embolised.

Recent Advances

Q44. What is the current standard of perioperative treatment for gastric and oesophageal adenocarcinoma?

MBBS ★★★

Perioperative FLOT chemotherapy for gastric and junctional adenocarcinoma, and CROSS chemoradiotherapy or FLOT for oesophageal cancer. Adjuvant nivolumab is given when residual disease remains after neoadjuvant chemoradiotherapy (CheckMate 577).

Q45. What is the role of immunotherapy in advanced gastric cancer?

MBBS ★★★

Nivolumab or pembrolizumab added to first-line chemotherapy improves survival in PD-L1-positive HER2-negative gastric and junctional adenocarcinoma. Zolbetuximab targets Claudin 18.2-positive tumours.

Q46. What are the advantages of minimally invasive oesophagectomy?

MBBS ★★☆

Thoracoscopic and laparoscopic or robotic oesophagectomy reduces pulmonary complications and blood loss and speeds recovery compared with open surgery, with similar cancer outcomes.

Q47. What is endoscopic submucosal dissection?

MBBS ★★☆

> En bloc endoscopic removal of early gastric and oesophageal cancers confined to the mucosa through dissection in the submucosal layer, avoiding gastrectomy or oesophagectomy in suitable patients.

Q48. What is enhanced recovery after surgery (ERAS) in upper GI surgery?

MBBS ★★☆

> A bundle of evidence-based measures: preoperative counselling and nutrition, carbohydrate loading, minimally invasive surgery, avoiding routine drains and tubes, early feeding and mobilisation, and multimodal analgesia, which shortens hospital stay and reduces complications.

Examiner's Favourite (Hard Questions)

Q49. What is the Siewert classification?

MBBS ★★★

> A classification of adenocarcinoma of the gastro-oesophageal junction by the tumour centre: type I, 1–5 cm above the junction (treated as oesophageal); type II, 1 cm above to 2 cm below (true cardia); type III, 2–5 cm below (treated as gastric).

Q50. What is linitis plastica?

MBBS ★★★

> Diffuse infiltration of the whole gastric wall by signet ring cell carcinoma, making the stomach small, thick and rigid ("leather bottle stomach"). It has a very poor prognosis.

Q51. Which organ is used to replace the oesophagus and what is its blood supply?

MBBS ★★★

> The stomach is the usual conduit, based on the right gastroepiploic artery (with the right gastric artery). Colon or jejunum is used when the stomach is unavailable.

Q52. Why does weight loss occur early in carcinoma oesophagus?

MBBS ★★★

> The patient eats less because of dysphagia and anorexia, and the tumour causes a catabolic state. By the time dysphagia to solids appears, the lumen is usually narrowed by more than half and the disease is often advanced.

Quick Recall

- ✓ Progressive dysphagia, solids first, in an elderly smoker = carcinoma until proven otherwise.
- ✓ SCC: upper and middle third. Adenocarcinoma: lower third and Barrett's.
- ✓ Endoscopy + biopsy first; CT, EUS, PET-CT and laparoscopy to stage.
- ✓ Virchow's node, Sister Mary Joseph nodule, Blumer's shelf, Krukenberg = incurable spread.
- ✓ Gastric outlet obstruction: hypochloraemic hypokalaemic alkalosis; give saline + potassium.
- ✓ Gastrectomy with D2 lymphadenectomy and perioperative chemotherapy.
- ✓ After total gastrectomy: lifelong vitamin B12.

CHAPTER

7

PART A: LONG CASES

Varicose Veins

Primary varicose veins, chronic venous insufficiency and venous ulcer

Sample Case Presentation

Mrs. H, a 45-year-old school teacher who stands for long hours, presents with dilated veins on the right leg for 8 years, with heaviness and aching that worsens by evening, and itching and darkening of the skin above the ankle for 1 year. She has had three pregnancies and no history of DVT. On standing, there are dilated tortuous veins along the medial side of the leg and thigh, with pigmentation and eczema in the gaiter area. There is a cough impulse at the saphenofemoral junction, and Trendelenburg's test shows saphenofemoral incompetence. Peripheral pulses are palpable. My provisional diagnosis is right-sided primary varicose veins of the great saphenous system with skin changes (CEAP C4).

History and Clinical Examination

Q1. What will you ask in the history of a patient with varicose veins?

MBBS ★☆☆

- Duration, symptoms of aching, heaviness, swelling, itching and night cramps, worse on standing.
- Complications: bleeding, thrombophlebitis, skin changes, ulceration.
- History of DVT, leg fracture or surgery (secondary varicose veins).
- Pregnancies, occupation with prolonged standing, family history, oral contraceptives.

Q2. How will you examine a patient with varicose veins?

MBBS ★☆☆

Examine standing, with both legs fully exposed. Inspect the distribution of veins, skin changes and ulcers; palpate for tenderness, a saphena varix and cough impulse at the saphenofemoral junction; perform the tourniquet tests; and examine the arterial pulses and the abdomen.

Q3. Describe Trendelenburg's test.

MBBS ★★☆

Test 1: with the leg elevated, the veins are emptied and pressure is applied over the saphenofemoral junction; the patient stands and the pressure is released. Rapid filling from above indicates saphenofemoral incompetence. Test 2: pressure is maintained; filling while the junction is controlled indicates incompetent perforators.

Q4. What is the multiple tourniquet test?

MBBS ★★☆

Tourniquets are applied at different levels (below the SFJ, mid-thigh, below the knee) after emptying the veins. The level at which filling is controlled identifies the site of the incompetent junction or perforator. It is largely replaced by duplex ultrasound.

Q5. What is Perthes' test and its purpose?

MBBS ★★☆

A tourniquet is applied below the SFJ while the patient stands, and the patient walks or performs tiptoe exercises. If the varicose veins empty, the deep veins and perforators are competent. If they become more prominent and painful, the deep veins are obstructed.

Q6. What is Schwartz's tap test?

MBBS ★★☆

Tapping a varicose vein below while feeling a transmitted impulse at the SFJ above indicates a continuous column of blood, i.e. incompetent valves along the vein.

Q7. Where do venous ulcers occur and what are their features?

MBBS ★☆☆

In the gaiter area, especially above the medial malleolus. They are shallow with sloping edges, a granulating floor, surrounding pigmentation, eczema and lipodermatosclerosis, and are relatively painless.

Q8. What is an "inverted champagne bottle" leg?

MBBS ★★☆

The appearance of advanced lipodermatosclerosis: fibrosis and contraction of the skin and subcutaneous tissue around the lower leg, with swelling above it.

Surgical Anatomy

Q9. Describe the course of the great saphenous vein.

MBBS ★☆☆

It begins at the medial end of the dorsal venous arch, passes in front of the medial malleolus, ascends along the medial side of the leg and behind the knee, then along the medial thigh to pierce the cribriform fascia and join the femoral vein at the saphenous opening, 2.5–4 cm below and lateral to the pubic tubercle.

Q10. Describe the course of the small saphenous vein.

MBBS ★☆☆

It begins at the lateral end of the dorsal venous arch, passes behind the lateral malleolus, ascends along the back of the calf and joins the popliteal vein in the popliteal fossa, at a variable level.

Q11. Name the tributaries of the great saphenous vein at the saphenofemoral junction.

MBBS ★★☆

Superficial epigastric, superficial circumflex iliac, superficial and deep external pudendal veins, and the anterolateral and posteromedial thigh veins. All must be ligated during surgery to prevent recurrence.

Q12. Name the important perforating veins of the lower limb.

MBBS ★★☆

Hunterian (mid-thigh), Dodd (lower thigh), Boyd (just below the knee) and Cockett (medial ankle and lower leg) perforators.

Q13. Which nerves are at risk during varicose vein surgery?

MBBS ★★☆

The saphenous nerve, which runs with the great saphenous vein below the knee, and the sural nerve with the small saphenous vein. Injury causes numbness on the medial and lateral side of the leg and foot respectively.

Pathology and Classification

Q14. Define varicose veins.

MBBS ★☆☆

Dilated, tortuous and elongated superficial veins with incompetent valves and reversed blood flow.

Q15. What are the causes of varicose veins?

MBBS ★☆☆

Primary: valve and vein wall weakness, with family history, prolonged standing, pregnancy and obesity as factors. Secondary: post-thrombotic (after DVT), pelvic masses or pregnancy obstructing venous return, arteriovenous fistula and congenital conditions.

Q16. How does a venous ulcer develop?

MBBS ★★☆

Valve incompetence causes ambulatory venous hypertension. This leads to capillary leak of fibrinogen and red cells, white cell trapping and inflammation, and fibrosis of the skin (lipodermatosclerosis), so that minor trauma results in a non-healing ulcer.

Q17. What is the CEAP classification?

MBBS ★★☆

Clinical, Etiological, Anatomical and Pathophysiological classification. Clinical grades: C0 no signs, C1 telangiectasia or reticular veins, C2 varicose veins, C3 oedema, C4 skin changes, C5 healed ulcer, C6 active ulcer.

Q18. What is lipodermatosclerosis?

MBBS ★★☆

Chronic inflammation and fibrosis of the skin and subcutaneous fat in the gaiter area due to venous hypertension, producing a hard, pigmented, tender skin.

Differential Diagnosis

Q19. What is the differential diagnosis of a leg ulcer?

MBBS ★☆☆

Venous, arterial, neuropathic (diabetic), mixed arterial-venous, vasculitic, infective (tuberculous), malignant (Marjolin's ulcer, squamous or basal cell carcinoma), and traumatic ulcers.

Q20. How will you differentiate a venous ulcer from an arterial ulcer?

MBBS ★☆☆

Venous: gaiter area, shallow, sloping edges, granulation tissue, pigmentation, relatively painless, pulses present. Arterial: toes, heel and pressure points, punched out, pale base, very painful especially at night, absent pulses and signs of ischaemia.

Q21. Give the causes of unilateral leg swelling.

MBBS ★★☆

DVT, post-thrombotic syndrome, cellulitis, lymphoedema, ruptured Baker's cyst, trauma, and pelvic mass or nodes compressing the veins.

Q22. What is Klippel–Trenaunay syndrome?

MBBS ★★★

A congenital condition with a port-wine stain, varicose veins (often lateral and atypical), and limb hypertrophy. The deep veins may be abnormal, so the superficial veins must not be removed without assessing the deep system.

Investigations

Q23. What is the investigation of choice for varicose veins?

MBBS ★☆☆

Colour duplex ultrasound. It shows the site of reflux at the junctions and perforators, the extent of incompetent veins, and the patency and competence of the deep veins. Reflux of more than 0.5 seconds is significant.

Q24. Why will you measure the ankle-brachial pressure index before treating a venous ulcer?

MBBS ★★☆

To exclude significant arterial disease before applying compression. An ABPI below 0.8 means high compression could cause ischaemia.

Q25. When will you biopsy a leg ulcer?

MBBS ★★☆

When it fails to heal despite adequate treatment, has an atypical appearance, or has a raised, everted or rolled edge, to exclude Marjolin's ulcer or other malignancy.

Q26. What is the role of venography today?

MBBS ★★☆

Mostly replaced by duplex. It is used in complex and recurrent cases, suspected pelvic or iliac vein obstruction (CT or MR venography), and before deep venous interventions.

Q27. When will you do a thrombophilia screen?

MBBS ★★★

In patients with unprovoked DVT, recurrent thrombosis, DVT at a young age or at an unusual site, and those with a strong family history.

Management

Q28. What is the conservative management of varicose veins?

MBBS ★☆☆

Graduated compression stockings, leg elevation, regular walking, weight reduction, avoiding prolonged standing, and skin care. It is used for mild symptoms, pregnancy, unfit patients, and while awaiting treatment.

Q29. What are the indications for intervention?

MBBS ★☆☆

Troublesome symptoms, skin changes (lipodermatosclerosis, eczema), venous ulcer (active or healed), bleeding, recurrent thrombophlebitis, and cosmetic concern.

Q30. What are endovenous thermal ablation techniques?

MBBS ★★☆

Endovenous laser ablation (EVLA) and radiofrequency ablation (RFA). Under ultrasound guidance and tumescent local anaesthesia, a catheter heats and closes the incompetent saphenous vein from inside. They are now first-line treatment for truncal reflux.

Q31. What is foam sclerotherapy?

MBBS ★★☆

Injection of a sclerosant (sodium tetradecyl sulphate or polidocanol) mixed with air into the vein to damage its endothelium and close it. It is used for tributaries, recurrent veins and patients unsuitable for ablation.

Q32. Describe the steps of saphenofemoral ligation and stripping.

MBBS ★★☆

Groin incision over the SFJ; identification and ligation of all tributaries; flush ligation of the great saphenous vein with the femoral vein; stripping of the vein down to just below the knee; and multiple stab avulsions of the varicosities.

Q33. How will you manage a venous ulcer?

MBBS ★★☆

Cleaning and dressing, treatment of infection and eczema, multilayer (four-layer) compression bandaging if ABPI is adequate, elevation and exercise. Once healed or during healing, superficial reflux is treated (ablation or surgery) to speed healing and prevent recurrence. Skin grafting is used for large ulcers.

Q34. How will you manage bleeding from a varicose vein?

MBBS ★☆☆

Lie the patient down, elevate the leg and apply firm direct pressure with a pad and bandage. Then treat the underlying varicose veins to prevent recurrence.

Q35. How will you treat superficial thrombophlebitis?

MBBS ★★☆

Analgesics and NSAIDs, warm compresses, compression and mobilisation. If it is near the SFJ or extensive, duplex is done to exclude DVT and anticoagulation is given.

Complications

Q36. What are the complications of varicose veins?

MBBS ★☆☆

Haemorrhage, thrombophlebitis, oedema, pigmentation, eczema, lipodermatosclerosis, venous ulcer, DVT, and rarely Marjolin's ulcer.

Q37. What are the complications of varicose vein surgery?

MBBS ★★☆

Haematoma and bruising, wound infection, saphenous or sural nerve injury, lymphocele, DVT, injury to the femoral vein or artery, and recurrence.

Q38. What are the complications of endovenous ablation?

MBBS ★★☆

Bruising, skin burns, thrombophlebitis, paraesthesia from nerve injury, and endovenous heat-induced thrombosis extending into the femoral vein, which may need anticoagulation.

Q39. What are the causes of recurrent varicose veins?

MBBS ★★☆

Neovascularisation at the groin, missed or untied tributaries, failure to ligate flush with the femoral vein, incompetent perforators, untreated small saphenous reflux, and disease progression.

Q40. What are the complications of sclerotherapy?

MBBS ★★☆

> Skin pigmentation, thrombophlebitis, skin necrosis from extravasation, allergic reaction, DVT, and transient visual or neurological disturbance with foam.

Recent Advances

Q41. What is cyanoacrylate glue closure of veins?

MBBS ★★☆

> A non-thermal, non-tumescent technique in which medical glue is injected into the saphenous vein through a catheter to seal it, avoiding multiple local anaesthetic injections and heat-related nerve injury.

Q42. What is mechanochemical ablation?

MBBS ★★☆

> A rotating wire damages the vein lining while a sclerosant is infused, closing the vein without heat or tumescent anaesthesia.

Q43. What did the EVRA trial show?

MBBS ★★★

> In patients with venous leg ulcers, early endovenous ablation of superficial reflux together with compression healed ulcers faster and reduced recurrence compared with compression alone and deferred ablation.

Q44. What is deep venous stenting?

MBBS ★★★

> Placement of dedicated venous stents in obstructed iliac veins, as in post-thrombotic syndrome or iliac vein compression (May–Thurner), to relieve swelling, pain and ulceration.

Q45. What is polidocanol microfoam?

MBBS ★★☆

> A pharmaceutical-grade, consistent foam of polidocanol for injection into incompetent saphenous and tributary veins, giving more predictable results than hand-made foam.

Examiner's Favourite (Hard Questions)

Q46. Why is the great saphenous vein stripped only to just below the knee and not to the ankle?

MBBS ★★★

> Below the knee the vein runs with the saphenous nerve, so stripping to the ankle commonly injures the nerve. Most of the reflux is controlled by stripping the thigh segment.

Q47. Can varicose veins be treated in a patient with previous DVT?

MBBS ★★★

> Only if the deep veins are patent on duplex. If the deep veins are blocked, the superficial veins act as collaterals, and removing them would worsen venous drainage.

Q48. Why is high compression contraindicated in peripheral arterial disease?

MBBS ★★★

> Compression reduces skin perfusion; with poor arterial inflow it can cause skin necrosis, ulceration and even limb loss. The ABPI must be checked first.

Q49. What is Marjolin's ulcer?

MBBS
★★★

A squamous cell carcinoma arising in a chronic scar or ulcer, such as a long-standing venous ulcer or burn scar. It is slow growing, painless, and does not spread to lymph nodes early because the scar tissue lacks lymphatics.

Quick Recall

- ✓ Examine standing; duplex ultrasound is the gold standard.
- ✓ Trendelenburg tests SFJ; Perthes tests deep veins.
- ✓ SFJ: 2.5–4 cm below and lateral to pubic tubercle; ligate all tributaries.
- ✓ CEAP: C2 varicose veins, C4 skin changes, C6 active ulcer.
- ✓ First line: endovenous ablation (EVLA, RFA); stripping only to the knee.
- ✓ Check ABPI (over 0.8) before compression for a venous ulcer.
- ✓ Non-healing ulcer with raised edge: biopsy for Marjolin's.

CHAPTER

8

PART A: LONG CASES

Peripheral Arterial Disease and Diabetic Foot

Chronic and acute limb ischaemia, gangrene and the diabetic foot

Sample Case Presentation

Mr. I, a 60-year-old diabetic for 15 years and a heavy smoker, presents with pain in the right calf on walking about 100 metres for 1 year, relieved by rest, and pain in the right foot at night for 1 month that is relieved by hanging the leg over the bed. Two weeks ago the right great toe became black. On examination the right foot is cold and pale with hair loss and shiny skin. There is dry gangrene of the right great toe with a line of demarcation. The right femoral pulse is palpable, but the popliteal, dorsalis pedis and posterior tibial pulses are absent. Buerger's angle is 20 degrees. My provisional diagnosis is chronic limb-threatening ischaemia of the right lower limb due to femoropopliteal atherosclerosis, with dry gangrene of the great toe in a diabetic patient.

History and Clinical Examination

Q1. What is intermittent claudication? How does its site indicate the level of disease?

MBBS ★☆☆

Cramp-like pain in the muscles on walking, relieved by rest, due to inadequate blood flow. Buttock and thigh claudication suggests aortoiliac disease; calf claudication suggests femoropopliteal disease.

Q2. What are the features of ischaemic rest pain?

MBBS ★☆☆

Persistent burning pain in the toes and forefoot, worse at night and on elevation, relieved by hanging the leg out of bed. Patients often sleep in a chair. It indicates critical ischaemia.

Q3. What risk factors will you ask about?

MBBS ★☆☆

Smoking, diabetes, hypertension, hyperlipidaemia, family history, and symptoms of disease elsewhere: angina, myocardial infarction and stroke.

Q4. What is the Fontaine classification?

MBBS ★★☆

Stage I asymptomatic, stage II intermittent claudication (IIa beyond 200 m, IIb under 200 m), stage III ischaemic rest pain, stage IV ulceration or gangrene.

Q5. What is Buerger's test?

MBBS ★★☆

The legs are elevated with the patient supine; in ischaemia the foot becomes pale. The angle at which it blanches is Buerger's angle; under 20 degrees indicates severe ischaemia. The patient then sits with legs hanging; the foot slowly becomes red and purple (reactive hyperaemia).

Q6. Where will you palpate the pulses of the lower limb?

MBBS ★☆☆

Femoral at the mid-inguinal point; popliteal deep in the popliteal fossa with the knee slightly flexed; posterior tibial behind the medial malleolus; and dorsalis pedis lateral to the extensor hallucis longus tendon on the dorsum of the foot.

Q7. What are the signs of chronic limb ischaemia?

MBBS ★☆☆

Cold, pale limb, loss of hair, thin shiny skin, brittle nails, muscle wasting, delayed capillary refill, venous guttering, ulcers on pressure points and toes, and gangrene.

Q8. What are the six Ps of acute limb ischaemia?

MBBS ★☆☆

Pain, pallor, pulselessness, perishing cold, paraesthesia and paralysis. Paraesthesia and paralysis indicate a threatened limb that needs urgent revascularisation.

Surgical Anatomy

Q9. Describe the course of the femoral artery.

MBBS ★☆☆

It begins as a continuation of the external iliac artery behind the inguinal ligament at the mid-inguinal point, descends in the femoral triangle and adductor canal, and becomes the popliteal artery at the adductor hiatus.

Q10. Why is the popliteal pulse difficult to feel?

MBBS ★★☆

The popliteal artery lies deep, on the posterior surface of the femur and knee joint, covered by the popliteal fat and fascia. The knee is flexed slightly to relax the fascia, and the pulse is felt against bone with both hands.

Q11. What collateral circulation develops in femoropopliteal occlusion?

MBBS ★★☆

Collaterals from the profunda femoris through the genicular branches around the knee reconstitute the popliteal artery. This is why the limb may survive and claudication may occur rather than gangrene.

Q12. Where is the dorsalis pedis pulse absent normally?

MBBS ★★☆

It is congenitally absent in about 10% of people. Absence of both foot pulses, or absence with signs of ischaemia, is significant.

Q13. What is Leriche syndrome?

MBBS ★★★

Aortoiliac occlusive disease presenting with bilateral buttock and thigh claudication, absent or weak femoral pulses, and erectile dysfunction.

Pathology and Classification

Q14. What are the causes of chronic lower limb ischaemia?

MBBS ★☆☆

Atherosclerosis (commonest), thromboangiitis obliterans (Buerger's disease), Takayasu's arteritis, popliteal entrapment, cystic adventitial disease, and fibromuscular dysplasia.

Q15. What is Buerger's disease?

MBBS ★★☆

Thromboangiitis obliterans: a non-atherosclerotic inflammatory occlusive disease of small and medium arteries and veins, affecting young male smokers. It involves distal limbs, causes rest pain and digital gangrene, and is associated with migratory thrombophlebitis. Stopping smoking is essential.

Q16. Differentiate dry and wet gangrene.

MBBS ★☆☆

Dry gangrene: gradual arterial occlusion, dry, black, mummified tissue with a clear line of demarcation and little infection. Wet gangrene: sudden occlusion or venous obstruction with infection, swollen, foul-smelling, spreading tissue with toxaemia, needing urgent surgery.

Q17. What is the pathophysiology of the diabetic foot?

MBBS ★★☆

Peripheral neuropathy (sensory loss, motor imbalance with deformities, autonomic dry skin), peripheral arterial disease (often distal, tibial vessels), and infection due to impaired immunity. Together these lead to unnoticed injury, ulceration and spreading infection.

Q18. What is a Charcot foot?

MBBS ★★☆

A neuropathic arthropathy in which loss of protective sensation and altered blood flow lead to fractures, dislocation and destruction of the foot joints, typically the midfoot, producing a rocker-bottom deformity. The acute stage presents as a warm, red, swollen foot that can mimic infection.

Differential Diagnosis

Q19. How will you differentiate vascular claudication from neurogenic claudication?

MBBS ★★☆

Vascular: calf pain after a fixed distance, relieved by standing still, absent pulses. Neurogenic (spinal stenosis): pain, numbness or weakness in the legs on walking or standing, relieved by sitting or bending forward, with normal pulses.

Q20. What are the causes of gangrene?

MBBS ★☆☆

Vascular (atherosclerosis, embolism, Buerger's disease, Raynaud's), diabetic, infective (gas gangrene, Fournier's), traumatic (crush, tight plaster), physical (frostbite, burns, electricity), and chemical (vasopressors, intra-arterial injection).

Q21. How will you differentiate a neuropathic ulcer from an ischaemic ulcer?

MBBS ★☆☆

Neuropathic: on pressure points (metatarsal heads, heel), painless, punched out with surrounding callus, warm foot with pulses present, loss of sensation. Ischaemic: on toes and margins, painful, pale base, cold foot with absent pulses.

Q22. How will you differentiate embolic from thrombotic acute limb ischaemia?

MBBS ★★☆

Embolic: sudden onset, an embolic source (atrial fibrillation, recent MI), normal pulses in the other leg, no history of claudication, severe ischaemia. Thrombotic: previous claudication, absent pulses in the other leg, less sudden onset due to existing collaterals.

Investigations

Q23. What is the ankle-brachial pressure index and how is it interpreted?

MBBS ★☆☆

Ankle systolic pressure divided by brachial systolic pressure, measured with a hand-held Doppler. Normal about 1.0 or above; 0.5–0.9 claudication; under 0.5 critical ischaemia. Values above 1.3 suggest calcified, incompressible arteries.

Q24. Why is the ABPI misleading in diabetics and what will you do instead?

MBBS ★★☆

Medial arterial calcification makes the vessels incompressible, giving a falsely high ABPI. Toe pressures, toe-brachial index or Doppler waveform analysis are used instead.

Q25. What imaging is used to plan revascularisation?

MBBS ★☆☆

Duplex ultrasound first, then CT angiography or MR angiography. Digital subtraction angiography is used when endovascular treatment is planned at the same time.

Q26. How will you investigate a diabetic foot ulcer?

MBBS ★☆☆

Blood sugar and HbA1c, full blood count, CRP, renal function, deep tissue or bone culture (not superficial swabs), X-ray of the foot for osteomyelitis, gas and foreign bodies, and assessment of pulses, ABPI or toe pressures and sensation.

Q27. How will you diagnose osteomyelitis in a diabetic foot?

MBBS ★★☆

Positive probe-to-bone test, X-ray changes (which appear late), MRI (most sensitive), and bone biopsy with culture for definitive diagnosis.

Q28. How will you test for protective sensation?

MBBS ★☆☆

With a 10 g Semmes–Weinstein monofilament at standard sites on the sole; inability to feel it indicates loss of protective sensation. A 128 Hz tuning fork tests vibration sense.

Q29. What is the Wagner classification of diabetic foot?

MBBS ★★☆

Grade 0 intact skin at risk, 1 superficial ulcer, 2 deep ulcer to tendon or capsule, 3 deep ulcer with abscess or osteomyelitis, 4 forefoot gangrene, 5 whole-foot gangrene.

Management

Q30. What is the best medical therapy for peripheral arterial disease?

MBBS ★☆☆

Stop smoking, antiplatelet therapy (aspirin or clopidogrel), statin, control of blood pressure and diabetes, weight reduction and supervised exercise. Cilostazol can improve walking distance.

Q31. What are the indications for revascularisation?

MBBS ★★☆

Chronic limb-threatening ischaemia (rest pain, ulceration, gangrene) and severe, lifestyle-limiting claudication not improving with exercise and medical therapy.

Q32. How will you choose between angioplasty and bypass?

MBBS ★★☆

Short stenoses or occlusions are treated by angioplasty with or without stenting. Long occlusions and multilevel disease in fit patients with a good vein are treated by bypass. The decision depends on the anatomy, the patient's fitness and the availability of vein.

Q33. What is the best conduit for a femoropopliteal bypass?

MBBS ★★☆

The patient's own great saphenous vein (reversed or in situ) gives the best long-term patency, especially below the knee. Prosthetic grafts (PTFE, Dacron) are used above the knee when vein is unavailable.

Q34. How will you manage acute limb ischaemia?

MBBS ★★☆

Immediate heparin, analgesia and oxygen. Embolism is treated by embolectomy with a Fogarty balloon catheter. Thrombosis on diseased vessels may need thrombolysis, angioplasty or bypass. Fasciotomy is done for compartment syndrome. A non-viable limb needs amputation.

Q35. What are the principles of managing a diabetic foot ulcer?

MBBS ★☆☆

Control of infection (drainage, debridement and antibiotics), off-loading of pressure, glycaemic control, revascularisation if ischaemic, wound care, and amputation when necessary. A multidisciplinary foot team gives the best results.

Q36. How will you choose the level of amputation?

MBBS ★★☆

The most distal level that will heal and allow function: toe or ray amputation for localised gangrene, transmetatarsal for forefoot, below-knee when the foot cannot be saved, and above-knee when below-knee healing is unlikely. Skin warmth, bleeding, pulses and pressures guide the decision.

Q37. What advice will you give for diabetic foot care?

MBBS ★☆☆

Inspect the feet daily, keep them clean and dry, moisturise but not between the toes, cut nails straight, never walk barefoot, wear well-fitting footwear, avoid hot water bottles, and report any injury early.

Complications

Q38. What is reperfusion injury after revascularisation of an acutely ischaemic limb?

MBBS ★★☆

Restored flow releases potassium, acid, myoglobin and free radicals from ischaemic muscle, causing hyperkalaemia, acidosis, myoglobinuric renal failure, arrhythmias and compartment syndrome.

Q39. How will you recognise and treat compartment syndrome?

MBBS ★★☆

Severe pain out of proportion, pain on passive stretch, tense swollen compartments and paraesthesia; pulses may be present. It is treated by urgent four-compartment fasciotomy of the leg.

Q40. What are the complications of a bypass graft?

MBBS ★★☆

Early: bleeding, graft thrombosis, wound infection, lymphocele. Late: graft stenosis or occlusion, graft infection, false aneurysm at the anastomosis.

Q41. What are the complications of amputation?

MBBS ★☆☆

Haematoma, infection, wound breakdown, flap necrosis, phantom limb pain, stump neuroma, joint contracture, DVT, and the need for revision to a higher level.

Q42. How will you manage spreading wet gangrene of the foot with sepsis?

MBBS ★★☆

Resuscitate and give IV antibiotics, control blood sugar, and perform urgent guillotine amputation above the infection to control sepsis, followed by definitive amputation later when the patient is stable.

Recent Advances

Q43. What are drug-coated balloons and drug-eluting stents?

MBBS ★★★

Balloons and stents coated with antiproliferative drugs (paclitaxel or sirolimus) that reduce restenosis after femoropopliteal angioplasty compared with plain balloon angioplasty.

Q44. What is dual pathway inhibition in peripheral arterial disease?

MBBS ★★★

Low-dose rivaroxaban (2.5 mg twice daily) with aspirin, which reduces major limb and cardiovascular events in stable disease and after revascularisation (COMPASS, VOYAGER-PAD).

Q45. What did the BEST-CLI trial show?

MBBS ★★★

In chronic limb-threatening ischaemia, patients with an adequate great saphenous vein had better outcomes with surgical bypass than with an endovascular-first strategy.

Q46. What is the WIfI classification?

MBBS ★★☆

A staging system for the threatened limb based on Wound, Ischaemia and foot Infection, which predicts amputation risk and the benefit of revascularisation.

Q47. What newer measures help diabetic foot ulcers heal?

MBBS ★★☆

Total contact casting for off-loading, negative pressure wound therapy, topical oxygen therapy, and multidisciplinary diabetic foot teams with rapid access, which reduce major amputation.

Examiner's Favourite (Hard Questions)

Q48. Define chronic limb-threatening (critical) ischaemia.

MBBS ★★★

Ischaemic rest pain for more than 2 weeks, or ulceration or gangrene, due to proven arterial disease, typically with an ankle pressure below 50 mmHg or toe pressure below 30 mmHg.

Q49. Why are diabetic ulcers often painless and on pressure points?

MBBS ★★★

Peripheral neuropathy removes protective pain sensation, and motor neuropathy causes deformities (claw toes, prominent metatarsal heads) that concentrate pressure, so repeated unnoticed trauma causes ulcers at these points.

Q50. Why is below-knee amputation preferred over above-knee when possible?

MBBS
★★★

Preserving the knee joint greatly reduces the energy needed for walking with a prosthesis and improves the chance of independent mobility.

Q51. What is the line of demarcation and why do surgeons wait for it?

MBBS
★★★

A red, inflamed band between living and dead tissue in dry gangrene. Waiting allows the boundary to become clear so that amputation can be done at the most distal viable level; this is not done for wet gangrene.

Quick Recall

- ✓ Calf claudication = femoropopliteal; buttock = aortoiliac.
- ✓ Rest pain relieved by hanging the leg = critical ischaemia.
- ✓ ABPI: under 0.9 abnormal, under 0.5 critical; falsely high in diabetics.
- ✓ Six Ps of acute ischaemia; paralysis and paraesthesia = limb threatened.
- ✓ Best medical therapy: stop smoking, antiplatelet, statin, exercise.
- ✓ Diabetic foot: neuropathy + ischaemia + infection. Debride, off-load, control sugar.
- ✓ Dry gangrene: wait for demarcation. Wet gangrene with sepsis: urgent guillotine amputation.

CHAPTER

9

PART A: LONG CASES

Hepatomegaly and Hydatid Cyst of Liver

Hepatomegaly, cystic liver lesions, hydatid disease and liver abscess

Sample Case Presentation

Mrs. J, a 35-year-old housewife from a village where the family keeps sheep and dogs, presents with dull aching pain and a feeling of heaviness in the right upper abdomen for 1 year. There is no fever, jaundice or weight loss. On examination she is well nourished and not jaundiced. The liver is palpable 6 cm below the right costal margin with a smooth, rounded, non-tender, cystic swelling arising from its lower edge, moving with respiration. I cannot get above it, and it is dull on percussion continuous with the liver dullness. The spleen is not palpable and there is no ascites. My provisional diagnosis is hydatid cyst of the right lobe of the liver, with differentials of simple liver cyst and amoebic liver abscess.

History and Clinical Examination

Q1. What will you ask in the history of a patient with suspected hydatid cyst?

MBBS ★☆☆

- Residence in a rural area, contact with dogs, sheep or cattle.
- Duration of pain, heaviness or swelling in the right upper abdomen.
- Fever and rigors (infected cyst), jaundice and colic (rupture into bile ducts).
- Urticaria, itching or collapse (allergic reaction from leakage).
- Cough with expectoration of salty fluid or membranes (rupture into a bronchus).

Q2. How will you confirm that a mass in the right upper abdomen is the liver?

MBBS ★☆☆

It is continuous with the liver dullness, the examining hand cannot get above it, it moves downward with respiration, its lower edge is felt below the costal margin, and it is not bimanually palpable or ballotable.

Q3. How will you differentiate an enlarged liver from an enlarged right kidney?

MBBS ★★☆

Liver: cannot get above it, moves early with respiration, dull to percussion continuous with liver dullness, not ballotable. Kidney: can get above it, bimanually palpable and ballotable, with a band of colonic resonance in front of it.

Q4. What features of a palpable liver will you describe?

MBBS ★☆☆

Size below the costal margin and liver span by percussion, edge (sharp or rounded), surface (smooth or nodular), consistency, tenderness, pulsation, and any discrete swelling arising from it, with a bruit or rub.

Q5. What is the hydatid thrill?

MBBS ★★☆

A classical sign elicited by placing three fingers on a large superficial cyst and tapping the middle one: a vibratory sensation is felt by the others. It is rarely elicited and not reliable.

Q6. What history suggests an amoebic liver abscess?

MBBS ★★☆

> Fever, sweating, right upper abdominal pain referred to the right shoulder, weight loss and tender hepatomegaly, sometimes with a past history of dysentery. Intercostal tenderness is a characteristic sign.

Q7. What signs suggest a complication of a hydatid cyst?

MBBS ★★☆

> Jaundice and cholangitis (rupture into bile ducts), acute abdomen with anaphylaxis (intraperitoneal rupture), fever and tenderness (infection), and pleural signs (rupture through the diaphragm).

Surgical Anatomy

Q8. Describe the segmental anatomy of the liver.

MBBS ★☆☆

> Couinaud divided the liver into eight functionally independent segments, each with its own portal pedicle and hepatic venous drainage. The three hepatic veins divide the liver into sectors, and the portal vein bifurcation divides them into upper and lower segments. Segment I is the caudate lobe.

Q9. What is the blood supply of the liver?

MBBS ★☆☆

> Dual supply: the portal vein provides about 75% of the blood flow, and the hepatic artery about 25%, though each supplies roughly half of the oxygen. Drainage is through the hepatic veins into the inferior vena cava.

Q10. Why is the right lobe most commonly affected by hydatid cysts and abscesses?

MBBS ★★☆

> The right lobe is larger, and portal blood from the superior mesenteric vein (draining the gut) streams preferentially to the right lobe.

Q11. What is the Pringle manoeuvre?

MBBS ★★☆

> Compression of the hepatoduodenal ligament (hepatic artery and portal vein) with fingers or a clamp to control bleeding from the liver during surgery or trauma.

Q12. What is the bare area of the liver and its importance?

MBBS ★★★

> The posterior surface of the right lobe not covered by peritoneum, in direct contact with the diaphragm. Infection or cysts here can spread to the pleura and lung without passing through the peritoneal cavity.

Pathology and Classification

Q13. Describe the life cycle of Echinococcus granulosus.

MBBS ★☆☆

> The adult tapeworm lives in the intestine of the dog (definitive host). Eggs passed in faeces are ingested by sheep or cattle (intermediate host), and man becomes an accidental intermediate host through contaminated food or contact with dogs. The embryos reach the liver through the portal vein and form cysts. Dogs are infected by eating the viscera of infected sheep.

Q14. Which organs are involved in hydatid disease?

MBBS ★☆☆

> Liver (about 70%), lung (about 20%), and less commonly the spleen, kidney, brain, bone and muscle.

Q15. Describe the layers of a hydatid cyst.

MBBS ★★☆

- Pericyst (adventitia): a fibrous layer formed by the host.
- Laminated membrane (ectocyst): white, acellular, like the white of a boiled egg.
- Germinal layer (endocyst): produces brood capsules, scolices and daughter cysts.

The fluid is clear and contains scolices and brood capsules, called hydatid sand.

Q16. What is the WHO classification of hepatic hydatid cysts?

MBBS ★★☆

Based on ultrasound: CL undifferentiated cyst; CE1 unilocular with visible wall (active); CE2 multivesicular with daughter cysts (active); CE3a detached membrane (water lily sign) and CE3b daughter cysts in solid matrix (transitional); CE4 heterogeneous solid content and CE5 calcified wall (inactive).

Q17. What are the possible fates of a hydatid cyst?

MBBS ★★☆

Slow growth, death and calcification, secondary infection, rupture into the biliary tree, peritoneum, pleura or bronchus, and compression of adjacent structures.

Q18. What is alveolar hydatid disease?

MBBS ★★★

Infection by Echinococcus multilocularis, with foxes as the definitive host. It grows by infiltrative budding like a malignant tumour, invades vessels and ducts, and may metastasise. Treatment is radical resection with long-term albendazole.

Differential Diagnosis

Q19. Classify the causes of hepatomegaly.

MBBS ★☆☆

- Infective: hepatitis, liver abscess (amoebic, pyogenic), hydatid cyst, malaria.
- Neoplastic: hepatocellular carcinoma, metastases, haemangioma, adenoma.
- Congestive: congestive cardiac failure, Budd–Chiari syndrome.
- Infiltrative and metabolic: fatty liver, amyloidosis, haemochromatosis, lymphoma, leukaemia.
- Biliary: obstructive jaundice. Cystic: simple and polycystic disease.

Q20. What is the differential diagnosis of a cystic lesion in the liver?

MBBS ★☆☆

Simple cyst, hydatid cyst, liver abscess, polycystic liver disease, biliary cystadenoma or cystadenocarcinoma, cystic metastases, and choledochal cyst.

Q21. How will you differentiate an amoebic from a pyogenic liver abscess?

MBBS ★★☆

Amoebic: younger males, single, usually right lobe, history of dysentery, anchovy-sauce pus, positive amoebic serology, responds to metronidazole. Pyogenic: older patients, often multiple, biliary or abdominal source, diabetes, positive blood and pus cultures, needs drainage and antibiotics.

Q22. What are the causes of a hard, nodular liver?

MBBS ★★☆

Metastatic disease, hepatocellular carcinoma, macronodular cirrhosis, and occasionally multiple calcified hydatid cysts.

Investigations

Q23. What blood tests will you do?

MBBS ★☆☆

Full blood count (eosinophilia in about a quarter of patients), liver function tests, and hydatid serology (ELISA, indirect haemagglutination). Serology may be negative in calcified or intact cysts and in lung cysts.

Q24. What are the ultrasound features of a hydatid cyst?

MBBS ★☆☆

A well-defined cyst with a double wall, daughter cysts within giving a honeycomb or cartwheel appearance, floating hydatid sand, a detached membrane (water lily sign) and wall calcification.

Q25. What is the role of CT scan?

MBBS ★★☆

It defines the number, size and site of cysts, their relation to the hepatic veins, portal pedicles and bile ducts, calcification, extrahepatic cysts, and complications. It is essential for surgical planning.

Q26. How will you detect communication between the cyst and the bile ducts?

MBBS ★★☆

Suspect it with jaundice, raised bilirubin and ALP, or dilated ducts. MRCP shows the communication; ERCP confirms it and allows sphincterotomy and clearance of membranes from the CBD.

Q27. Why will you do a chest X-ray?

MBBS ★☆☆

To look for coexisting lung hydatid cysts, a raised right hemidiaphragm, pleural effusion, and evidence of rupture into the chest.

Q28. Why is diagnostic needle aspiration of a suspected hydatid cyst dangerous?

MBBS ★★★

Leakage of hydatid fluid can cause anaphylaxis, and spillage of scolices causes secondary hydatidosis in the peritoneum. Puncture is done only as part of the PAIR procedure under albendazole cover with resuscitation facilities ready.

Q29. What will you do for a suspected amoebic liver abscess?

MBBS ★★☆

Ultrasound, raised white count and ESR, amoebic serology, and chest X-ray. Aspiration is reserved for large abscesses, left lobe abscesses, those at risk of rupture, or failure to respond to metronidazole.

Management

Q30. What is the role of albendazole in hydatid disease?

MBBS ★★☆

Albendazole (about 10–15 mg/kg/day) is used alone for small, multiple, inoperable or disseminated cysts and in unfit patients. It is started before surgery or PAIR to sterilise the cyst and reduce the risk of recurrence, and continued for 1–3 months afterwards.

Q31. What is PAIR and when is it used?

MBBS ★★☆

Puncture, Aspiration, Injection of a scolicidal agent and Re-aspiration, under ultrasound guidance with albendazole cover. It is used for unilocular cysts (CE1 and CE3a) in patients unfit for or refusing surgery. It is avoided in cysts communicating with the bile ducts, multivesicular cysts, inactive cysts and lung cysts.

Q32. What are the surgical options for hydatid cyst of the liver?

MBBS ★★☆

Conservative: deroofing, evacuation of contents and germinal layer, partial pericystectomy and management of the residual cavity (omentoplasty, capitonnage or drainage). Radical: total pericystectomy or liver resection, which have lower recurrence but higher risk.

Q33. Which scolicidal agents are used and what precaution is needed?

MBBS ★★☆

Hypertonic saline (15–20%), povidone iodine, cetrimide and alcohol. They must not be injected if the cyst communicates with the bile ducts, as they can cause sclerosing cholangitis.

Q34. What precautions will you take during surgery for hydatid cyst?

MBBS ★★☆

Preoperative albendazole; packs soaked in scolicidal solution around the cyst; aspiration before opening to avoid spillage; careful removal of membranes; checking for bile leaks; and adrenaline, hydrocortisone and antihistamines ready for anaphylaxis.

Q35. How will you manage a cystobiliary communication found at surgery?

MBBS ★★★

The opening in the cyst wall is sutured from inside the cavity. Large communications or membranes in the CBD need CBD exploration with T-tube or postoperative ERCP with sphincterotomy to reduce biliary pressure and allow the fistula to close.

Q36. How will you manage an inactive calcified hydatid cyst?

MBBS ★★☆

Asymptomatic inactive cysts (CE4, CE5) are usually observed with periodic ultrasound, as they are dead and do not need treatment.

Q37. How will you treat an amoebic liver abscess?

MBBS ★★☆

Metronidazole (about 10 days) followed by a luminal agent such as diloxanide furoate to clear intestinal cysts. Aspiration or percutaneous drainage for large or left-lobe abscesses, impending rupture or no response in 3–5 days. Surgery only for rupture with peritonitis not controlled by drainage.

Complications

Q38. What are the complications of a hydatid cyst?

MBBS ★☆☆

Rupture into the bile ducts (commonest, causing jaundice and cholangitis), into the peritoneum (anaphylaxis and secondary hydatidosis), or into the pleura and bronchus; secondary infection; compression of bile ducts or vessels; and portal hypertension.

Q39. What are the complications after surgery for hydatid cyst?

MBBS ★★☆

Bile leak and external biliary fistula, infected residual cavity, recurrence, anaphylaxis during surgery, and secondary sclerosing cholangitis from scolicidal agents.

Q40. What are the side effects of albendazole?

MBBS ★★☆

Hepatotoxicity (raised transaminases), neutropenia, alopecia, abdominal pain and nausea. It is teratogenic and avoided in early pregnancy. Liver function and blood counts are monitored.

Q41. How will you manage anaphylaxis during hydatid surgery?

MBBS ★★☆

Stop the procedure, give IM or IV adrenaline, oxygen and airway support, IV fluids, hydrocortisone and antihistamines, and complete the operation once the patient is stable.

Q42. What causes recurrence of hydatid disease after surgery?

MBBS ★★★

Spillage of scolices at operation, missed small or exophytic cysts, incomplete removal of the germinal layer, and reinfection. Recurrence is reduced by albendazole and careful technique.

Recent Advances

Q43. What is the stage-specific approach to hepatic hydatid disease?

MBBS ★★☆

Treatment is chosen by WHO ultrasound stage: albendazole or PAIR for small active cysts, catheterisation techniques or surgery for multivesicular cysts, and watch-and-wait for inactive CE4 and CE5 cysts.

Q44. What is the role of laparoscopy in hydatid surgery?

MBBS ★★☆

Laparoscopic deroofing, evacuation and pericystectomy are done for accessible, uncomplicated cysts in experienced hands, with shorter hospital stay, provided spillage is prevented.

Q45. What are percutaneous catheterisation techniques?

MBBS ★★★

Modified catheterisation techniques (such as PEVAC and MoCaT) evacuate the contents and membranes of multivesicular cysts through a large-bore catheter under imaging, extending percutaneous treatment beyond PAIR.

Q46. How is endoscopy used in hydatid disease?

MBBS ★★☆

ERCP with sphincterotomy clears membranes from the CBD and treats cystobiliary fistula before or after surgery, reducing postoperative bile leak.

Q47. How is hydatid disease being prevented in animals?

MBBS ★★☆

The EG95 vaccine for sheep, regular praziquantel treatment of dogs, and controlled slaughter break the transmission cycle.

Examiner's Favourite (Hard Questions)

Q48. Why is albendazole given before surgery?

MBBS
★★★

It reduces the viability of the scolices and the pressure inside the cyst, lowering the risk of anaphylaxis and secondary seeding if spillage occurs during the operation.

Q49. Why does the patient develop jaundice in hydatid disease?

MBBS
★★★

Rupture of the cyst into the bile ducts lets daughter cysts and membranes pass into the CBD and block it. Less often, a large cyst compresses the hilar ducts.

Q50. What is the significance of the water lily sign?

MBBS
★★★

Collapsed, floating laminated membrane within the cyst fluid, seen on ultrasound or CT. It indicates detachment of the endocyst (CE3a) and is pathognomonic of hydatid disease.

Q51. How do you prevent hydatid disease in the community?

MBBS
★★★

Regular deworming of dogs, preventing dogs from eating raw offal of slaughtered animals, controlled slaughter of livestock, hand-washing and hygiene, and health education.

Quick Recall

- ✓ Liver mass: cannot get above it, moves with respiration, dull, not ballotable.
- ✓ Dog definitive host; sheep intermediate; man accidental.
- ✓ Layers: pericyst (host), laminated membrane, germinal layer (scolices).
- ✓ Ultrasound: daughter cysts, honeycomb, water lily sign. CT for planning.
- ✓ Never aspirate for diagnosis: anaphylaxis and seeding.
- ✓ Albendazole before and after surgery; PAIR for CE1 and CE3a.
- ✓ No scolicidal agent if bile duct communication: risk of sclerosing cholangitis.

CHAPTER

10

PART B: SHORT CASES

Parathyroid Disease

Primary, secondary and tertiary hyperparathyroidism

Sample Case Presentation

Mrs. E, a 48-year-old schoolteacher, was referred with recurrent left renal colic and a raised serum calcium found on routine testing. She complains of tiredness, constipation, generalised bone aches and low mood for one year. There is no neck swelling, no history of neck irradiation, and no family history of endocrine disease. Examination of the neck is normal and no mass is palpable. Her serum calcium is 2.9 mmol/l with a raised PTH and a low phosphate. My provisional diagnosis is primary hyperparathyroidism, probably due to a single parathyroid adenoma.

History and Clinical Examination

Q1. What are the clinical features of hyperparathyroidism?

BDS + MBBS
★☆☆

Remembered as "stones, bones, abdominal groans and psychic moans": renal stones and polyuria; bone pain and fractures; constipation, peptic ulcer and pancreatitis; depression, fatigue and confusion. Today most patients are found incidentally with raised calcium.

Q2. Why is a parathyroid adenoma usually not palpable?

BDS + MBBS
★★☆

It is small (often under 1 g), soft and lies deep behind the thyroid. A palpable hard neck mass with very high calcium should raise suspicion of parathyroid carcinoma.

Q3. What will you ask to exclude a familial syndrome?

BDS + MBBS
★★☆

Family history of hypercalcaemia, kidney stones, pituitary or pancreatic tumours (MEN 1), and medullary thyroid cancer or phaeochromocytoma (MEN 2A).

Q4. What drug history is relevant in hypercalcaemia?

BDS + MBBS
★★☆

Thiazide diuretics, lithium, vitamin D and calcium supplements, and vitamin A, all of which can raise serum calcium.

Q5. What eye sign may be seen in long-standing hypercalcaemia?

MBBS
★★☆

Band keratopathy: calcium deposited in the cornea at the limbus, seen as a horizontal band.

Surgical Anatomy and Embryology

Q6. How many parathyroid glands are there and where do they lie?

BDS + MBBS
★☆☆

Usually four, two on each side behind the thyroid lobes. The superior glands are fairly constant, near the cricothyroid junction. The inferior glands are more variable, usually near the lower pole of the thyroid. Each normal gland weighs about 30–50 mg.

Q7. Describe the embryology of the parathyroid glands.

BDS + MBBS
★★☆

The superior glands arise from the fourth pharyngeal pouch and migrate a short distance. The inferior glands arise from the third pouch with the thymus and migrate further, so they are more often ectopic.

Q8. What are the ectopic sites of parathyroid glands?

BDS + MBBS
★★☆

Within the thymus or anterior mediastinum, inside the thyroid, in the carotid sheath, behind the oesophagus (retro-oesophageal), and high in the neck near the carotid bifurcation.

Q9. What is the blood supply of the parathyroid glands?

BDS + MBBS
★☆☆

Mainly from the inferior thyroid artery for both superior and inferior glands, with some supply to the superior glands from the superior thyroid artery.

Q10. What is the relation of the parathyroids to the recurrent laryngeal nerve?

MBBS
★★★

The superior gland usually lies posterior (dorsal) to the nerve, and the inferior gland anterior (ventral) to it.

Physiology and Pathology

Q11. What are the actions of parathyroid hormone?

BDS + MBBS
★☆☆

PTH raises serum calcium by increasing bone resorption, increasing calcium reabsorption and phosphate excretion in the kidney, and stimulating renal production of active vitamin D (1,25-dihydroxyvitamin D), which increases intestinal calcium absorption.

Q12. Define primary, secondary and tertiary hyperparathyroidism.

BDS + MBBS
★☆☆

- Primary: autonomous PTH secretion from the parathyroid itself; calcium high.
- Secondary: compensatory PTH rise due to low calcium, usually in chronic kidney disease or vitamin D deficiency; calcium low or normal.
- Tertiary: autonomous secretion developing after long-standing secondary disease, often after renal transplant; calcium high.

Q13. What are the causes of primary hyperparathyroidism?

BDS + MBBS
★☆☆

Single adenoma (about 85%), multigland hyperplasia (about 10–15%, especially in MEN syndromes), double adenoma, and parathyroid carcinoma (under 1%).

Q14. What is a brown tumour?

BDS + MBBS
★★☆

A lytic bone lesion of osteitis fibrosa cystica in severe hyperparathyroidism, containing osteoclasts, haemorrhage and haemosiderin, which gives it a brown colour. It may present as a jaw swelling.

Q15. Which MEN syndromes involve the parathyroids?

MBBS
★★☆

MEN 1 (parathyroid hyperplasia, pituitary and pancreatic tumours; MEN1 gene) and MEN 2A (medullary thyroid cancer, phaeochromocytoma and parathyroid hyperplasia; RET gene).

Differential Diagnosis

Q16. What are the causes of hypercalcaemia?

BDS + MBBS
★☆☆

Primary hyperparathyroidism and malignancy account for about 90%. Others: tertiary hyperparathyroidism, vitamin D excess, thiazides and lithium, sarcoidosis, thyrotoxicosis, immobilisation, milk–alkali syndrome and familial hypocalciuric hypercalcaemia.

Q17. How will you differentiate hypercalcaemia of malignancy from primary hyperparathyroidism?

BDS + MBBS
★★☆

In malignancy PTH is suppressed, and the calcium is often very high with a short history; PTH-related peptide (PTHrP) may be raised. In primary hyperparathyroidism PTH is raised or inappropriately normal.

Q18. What is familial hypocalciuric hypercalcaemia and why is it important?

MBBS
★★★

An inherited defect of the calcium-sensing receptor causing mild hypercalcaemia with normal or slightly raised PTH but low urinary calcium. It is benign and parathyroidectomy does not cure it, so it must be excluded by measuring urinary calcium.

Q19. How will you differentiate the jaw lesion of hyperparathyroidism from other jaw swellings?

BDS + MBBS
★★☆

A brown tumour occurs with raised calcium and PTH, may be multiple, and regresses after parathyroidectomy. Giant cell granuloma, ameloblastoma and odontogenic cysts have normal biochemistry.

Investigations

Q20. What biochemical tests will you do?

BDS + MBBS
★☆☆

Serum calcium corrected for albumin (or ionised calcium), PTH, phosphate (low), alkaline phosphatase, creatinine, vitamin D level, and 24-hour urinary calcium.

Q21. How is serum calcium corrected for albumin?

BDS + MBBS
★★☆

Corrected calcium (mmol/l) = measured calcium + 0.02 × (40 − albumin in g/l).

Q22. Which imaging tests are used to localise a parathyroid adenoma?

BDS + MBBS
★★☆

> Ultrasound of the neck and technetium-99m sestamibi scan (with SPECT-CT), which are complementary. 4D-CT is used if these are negative or discordant. Imaging localises; it does not make the diagnosis, which is biochemical.

Q23. Why does sestamibi concentrate in a parathyroid adenoma?

MBBS
★★★

> Sestamibi is taken up by mitochondria, which are abundant in the oxyphil cells of adenomas. It washes out of the thyroid faster than from the adenoma, so the adenoma remains visible on delayed images.

Q24. What X-ray findings are seen in hyperparathyroid bone disease?

BDS + MBBS
★★☆

> Subperiosteal bone resorption on the radial side of the middle phalanges, "pepper-pot" skull, loss of the lamina dura around the teeth, brown tumours and osteoporosis.

Q25. What other investigations will you do in a patient with primary hyperparathyroidism?

BDS + MBBS
★☆☆

> DEXA scan for bone density and renal ultrasound or CT for stones and nephrocalcinosis.

Management

Q26. What is the definitive treatment of primary hyperparathyroidism?

BDS + MBBS
★☆☆

> Parathyroidectomy. It is the only curative treatment and is indicated in all symptomatic patients.

Q27. What are the indications for surgery in asymptomatic primary hyperparathyroidism?

MBBS
★★☆

> Serum calcium more than 0.25 mmol/l above the upper limit, age under 50, osteoporosis or fragility fracture, eGFR under 60 ml/min, kidney stones or nephrocalcinosis, and high urinary calcium.

Q28. What is focused (minimally invasive) parathyroidectomy?

BDS + MBBS
★★☆

> Removal of a single adenoma through a small incision when it has been localised preoperatively by concordant ultrasound and sestamibi. It shortens the operation and hospital stay.

Q29. What is intraoperative PTH monitoring?

MBBS
★★★

> PTH has a half-life of only a few minutes. A fall of more than 50% from the baseline 10 minutes after removing the adenoma indicates that the hyperfunctioning tissue has been removed (the Miami criterion).

Q30. How is parathyroid hyperplasia treated?

MBBS
★★☆

> Bilateral neck exploration with subtotal parathyroidectomy (removal of three and a half glands) or total parathyroidectomy with autotransplantation of a small piece into the forearm muscle. Cervical thymectomy is often added.

Q31. How will you manage a hypercalcaemic crisis?

BDS + MBBS
★★☆

Rehydration with IV normal saline (several litres), then loop diuretic once rehydrated, IV bisphosphonate (zoledronic acid or pamidronate), and calcitonin for rapid short-term effect. Treat the cause; urgent parathyroidectomy if due to hyperparathyroidism.

Q32. How is secondary hyperparathyroidism managed?

MBBS
★★☆

Mainly medically: phosphate binders, dietary phosphate restriction, active vitamin D and calcimimetics (cinacalcet). Parathyroidectomy is indicated when medical treatment fails, for severe bone disease, pruritus or calciphylaxis.

Q33. When is cinacalcet used?

BDS + MBBS
★★☆

It is a calcimimetic that sensitises the calcium-sensing receptor and lowers PTH. It is used in secondary hyperparathyroidism and in primary disease when surgery is unsuitable or has failed.

Complications

Q34. What are the complications of parathyroidectomy?

BDS + MBBS
★☆☆

Hypocalcaemia, recurrent laryngeal nerve injury, haematoma, persistent or recurrent hyperparathyroidism, and infection.

Q35. What is hungry bone syndrome?

BDS + MBBS
★★☆

Severe and prolonged hypocalcaemia after parathyroidectomy in patients with marked bone disease, as demineralised bone rapidly takes up calcium, phosphate and magnesium. It needs IV calcium, oral calcium and active vitamin D.

Q36. What is the difference between persistent and recurrent hyperparathyroidism?

MBBS
★★★

Persistent: hypercalcaemia within 6 months of surgery, usually due to a missed adenoma or unrecognised multigland disease. Recurrent: hypercalcaemia returning after 6 months of normocalcaemia.

Q37. Where will you look for a missing inferior parathyroid gland at operation?

MBBS
★★★

In the thymus and thyrothymic ligament, then within the thyroid, the carotid sheath, and lower in the anterior mediastinum. A missing superior gland is sought behind the oesophagus and in the tracheo-oesophageal groove.

Q38. What are the clinical signs of hypocalcaemia after surgery?

BDS + MBBS
★★☆

Perioral and fingertip tingling, cramps, Chvostek's sign (twitching of facial muscles on tapping the facial nerve), Trousseau's sign (carpal spasm with an inflated BP cuff), tetany and seizures.

Recent Advances

Q39. What newer imaging localises parathyroid adenomas?

BDS + MBBS
★★★

4D-CT and 18F-fluorocholine PET-CT, which detect small and ectopic adenomas and multigland disease more accurately than sestamibi in many cases.

Q40. How is near-infrared autofluorescence used in parathyroid surgery?

BDS + MBBS
★★☆

Parathyroid tissue glows under near-infrared light, helping surgeons identify and preserve normal glands during thyroidectomy and find adenomas during parathyroidectomy.

Q41. What is the role of thermal ablation for parathyroid adenomas?

BDS + MBBS
★★★

Ultrasound-guided radiofrequency or microwave ablation is an option for patients unfit for or refusing surgery, though surgery remains the standard.

Q42. What newer drugs treat secondary hyperparathyroidism?

BDS + MBBS
★★☆

Etelcalcetide, an intravenous calcimimetic given at dialysis, in addition to oral cinacalcet, active vitamin D analogues and phosphate binders.

Q43. What is new in the treatment of chronic hypoparathyroidism after neck surgery?

BDS + MBBS
★★★

Long-acting PTH replacement (palopegteriparatide) restores near-normal calcium with less need for large doses of calcium and active vitamin D.

Examiner's Favourite (Hard Questions)

Q44. What features suggest parathyroid carcinoma?

MBBS
★★★

Very high calcium (often above 3.5 mmol/l), very high PTH, a palpable hard neck mass, and recurrent laryngeal nerve palsy. It is treated by en bloc resection with the adjacent thyroid lobe.

Q45. Why does the patient with hyperparathyroidism get peptic ulcer and pancreatitis?

BDS + MBBS
★★★

Hypercalcaemia stimulates gastrin and acid secretion, causing peptic ulceration, and activates trypsinogen within the pancreas and promotes calcium deposition in ducts, causing pancreatitis.

Q46. What is normocalcaemic primary hyperparathyroidism?

MBBS
★★★

Persistently raised PTH with normal serum calcium after excluding secondary causes such as vitamin D deficiency and renal impairment. Some progress to hypercalcaemia and need follow-up.

Q47. Why is phosphate low in primary but high in secondary hyperparathyroidism due to renal failure?

BDS + MBBS
★★★

In primary disease PTH increases renal phosphate excretion, lowering serum phosphate. In chronic kidney disease the failing kidney cannot excrete phosphate, so it rises, and this itself drives PTH secretion.

Quick Recall

- ✓ Stones, bones, abdominal groans, psychic moans.
- ✓ Primary: high Ca, high PTH, low phosphate. Malignancy: high Ca, low PTH.
- ✓ Single adenoma 85%; hyperplasia in MEN 1 and 2A.
- ✓ Superior parathyroid: 4th pouch. Inferior: 3rd pouch with thymus, more often ectopic.
- ✓ Localise with ultrasound + sestamibi; diagnosis is biochemical.
- ✓ Intraoperative PTH: more than 50% fall at 10 minutes = cure.
- ✓ Crisis: saline, then bisphosphonate. Post-op: watch for hungry bone syndrome.

CHAPTER

11

PART B: SHORT CASES

Salivary Gland Swellings

Parotid and submandibular swellings, tumours, sialadenitis and stones

Sample Case Presentation

Mr. K, a 50-year-old man, presents with a painless, slowly growing swelling in front of the right ear for 3 years. There is no pain, no facial weakness and no change on eating. On examination there is a 4 × 3 cm smooth, firm, non-tender swelling in front of and below the right ear, lifting the ear lobe and obliterating the retromandibular groove. It is mobile, not fixed to skin or masseter. All branches of the facial nerve are intact, the parotid duct opening is normal, and no cervical lymph nodes are palpable. My provisional diagnosis is pleomorphic adenoma of the right parotid gland.

History and Clinical Examination

Q1. What will you ask in the history of a salivary gland swelling?

BDS + MBBS ★☆☆

- Duration, rate of growth, pain, and sudden recent increase.
- Swelling and pain during meals (salivary stone).
- Facial weakness, numbness, dry mouth or dry eyes.
- Fever, foul taste (infection), recent illness or surgery (acute parotitis).
- Smoking (Warthin's tumour) and previous radiotherapy.

Q2. How do you know that a swelling arises from the parotid gland?

BDS + MBBS ★☆☆

It lies in front of and below the ear, lifts the ear lobe, and fills the retromandibular groove. A deep lobe tumour may push the tonsil and soft palate medially, seen on oral examination.

Q3. How will you examine the facial nerve?

BDS + MBBS ★☆☆

Ask the patient to wrinkle the forehead (temporal), close the eyes tightly (zygomatic), blow out the cheeks and show the teeth (buccal), pull the corner of the mouth down (marginal mandibular), and tense the neck (cervical).

Q4. How will you examine the submandibular gland?

BDS + MBBS ★☆☆

Bimanual palpation with one finger in the floor of the mouth and the other hand under the jaw. The gland is bimanually palpable; a lymph node is not. Also inspect the submandibular duct opening and feel for a stone along its course.

Q5. Where do the parotid and submandibular ducts open?

BDS + MBBS ★☆☆

The parotid (Stensen's) duct opens on the buccal mucosa opposite the upper second molar. The submandibular (Wharton's) duct opens on a papilla at the side of the frenulum in the floor of the mouth.

Q6. What features suggest malignancy in a parotid swelling?

BDS + MBBS ★☆☆

> Rapid growth, pain, facial nerve palsy, hard consistency, fixity to skin or deep structures, skin ulceration, and cervical lymph nodes.

Q7. What is a dumb-bell tumour of the parotid?

BDS + MBBS ★★☆

> A deep lobe tumour that passes through the stylomandibular tunnel into the parapharyngeal space, producing swelling both in the neck and in the lateral pharyngeal wall, displacing the tonsil.

Q8. What are the features of mumps?

BDS + MBBS ★☆☆

> Viral parotitis, usually in children: fever, painful bilateral parotid swelling, and complications such as orchitis, oophoritis, pancreatitis, meningitis and deafness.

Surgical Anatomy

Q9. What structures pass through the parotid gland?

BDS + MBBS ★☆☆

> From superficial to deep: the facial nerve and its branches, the retromandibular vein, and the external carotid artery with its terminal branches. Lymph nodes and the auriculotemporal nerve also lie within or near the gland.

Q10. Name the branches of the facial nerve in the face.

BDS + MBBS ★☆☆

> Temporal, zygomatic, buccal, marginal mandibular and cervical.

Q11. How is the facial nerve trunk found during parotidectomy?

BDS + MBBS ★★☆

> Using landmarks: the tragal pointer (the nerve lies about 1 cm deep and inferior to its tip), the tympanomastoid suture, the posterior belly of digastric, and the styloid process. A nerve monitor helps. In difficult cases a peripheral branch is traced backwards (retrograde).

Q12. Describe the course of the parotid duct.

BDS + MBBS ★☆☆

> It emerges from the anterior border of the gland, runs forward across the masseter about a finger's breadth below the zygomatic arch, turns medially at its anterior border, pierces the buccinator and opens opposite the upper second molar.

Q13. Which nerves are at risk during submandibular gland excision?

BDS + MBBS ★★☆

> Marginal mandibular branch of the facial nerve (weakness of the lower lip), lingual nerve (numbness of the tongue), and hypoglossal nerve (weakness of the tongue).

Q14. Describe the secretomotor nerve supply of the parotid gland.

BDS + MBBS ★★★

> From the inferior salivatory nucleus, through the glossopharyngeal nerve, tympanic branch and lesser petrosal nerve to the otic ganglion. Postganglionic fibres reach the gland through the auriculotemporal nerve. This is the basis of Frey's syndrome.

Pathology and Classification

Q15. Classify salivary gland tumours.

BDS + MBBS ★☆☆

- Benign: pleomorphic adenoma (commonest), Warthin's tumour, basal cell adenoma, oncocytoma.
- Malignant: mucoepidermoid carcinoma (commonest), adenoid cystic carcinoma, acinic cell carcinoma, carcinoma ex pleomorphic adenoma, adenocarcinoma, squamous carcinoma.
- Non-epithelial: lymphoma, haemangioma (in children), lipoma.

Q16. What is the relationship between gland size and risk of malignancy?

BDS + MBBS ★★☆

The smaller the gland, the more likely a tumour is malignant. About 80% of parotid tumours are benign, about half of submandibular tumours, and most sublingual and minor salivary gland tumours are malignant.

Q17. What is the pathology of a pleomorphic adenoma?

BDS + MBBS ★☆☆

A mixed tumour with epithelial and myoepithelial cells in a chondromyxoid stroma. It has an incomplete capsule with finger-like projections (pseudopodia), so enucleation leads to recurrence. Long-standing tumours can become malignant (carcinoma ex pleomorphic adenoma).

Q18. What are the features of Warthin's tumour?

BDS + MBBS ★★☆

Adenolymphoma: occurs in older men who smoke, in the lower pole of the parotid, may be bilateral or multiple, is soft or cystic, and takes up technetium on scanning (hot). It never involves the facial nerve and does not turn malignant.

Q19. What is special about adenoid cystic carcinoma?

BDS + MBBS ★★☆

It spreads along nerves (perineural invasion), causing pain and nerve palsy, metastasises late to the lungs, and recurs many years after treatment, so long-term follow-up is needed.

Q20. Why are stones commoner in the submandibular gland?

BDS + MBBS ★☆☆

Its saliva is more viscous, mucous, alkaline and rich in calcium, and the duct is long and runs upward against gravity. About 80% of salivary stones occur in the submandibular gland.

Differential Diagnosis

Q21. What is the differential diagnosis of a parotid swelling?

BDS + MBBS ★☆☆

Neoplasms (benign and malignant), sialadenitis (mumps, bacterial parotitis), stones and strictures, Sjögren's syndrome, sialosis, preauricular lymph nodes, sebaceous cyst, masseteric hypertrophy, and dental swellings.

Q22. What are the causes of bilateral parotid swelling?

BDS + MBBS ★★☆

Mumps, sialosis (diabetes, alcoholism, malnutrition, bulimia, drugs), Sjögren's syndrome, sarcoidosis, HIV-associated lymphoepithelial cysts, Warthin's tumour (sometimes bilateral) and lymphoma.

Q23. What is the differential diagnosis of a submandibular swelling?

BDS + MBBS ★☆☆

> Submandibular lymph node enlargement, sialadenitis with or without stone, salivary tumour, plunging ranula, and dental abscess or cellulitis (Ludwig's angina).

Q24. What is a ranula?

BDS + MBBS ★★☆

> A mucous extravasation cyst arising from the sublingual gland, forming a bluish, translucent swelling in the floor of the mouth like a frog's belly. A plunging ranula extends through the mylohyoid into the neck.

Investigations

Q25. What is the first investigation for a parotid lump?

BDS + MBBS ★☆☆

> Ultrasound with fine needle aspiration cytology (or ultrasound-guided core biopsy). Ultrasound shows whether the lesion is solid or cystic and within the gland.

Q26. When is MRI indicated?

BDS + MBBS ★★☆

> For deep lobe or parapharyngeal tumours, suspected malignancy, recurrent tumours and perineural spread. CT is used for bone erosion and staging the neck and chest.

Q27. Why is open (incisional) biopsy of a parotid lump avoided?

BDS + MBBS ★★☆

> It risks seeding the tumour, especially pleomorphic adenoma, into the wound, causing multifocal recurrence, and can injure the facial nerve. Excision by parotidectomy is the definitive biopsy.

Q28. How will you investigate a suspected submandibular stone?

BDS + MBBS ★☆☆

> An intraoral occlusal X-ray, as about 80% of submandibular stones are radio-opaque, and ultrasound. Sialography or sialendoscopy is used for small stones and strictures. Parotid stones are more often radiolucent.

Q29. What is sialendoscopy?

BDS + MBBS ★★★

> Insertion of a fine endoscope into the salivary duct to visualise and remove small stones and dilate strictures, preserving the gland.

Management

Q30. How will you treat a pleomorphic adenoma of the superficial lobe?

BDS + MBBS ★☆☆

> Superficial (conservative) parotidectomy with identification and preservation of the facial nerve, or extracapsular dissection with a margin of normal tissue for small mobile tumours. Enucleation is not done because of recurrence.

Q31. How will you treat a deep lobe tumour?

BDS + MBBS ★★☆

> Total conservative parotidectomy, removing both lobes while preserving the facial nerve. Parapharyngeal tumours may need a cervical or transmandibular approach.

Q32. How will you manage a malignant parotid tumour?

BDS + MBBS ★★☆

Total parotidectomy; the facial nerve is preserved unless directly involved, in which case it is sacrificed and grafted (e.g. with the great auricular or sural nerve). Neck dissection for nodal disease or high-grade tumours, and postoperative radiotherapy for high-grade tumours, close margins or perineural invasion.

Q33. How will you treat a stone in the submandibular duct?

BDS + MBBS ★☆☆

A stone in the anterior duct is removed through an intraoral incision over it, with a stay suture behind it to prevent backward slip. A stone in the gland or a chronically damaged gland needs submandibular gland excision.

Q34. How will you treat acute suppurative parotitis?

BDS + MBBS ★☆☆

Rehydration, oral hygiene, antibiotics against Staphylococcus aureus, warm compresses, gland massage and sialogogues. An abscess is drained through incisions parallel to the facial nerve branches. It typically affects dehydrated elderly or postoperative patients.

Q35. How will you treat a ranula?

BDS + MBBS ★★☆

Excision of the ranula with the sublingual gland from which it arises, through the mouth. Marsupialisation alone has a high recurrence rate. A plunging ranula is also treated by removing the sublingual gland.

Q36. What is a mucocele and how is it treated?

BDS + MBBS ★☆☆

A mucous retention or extravasation cyst of a minor salivary gland, usually on the lower lip after trauma. It is excised along with the underlying minor salivary glands.

Q37. How will you counsel a patient before parotidectomy?

BDS + MBBS ★★☆

Explain the risk of temporary facial weakness (common) and permanent weakness (rare), numbness of the ear lobe, Frey's syndrome, salivary fistula, a visible scar and a depression in front of the ear, and the possibility of recurrence or malignancy on histology.

Complications

Q38. What are the complications of parotidectomy?

BDS + MBBS ★☆☆

Facial nerve weakness (temporary or permanent), numbness of the ear lobe (great auricular nerve), Frey's syndrome, salivary fistula or sialocele, haematoma, infection, and cosmetic deformity.

Q39. What is Frey's syndrome? How is it treated?

BDS + MBBS ★★☆

Gustatory sweating: sweating and flushing of the skin in front of the ear while eating. Cut parasympathetic fibres to the parotid regrow into the sympathetic nerves of the sweat glands. It is treated with botulinum toxin injection or antiperspirants and is reduced by flaps placed during surgery.

Q40. How will you manage facial nerve palsy after parotidectomy?

BDS + MBBS ★★☆

Most temporary palsies recover in weeks to months. Protect the eye with lubricating drops, ointment and taping at night to prevent exposure keratitis. Permanent palsy needs reanimation procedures and eyelid gold weights.

Q41. Why does pleomorphic adenoma recur?

BDS + MBBS
★★☆

Due to enucleation leaving behind pseudopodia, rupture of the capsule with spillage at surgery, or incomplete excision. Recurrences are often multinodular and difficult to remove.

Q42. What happens if the great auricular nerve is injured?

BDS + MBBS
★★☆

Numbness of the ear lobe and the skin over the angle of the jaw, which usually improves partially. A painful neuroma may form.

Recent Advances

Q43. What is the Milan system?

BDS + MBBS
★★☆

A standardised system for reporting salivary gland cytology in categories from non-diagnostic to malignant, each with a risk of malignancy and a recommended management.

Q44. What is gland-preserving management of salivary stones?

BDS + MBBS
★★☆

Interventional sialendoscopy with basket retrieval or laser lithotripsy, and sialendoscopy-assisted transoral removal of hilar stones, which avoid excision of the submandibular gland in most patients.

Q45. Which targeted therapies are used in salivary cancers?

BDS + MBBS
★★★

HER2-directed therapy in salivary duct carcinoma, androgen receptor blockade in androgen receptor-positive tumours, and NTRK inhibitors (larotrectinib, entrectinib) in secretory carcinoma with NTRK fusions.

Q46. How is Frey's syndrome prevented during parotidectomy?

BDS + MBBS
★★☆

By raising a thick skin flap and placing a barrier between skin and gland bed, such as a superficial musculoaponeurotic system (SMAS) flap, sternocleidomastoid flap or acellular dermal matrix.

Q47. What newer imaging helps characterise parotid tumours?

BDS + MBBS
★★☆

Diffusion-weighted and dynamic contrast MRI and ultrasound elastography help distinguish benign from malignant tumours and Warthin's tumour from pleomorphic adenoma.

Examiner's Favourite (Hard Questions)

Q48. Why is a parotid abscess not fluctuant?

BDS + MBBS
★★★

The parotid is enclosed in a dense, tough fascial capsule derived from the investing layer of deep cervical fascia, which prevents fluctuation. Ultrasound confirms pus.

Q49. Why is the facial nerve more at risk in children?

BDS + MBBS
★★★

The mastoid process is not developed, so the facial nerve lies superficially as it emerges from the stylomastoid foramen.

Q50. Why do salivary stones cause pain and swelling at meal times?

BDS + MBBS
★★★

> Eating stimulates salivary secretion, but the stone obstructs outflow, so the gland swells and becomes painful (salivary colic), then slowly subsides.

Q51. What is Sjögren's syndrome and its surgical importance?

MBBS
★★★

> An autoimmune disease with dry eyes and dry mouth (sicca) and salivary gland enlargement, with or without a connective tissue disease. It increases the risk of salivary gland lymphoma (MALT type), so a dominant or rapidly growing swelling must be biopsied.

Quick Recall

- ✓ Parotid: lifts ear lobe, fills retromandibular groove; check all facial nerve branches.
- ✓ Facial nerve: tragal pointer, tympanomastoid suture, posterior belly of digastric.
- ✓ Smaller gland = higher chance of malignancy.
- ✓ Pleomorphic adenoma: pseudopodia, so superficial parotidectomy, never enucleation.
- ✓ Warthin's: older male smoker, lower pole, bilateral, hot on technetium scan.
- ✓ Submandibular stones: 80%, radio-opaque. Duct stone: intraoral removal.
- ✓ Frey's syndrome: gustatory sweating; treat with botulinum toxin.

CHAPTER

12

PART B: SHORT CASES

Congenital Neck Swellings

Thyroglossal cyst, branchial cyst and fistula, cystic hygroma, dermoid and carotid body tumour

Sample Case Presentation

Mr. L, a 22-year-old student, presents with a painless swelling on the left side of the neck for 1 year that became painful and larger during a sore throat 2 months ago, then settled. On examination there is a 4 × 3 cm smooth, soft, fluctuant swelling at the anterior border of the left sternocleidomastoid muscle at the junction of its upper and middle thirds, partly deep to the muscle. It is not transilluminant, does not move with swallowing or tongue protrusion, and there are no palpable lymph nodes. My provisional diagnosis is a left branchial cyst.

History and Clinical Examination

Q1. How does age guide the diagnosis of a neck swelling?

BDS + MBBS
★☆☆

In children, most swellings are congenital or inflammatory. In young adults, inflammatory and congenital lesions are common. In patients over 40, a persistent lateral neck lump is malignant (usually a metastatic node) until proven otherwise.

Q2. What are the clinical features of a thyroglossal cyst?

BDS + MBBS
★☆☆

A midline swelling, usually just below the hyoid bone, in a child or young adult. It is smooth and cystic, and moves upward both on swallowing and on protrusion of the tongue.

Q3. What are the clinical features of a branchial cyst?

BDS + MBBS
★☆☆

A smooth, soft, fluctuant swelling in a young adult, at the anterior border of sternocleidomastoid at the junction of its upper and middle thirds, partly deep to the muscle. It is usually not transilluminant and may become infected after a sore throat.

Q4. What are the clinical features of a cystic hygroma?

BDS + MBBS
★☆☆

A soft, multilocular, compressible swelling, usually in the posterior triangle of an infant, present at birth or soon after. It is brilliantly transilluminant.

Q5. What are the clinical features of a carotid body tumour?

BDS + MBBS
★★☆

A slow-growing, firm swelling at the carotid bifurcation, below the angle of the jaw. It moves side to side but not up and down (Fontaine's sign), may have transmitted pulsation and a bruit, and may cause cranial nerve palsies.

Q6. Which neck swellings are brilliantly transilluminant?

BDS + MBBS
★☆☆

Cystic hygroma (lymphangioma), and less often meningocele. A branchial cyst is usually not transilluminant because its contents are thick, and a dermoid is not transilluminant.

Q7. Where does a branchial fistula open?

BDS + MBBS
★★☆

On the skin at the anterior border of sternocleidomastoid in its lower third. It discharges mucus and may be bilateral. The internal opening is in the tonsillar fossa.

Surgical Anatomy and Embryology

Q8. What are the boundaries of the anterior and posterior triangles of the neck?

BDS + MBBS
★☆☆

Anterior triangle: midline of the neck, anterior border of sternocleidomastoid and the lower border of the mandible. Posterior triangle: posterior border of sternocleidomastoid, anterior border of trapezius and the middle third of the clavicle.

Q9. Describe the development of the thyroglossal tract.

BDS + MBBS
★★☆

The thyroid begins at the foramen caecum of the tongue and descends in the midline in front of the hyoid and larynx as the thyroglossal duct. The duct is closely related to the hyoid, passing in front of, through or behind its body, and usually disappears. Remnants form a thyroglossal cyst.

Q10. What is the embryological basis of branchial cysts and fistulae?

BDS + MBBS
★★☆

During development the second arch grows over the second, third and fourth clefts, forming a temporary cavity, the cervical sinus of His, which normally disappears. Persistence of the sinus forms a cyst; persistence with a communication forms a fistula.

Q11. Describe the course of a second branchial fistula.

BDS + MBBS
★★★

From the skin opening at the lower anterior border of sternocleidomastoid, it ascends along the carotid sheath, passes between the internal and external carotid arteries, over the hypoglossal and glossopharyngeal nerves, and opens into the tonsillar fossa.

Q12. What is the origin of a cystic hygroma?

BDS + MBBS
★★☆

It arises from sequestration of the primitive jugular lymph sacs that fail to join the venous system, forming a multilocular lymphatic malformation.

Q13. What is the carotid body?

MBBS
★★☆

A small chemoreceptor at the carotid bifurcation that senses changes in oxygen, carbon dioxide and pH. It is supplied by the glossopharyngeal nerve. A tumour arising from it is a paraganglioma.

Pathology and Classification

Q14. What does a branchial cyst contain?

BDS + MBBS
★★☆

Thick, turbid or creamy fluid containing cholesterol crystals. The lining is usually stratified squamous epithelium with lymphoid tissue in the wall.

Q15. Why is a thyroglossal fistula always acquired?

BDS + MBBS
★★☆

The thyroglossal duct never reaches the skin during development. A fistula forms only after an infected cyst bursts or is incised and drained. It is lined by columnar epithelium and discharges mucus.

Q16. What is a dermoid cyst? Name its types.

BDS + MBBS
★☆☆

A cyst lined by squamous epithelium containing skin appendages and sebaceous material. Congenital (sequestration) dermoids occur along lines of fusion: external angular dermoid at the outer end of the eyebrow, and sublingual dermoid in the floor of the mouth. Implantation dermoids follow puncture injuries, usually in the fingers.

Q17. What is the pathology of a carotid body tumour?

MBBS
★★☆

A paraganglioma, usually benign and slow growing; about 5–10% are malignant. Some are familial (succinate dehydrogenase gene mutations) and bilateral. They are highly vascular and rarely secrete catecholamines.

Q18. What is a laryngocele?

MBBS
★★☆

An air-filled dilatation of the saccule of the larynx. An external laryngocele protrudes through the thyrohyoid membrane into the neck, enlarging when the patient blows against a closed mouth; it is seen in trumpet players and glass blowers.

Differential Diagnosis

Q19. What is the differential diagnosis of a lateral neck swelling in a young adult?

BDS + MBBS
★☆☆

Reactive or tuberculous lymph nodes, branchial cyst, lymphoma, lipoma, sebaceous cyst, carotid body tumour, neurofibroma and cold abscess.

Q20. What are the causes of swelling in the posterior triangle?

BDS + MBBS
★☆☆

Lymph nodes (TB, lymphoma, metastasis), cystic hygroma, lipoma, cervical rib, subclavian artery aneurysm, pharyngeal pouch and neurofibroma.

Q21. What is the differential diagnosis of a swelling in the submental region?

BDS + MBBS
★☆☆

Enlarged submental lymph nodes, sublingual dermoid, thyroglossal cyst, ranula, lipoma and sebaceous cyst.

Q22. How will you differentiate a branchial cyst from a tuberculous cold abscess?

BDS + MBBS ★★☆

A branchial cyst has a smooth wall, a fixed classical site and no signs of TB. A cold abscess arises from matted nodes, may be in any level, may form a collar-stud abscess with skin discolouration, and is associated with constitutional symptoms. FNAC confirms the diagnosis.

Investigations

Q23. What is the first investigation for a neck swelling?

BDS + MBBS ★☆☆

Ultrasound, which shows whether the lesion is cystic or solid and its relations, and guides FNAC.

Q24. What will FNAC show in a branchial cyst?

BDS + MBBS ★★☆

Turbid fluid with cholesterol crystals and squamous cells. In patients over 40, a cystic lateral neck mass must be treated as a cystic metastatic node (from oropharynx or papillary thyroid cancer) until proven otherwise.

Q25. What investigation is essential before excising a thyroglossal cyst?

BDS + MBBS ★★☆

Ultrasound of the neck to confirm a normal thyroid gland, with thyroid function tests. Rarely the cyst contains the only functioning thyroid tissue, and removing it would make the patient hypothyroid.

Q26. How is a carotid body tumour investigated? What must be avoided?

MBBS ★★★

Duplex ultrasound, CT or MR angiography, which show a vascular mass splaying the internal and external carotid arteries (lyre sign). Biopsy or FNAC must be avoided because of bleeding. Urinary catecholamines and genetic testing are done in selected patients.

Q27. How will you investigate a branchial fistula?

BDS + MBBS ★★☆

Usually clinically. A fistulogram with contrast or MRI may show the extent of the tract before surgery.

Management

Q28. What is Sistrunk's operation?

BDS + MBBS ★☆☆

Excision of a thyroglossal cyst together with its tract, the central part of the body of the hyoid bone and a core of tongue muscle up towards the foramen caecum. It reduces recurrence from over 30% after simple excision to under 5%.

Q29. How will you manage a branchial cyst?

BDS + MBBS ★☆☆

Complete surgical excision through a skin crease incision. If infected, it is first treated with antibiotics and aspiration, and excised once the inflammation settles.

Q30. How is a branchial fistula excised?

BDS + MBBS ★★☆

The tract is cannulated or injected with dye and excised completely up to the pharynx through one or two horizontal (step-ladder) incisions, taking care of the carotid vessels and the hypoglossal and glossopharyngeal nerves.

Q31. How is a cystic hygroma treated?

BDS + MBBS
★★☆

> Sclerotherapy (OK-432, bleomycin or doxycycline), especially for macrocystic lesions, or surgical excision. Urgent airway management is needed if the hygroma compresses the trachea in a newborn.

Q32. How is a carotid body tumour treated?

MBBS
★★☆

> Surgical excision in the subadventitial plane in fit patients, with vascular surgical backup. Preoperative embolisation may reduce bleeding in large tumours. Elderly patients with small asymptomatic tumours may be observed or treated with radiotherapy.

Q33. How is a sublingual dermoid removed?

BDS + MBBS
★★☆

> Through the mouth if it lies above the mylohyoid (in the floor of the mouth), and through a submental neck incision if it lies below the mylohyoid.

Q34. How will you manage an infected thyroglossal cyst?

BDS + MBBS
★☆☆

> Antibiotics and aspiration if needed, avoiding incision and drainage, which causes a thyroglossal fistula. Sistrunk's operation is done after the infection settles.

Complications

Q35. What are the complications of a thyroglossal cyst?

BDS + MBBS
★☆☆

> Infection, abscess and fistula formation, recurrence after inadequate excision, and rarely papillary carcinoma arising in the cyst.

Q36. Which nerves are at risk during branchial cyst excision?

BDS + MBBS
★★☆

> Hypoglossal, glossopharyngeal, spinal accessory and vagus nerves, and the marginal mandibular branch of the facial nerve.

Q37. What are the complications of carotid body tumour surgery?

MBBS
★★☆

> Cranial nerve injuries (vagus, hypoglossal, glossopharyngeal), haemorrhage, injury to the carotid arteries, and stroke. Larger tumours (Shamblin class III) carry higher risk.

Q38. What complications can a cystic hygroma cause?

BDS + MBBS
★★☆

> Airway compression, feeding difficulty, infection, sudden enlargement from haemorrhage, and recurrence after incomplete excision.

Recent Advances

Q39. What is the role of sirolimus in lymphatic malformations?

BDS + MBBS
★★☆

> Sirolimus, an mTOR inhibitor, shrinks complex and diffuse lymphatic malformations that are unsuitable for surgery or sclerotherapy.

Q40. Why is HPV and p16 testing done on a cystic neck mass in adults?

BDS + MBBS
★★★

A p16 or HPV-positive cystic node strongly suggests metastasis from an oropharyngeal (tonsil or base of tongue) cancer, which directs the search for the primary.

Q41. What is the role of genetic testing and functional imaging in carotid body tumours?

BDS + MBBS
★★★

Testing for succinate dehydrogenase (SDHx) mutations identifies familial cases, and Gallium-68 DOTATATE PET-CT detects multiple and metastatic paragangliomas.

Q42. What is the EXIT procedure?

BDS + MBBS
★★☆

Ex utero intrapartum treatment: during caesarean section, the baby's airway is secured while still on placental circulation, used when a large neck mass such as a lymphatic malformation is detected antenatally and may obstruct the airway.

Q43. What newer surgical approaches are used for neck cysts?

BDS + MBBS
★★☆

Endoscopic and robotic excision through hidden incisions (e.g. retroauricular or hairline) for branchial cysts in selected patients, avoiding visible neck scars.

Examiner's Favourite (Hard Questions)

Q44. Why does a thyroglossal cyst move with protrusion of the tongue?

BDS + MBBS
★★★

It is attached to the base of the tongue at the foramen caecum by the remnant of the thyroglossal duct, so tongue protrusion pulls it upward.

Q45. Why is the central part of the hyoid removed in Sistrunk's operation?

BDS + MBBS
★★★

The thyroglossal tract is intimately related to the body of the hyoid and may pass through it. Leaving this part behind is the commonest cause of recurrence.

Q46. What is the Shamblin classification?

MBBS
★★★

A classification of carotid body tumours: I small and easily separated from the carotid vessels, II partly surrounding the vessels, III encasing the carotid arteries, often needing arterial resection and grafting.

Q47. Why must a "branchial cyst" in an elderly smoker be viewed with suspicion?

BDS + MBBS
★★★

New branchial cysts are rare after 40. A cystic lateral neck mass at this age is more likely a cystic metastasis from oropharyngeal squamous cancer (often HPV related) or papillary thyroid cancer, so the upper aerodigestive tract and thyroid must be examined.

Quick Recall

- ✓ Thyroglossal cyst: midline, moves with swallowing and tongue protrusion; Sistrunk's operation.
- ✓ Branchial cyst: anterior border of SCM, junction of upper and middle thirds; cholesterol crystals.
- ✓ Branchial fistula: opens at lower third of SCM, tract between ICA and ECA to tonsillar fossa.
- ✓ Cystic hygroma: infant, posterior triangle, brilliantly transilluminant.
- ✓ Carotid body tumour: side-to-side mobility only; lyre sign; never biopsy.
- ✓ Check the thyroid before excising a thyroglossal cyst.
- ✓ Over 40 with a cystic neck mass: think cystic metastasis.

CHAPTER

13

PART B: SHORT CASES

Cervical Lymphadenopathy

Tuberculous lymphadenitis, lymphoma and metastatic neck nodes

Sample Case Presentation

Miss M, a 22-year-old student, presents with multiple swellings on the left side of the neck for 4 months, with evening fever, night sweats, loss of appetite and weight loss. One swelling has recently become soft and the overlying skin is bluish. On examination there are multiple firm, matted lymph nodes in the left upper jugular and posterior triangle, 1 to 3 cm in size, with one soft fluctuant swelling that is not warm or very tender. There is no lesion in the oral cavity or scalp, and the chest is clear. My provisional diagnosis is tuberculous cervical lymphadenitis with cold abscess formation, with lymphoma as the main differential.

History and Clinical Examination

Q1. What will you ask in the history of a patient with enlarged neck nodes?

BDS + MBBS
★☆☆

- Duration, number, growth, pain, discharge.
- Fever, night sweats, weight loss (TB, lymphoma), cough, contact with TB.
- Sore throat, dental infection, scalp lesions (reactive nodes).
- Hoarseness, dysphagia, nasal bleeding or blockage, ear pain, oral ulcers (head and neck cancer).
- Smoking, tobacco or betel chewing, alcohol, HIV risk factors.

Q2. How will you examine the cervical lymph nodes?

BDS + MBBS
★☆☆

From behind with the patient's head slightly flexed, systematically: submental, submandibular, preauricular, postauricular, occipital, along the jugular chain, posterior triangle and supraclavicular. For each node note site, number, size, consistency, tenderness, mobility, matting and skin changes.

Q3. Describe the levels of cervical lymph nodes.

BDS + MBBS
★☆☆

- Level I: submental (Ia) and submandibular (Ib).
- Levels II, III, IV: upper, middle and lower jugular nodes.
- Level V: posterior triangle.
- Level VI: central (anterior) compartment, around the thyroid and trachea.
- Level VII: superior mediastinal.

Q4. How will you differentiate tuberculous, lymphomatous and metastatic nodes clinically?

BDS + MBBS ★☆☆

> Tuberculous: young patient, matted, may soften into a cold abscess or sinus. Lymphoma: rubbery, discrete, not matted, often multiple sites. Metastatic: older patient, hard, may be fixed, with a primary in the head and neck.

Q5. What is a collar-stud abscess?

BDS + MBBS ★☆☆

> A tuberculous abscess that breaks through the deep fascia to form a second, superficial collection connected to the deep one by a narrow track, like a collar-stud.

Q6. Where will you look for the primary tumour in a patient with a hard neck node?

BDS + MBBS ★☆☆

> Scalp and skin, oral cavity, tongue, tonsils, nasopharynx, larynx and hypopharynx (with nasendoscopy), thyroid, salivary glands, and below the clavicle: breast, lung, stomach and other abdominal organs.

Q7. What is Troisier's sign?

BDS + MBBS ★★☆

> An enlarged left supraclavicular lymph node (Virchow's node), indicating metastasis from an abdominal malignancy, especially carcinoma stomach.

Q8. What symptoms are typical of Hodgkin's lymphoma?

MBBS ★★☆

> Painless rubbery nodes, fever (sometimes cyclical, Pel–Ebstein), night sweats, weight loss (B symptoms), itching, and pain in the nodes after drinking alcohol.

Surgical Anatomy

Q9. Which areas drain to the main groups of cervical nodes?

BDS + MBBS ★☆☆

> Submental: tip of tongue, floor of mouth, central lower lip. Submandibular: face, cheek, lips, gums, anterior tongue. Jugulodigastric: tonsil, pharynx. Jugulo-omohyoid: tongue. Supraclavicular: thorax, breast and abdomen (left side).

Q10. Why does an abdominal cancer spread to the left supraclavicular node?

BDS + MBBS ★★☆

> The thoracic duct, which drains lymph from the abdomen, ends at the junction of the left internal jugular and subclavian veins, close to the left supraclavicular nodes.

Q11. Which nerve is at risk during excision of a node in the posterior triangle?

BDS + MBBS ★★☆

> The spinal accessory nerve, which crosses the posterior triangle superficially. Injury causes trapezius weakness, shoulder drooping, pain and difficulty in raising the arm above the head.

Q12. What is Waldeyer's ring?

BDS + MBBS ★★☆

> A ring of lymphoid tissue around the entrance of the pharynx: the adenoids, tubal tonsils, palatine tonsils and lingual tonsil. It is a common site of extranodal lymphoma.

Q13. Where is the jugulodigastric node and why is it important?

BDS + MBBS ★☆☆

Below the angle of the mandible where the posterior belly of digastric crosses the internal jugular vein. It drains the tonsil and is the commonest node enlarged in tonsillitis and tonsillar cancer.

Pathology and Classification

Q14. Classify the causes of cervical lymphadenopathy.

BDS + MBBS ★☆☆

- Infective: acute (bacterial, viral) and chronic (tuberculosis, toxoplasmosis, HIV, infectious mononucleosis).
- Neoplastic: primary (Hodgkin's and non-Hodgkin's lymphoma, leukaemia) and secondary (metastases).
- Others: sarcoidosis, connective tissue diseases, drug reactions.

Q15. Describe the stages of tuberculous lymphadenitis.

BDS + MBBS ★☆☆

- Stage 1: enlarged, firm, discrete, mobile nodes.
- Stage 2: periadenitis with matting of nodes.
- Stage 3: central caseation forming a cold abscess.
- Stage 4: collar-stud abscess.
- Stage 5: sinus formation.

Q16. What is a cold abscess?

BDS + MBBS ★☆☆

A collection of caseous pus without the signs of acute inflammation (no heat or marked redness or tenderness). It is typically tuberculous.

Q17. How do Hodgkin's and non-Hodgkin's lymphoma differ?

MBBS ★★☆

Hodgkin's: Reed–Sternberg cells, young adults and older peaks, spreads to contiguous node groups, mainly nodal, better prognosis. Non-Hodgkin's: no Reed–Sternberg cells, older patients, non-contiguous spread, frequent extranodal involvement including Waldeyer's ring and gut.

Q18. What is the Ann Arbor staging of lymphoma?

MBBS ★★☆

Stage I: one node region. II: two or more regions on the same side of the diaphragm. III: nodes on both sides of the diaphragm. IV: diffuse extranodal involvement. Suffix A or B for absence or presence of B symptoms (fever, night sweats, weight loss over 10%).

Differential Diagnosis

Q19. What is the likely cause of enlarged neck nodes in a child?

BDS + MBBS ★☆☆

Reactive nodes from upper respiratory or dental infection are commonest, then tuberculosis. Lymphoma and leukaemia are less common but must be considered with persistent, enlarging nodes or systemic features.

Q20. What is the likely cause of a hard neck node in a 60-year-old smoker?

BDS + MBBS ★☆☆

> Metastatic squamous cell carcinoma from the upper aerodigestive tract (oral cavity, pharynx, larynx), until proven otherwise.

Q21. How will you differentiate tuberculous lymphadenitis from lymphoma?

BDS + MBBS ★★☆

> Both affect young adults and cause fever and weight loss. TB nodes are matted and may caseate, forming abscess and sinus. Lymphoma nodes are rubbery and discrete. Histology is definitive: caseating granulomas in TB, abnormal lymphoid cells in lymphoma.

Q22. What is the differential diagnosis of a cold abscess in the neck?

BDS + MBBS ★★☆

> Branchial cyst, infected sebaceous or dermoid cyst, actinomycosis, and necrotic metastatic or lymphomatous node.

Investigations

Q23. What basic investigations will you do?

BDS + MBBS ★☆☆

> Full blood count and film, ESR, chest X-ray, Mantoux test or interferon-gamma release assay, HIV screening when indicated, and ultrasound of the neck.

Q24. What is the first investigation for a persistent neck node?

BDS + MBBS ★☆☆

> Ultrasound-guided FNAC, which differentiates reactive, granulomatous and malignant nodes. Material is sent for AFB stain, culture and GeneXpert if TB is suspected.

Q25. What ultrasound features suggest a malignant or tuberculous node?

BDS + MBBS ★★☆

> Malignant: round shape, loss of the fatty hilum, peripheral vascularity, necrosis. Tuberculous: matting, intranodal necrosis, surrounding oedema and abscess. Reactive nodes are oval with a preserved hilum.

Q26. Why is excision biopsy needed when lymphoma is suspected?

BDS + MBBS ★★☆

> FNAC cannot show the nodal architecture needed to classify lymphoma. A whole node (or core biopsy) is sent fresh for histology, immunohistochemistry and flow cytometry.

Q27. How will you investigate a metastatic neck node with an unknown primary?

BDS + MBBS ★★★

> Thorough clinical and endoscopic examination, CT and MRI of the head and neck, PET-CT, then panendoscopy under anaesthesia with biopsies of likely sites (nasopharynx, tonsils, base of tongue, pyriform fossae), often with tonsillectomy. HPV testing of the node points to an oropharyngeal primary.

Q28. Why should an open biopsy of a suspected metastatic squamous cell node be avoided?

BDS + MBBS ★★☆

> It can seed tumour into the wound and neck, making later neck dissection and radiotherapy more difficult and worsening the outcome. FNAC or core biopsy is done first, and the primary is searched for.

Q29. How will you stage a patient with lymphoma?

MBBS
★★☆

Full blood count, LDH, liver and renal function, HIV and hepatitis screening, PET-CT of neck, chest, abdomen and pelvis, and bone marrow biopsy in selected patients.

Management

Q30. How will you treat tuberculous cervical lymphadenitis?

BDS + MBBS
★☆☆

Antituberculous therapy for 6 months (2 months of isoniazid, rifampicin, pyrazinamide and ethambutol, then 4 months of isoniazid and rifampicin). Surgery is reserved for complications.

Q31. How will you manage a tuberculous cold abscess?

BDS + MBBS
★★☆

Aspiration with a wide-bore needle inserted through healthy skin from a non-dependent site along a zig-zag track, with ATT. Incision and drainage is avoided, as it leads to a persistent sinus.

Q32. What are the indications for surgery in tuberculous lymphadenitis?

BDS + MBBS
★★☆

Diagnostic excision biopsy when FNAC is inconclusive, abscess not responding to aspiration, persistent sinus, and nodes enlarging despite adequate ATT (after excluding resistance).

Q33. What precautions will you take when doing an excision biopsy of a neck node?

BDS + MBBS
★☆☆

Use a skin crease incision, avoid the spinal accessory nerve in the posterior triangle and the marginal mandibular nerve near the jaw, take the whole node with its capsule, and send it fresh and in formalin as needed.

Q34. How is lymphoma treated?

MBBS
★★☆

Mainly by chemotherapy (e.g. ABVD for Hodgkin's, R-CHOP for diffuse large B-cell lymphoma) with or without radiotherapy. The surgeon's role is diagnosis by biopsy.

Q35. What are the types of neck dissection?

MBBS
★★☆

Radical: removes levels I–V with the sternocleidomastoid, internal jugular vein and spinal accessory nerve. Modified radical: removes levels I–V but preserves one or more of these structures. Selective: removes only the levels at risk (e.g. supraomohyoid levels I–III). Extended: removes additional structures or levels.

Q36. How will you treat a metastatic neck node from a head and neck cancer?

BDS + MBBS
★★☆

Treat the primary and the neck together: surgery (excision of the primary and neck dissection) with postoperative radiotherapy or chemoradiotherapy, or primary chemoradiotherapy for some sites such as the oropharynx.

Complications

Q37. What are the complications of tuberculous lymphadenitis?

BDS + MBBS
★☆☆

Cold abscess, collar-stud abscess, discharging sinus, ugly scarring, and spread of disease.

Q38. What are the complications of a cervical node biopsy?

BDS + MBBS
★★☆

Spinal accessory nerve injury (shoulder droop and pain), marginal mandibular nerve injury, haematoma, wound infection, persistent sinus and keloid scar.

Q39. What are the complications of radical neck dissection?

MBBS
★★☆

Shoulder syndrome from accessory nerve sacrifice, haemorrhage, chyle leak (especially on the left), skin flap necrosis, carotid blowout (particularly after radiotherapy), facial oedema, and nerve injuries (vagus, hypoglossal, phrenic, marginal mandibular).

Q40. How will you manage a chyle leak after neck dissection?

BDS + MBBS
★★☆

Low-volume leaks: pressure dressing, drainage, a medium-chain triglyceride diet or parenteral nutrition and octreotide. High-volume or persistent leaks need surgical ligation of the thoracic duct.

Recent Advances

Q41. Is excision biopsy always needed for suspected lymphoma?

BDS + MBBS
★★☆

Ultrasound-guided core needle biopsy, with immunohistochemistry and flow cytometry, is increasingly used and often sufficient, though excision biopsy remains the gold standard when core material is inadequate.

Q42. What is the role of PET-CT in lymphoma?

BDS + MBBS
★★☆

It is the standard for staging and for response assessment (Deauville scale), and guides de-escalation of therapy, such as omitting radiotherapy when the interim PET is negative.

Q43. How is tuberculous lymphadenitis diagnosed faster today?

BDS + MBBS
★★☆

GeneXpert MTB/RIF Ultra on fine-needle aspirate gives a rapid diagnosis and rifampicin resistance status, alongside cytology.

Q44. What is sentinel node biopsy in head and neck cancer?

BDS + MBBS
★★★

In early oral cancer with a clinically negative neck, the first draining node is identified with radioactive tracer and removed; neck dissection is done only if it contains tumour, reducing morbidity.

Q45. What newer treatments are used for head and neck cancers presenting with neck nodes?

BDS + MBBS
★★★

Transoral robotic surgery for oropharyngeal cancers and unknown primaries, de-escalation trials in HPV-positive disease, and immunotherapy (pembrolizumab, nivolumab) for recurrent or metastatic disease.

Examiner's Favourite (Hard Questions)

Q46. Why is aspiration of a cold abscess done through a non-dependent site?

BDS + MBBS
★★★

A track through a dependent site allows pus to continue draining and form a sinus. A non-dependent, oblique (zig-zag) track through healthy skin seals after the needle is withdrawn.

Q47. Why might tuberculous nodes enlarge during treatment?

BDS + MBBS
★★★

A paradoxical reaction due to immune recovery as bacilli are killed, which is not treatment failure. Drug resistance and an alternative diagnosis must be excluded if enlargement persists.

Q48. What is the importance of nodal level in a metastatic node?

MBBS
★★★

The level points to the likely primary: level I for oral cavity, level II for oropharynx and nasopharynx, levels III and IV for larynx and hypopharynx, level V for nasopharynx and scalp, level VI for thyroid, and the supraclavicular fossa for infraclavicular primaries.

Q49. What is Kikuchi's disease?

BDS + MBBS
★★★

Histiocytic necrotising lymphadenitis: a benign, self-limiting cause of tender cervical nodes and fever in young women. It is diagnosed on node biopsy and must be distinguished from TB and lymphoma.

Quick Recall

- ✓ Over 40 with a hard neck node: metastatic SCC until proven otherwise.
- ✓ Levels: I submental/submandibular; II–IV jugular; V posterior triangle; VI central.
- ✓ TB stages: discrete, matted, cold abscess, collar-stud, sinus.
- ✓ FNAC first; excision biopsy for suspected lymphoma.
- ✓ Cold abscess: aspirate through a non-dependent zig-zag track; do not incise.
- ✓ Accessory nerve in the posterior triangle: shoulder droop if injured.
- ✓ Left supraclavicular node (Virchow's) = abdominal primary.

CHAPTER

14

PART B: SHORT CASES

Lumps and Bumps

Lipoma, sebaceous cyst, neurofibroma, ganglion, haemangioma and keloid

Sample Case Presentation

Mr. N, a 40-year-old shopkeeper, presents with a painless swelling on the upper back for 5 years, slowly increasing in size. On examination there is a 6 × 5 cm hemispherical, soft, lobulated swelling over the left scapula. The overlying skin is normal and free, and the swelling is not tender, not warm and not attached to the underlying muscle. Its edge slips from under the palpating finger (slip sign), and it shows pseudofluctuation but is not transilluminant. There are no regional lymph nodes. My provisional diagnosis is subcutaneous lipoma of the back.

History and Clinical Examination

Q1. What will you ask in the history of a lump?

BDS + MBBS
★☆☆

- When and how it was noticed, duration, rate of growth, and any recent rapid increase.
- Pain, discharge, change in colour, ulceration.
- Similar lumps elsewhere, previous excision or recurrence.
- Loss of weight, appetite, and general symptoms.
- Family history (neurofibromatosis, multiple lipomas).

Q2. How will you examine a lump?

BDS + MBBS
★☆☆

Inspection: site, size, shape, surface, skin over it, pulsation. Palpation: temperature, tenderness, size, shape, surface, edge, consistency, fluctuation, transillumination, compressibility, reducibility, pulsation, attachment to skin and deep structures. Then percussion and auscultation where relevant, and the regional lymph nodes.

Q3. What is the slip sign?

BDS + MBBS
★☆☆

When the edge of a lipoma is pressed, it slips away from under the finger because the soft, lobulated fat moves easily. It is characteristic of a subcutaneous lipoma.

Q4. How will you find out whether a lump is in the skin, subcutaneous tissue or deeper?

BDS + MBBS
★☆☆

A skin lesion moves with the skin. A subcutaneous lump allows the skin to move over it. To test attachment to muscle, the muscle is contracted: a lump deep to the muscle becomes less prominent and fixed, while a subcutaneous lump remains mobile.

Q5. What is a punctum and what does it indicate?

BDS + MBBS ★☆☆

> A small dark spot on the skin over a sebaceous (epidermoid) cyst, marking the blocked opening of the hair follicle or duct to which the cyst is attached. It is pathognomonic of a sebaceous cyst.

Q6. How do you test for fluctuation and transillumination?

BDS + MBBS ★★☆

> Fluctuation: two fingers are placed on either side of the swelling and pressure from a third finger in the centre displaces them, in two planes at right angles. Transillumination: a bright light is placed against the side of the swelling in a dark room; clear fluid allows light through.

Q7. How does a neurofibroma move?

BDS + MBBS ★★☆

> It moves from side to side across the line of the nerve but not along its long axis. Pressure on it may cause tingling in the distribution of the nerve.

Q8. How will you differentiate a pulsatile swelling from one with transmitted pulsation?

BDS + MBBS ★★☆

> An aneurysm has expansile pulsation: fingers placed on either side are pushed apart. A swelling lying over an artery has transmitted pulsation: fingers are pushed upward but not apart, and the pulsation disappears when the swelling is moved off the artery.

Surgical Anatomy

Q9. What are Langer's lines and why are they important?

BDS + MBBS ★☆☆

> Lines of tension in the skin, related to the orientation of collagen fibres. Incisions along these lines (or skin creases) heal with finer scars.

Q10. Where does a ganglion commonly occur?

BDS + MBBS ★★☆

> On the dorsum of the wrist, arising from the scapholunate joint, followed by the volar aspect of the wrist near the radial artery, the flexor tendon sheaths of the fingers, and the dorsum of the foot.

Q11. What is the difference between a neurofibroma and a schwannoma?

BDS + MBBS ★★☆

> A schwannoma (neurilemmoma) arises from Schwann cells, is encapsulated and lies eccentric to the nerve, so it can be shelled out preserving the nerve. A neurofibroma involves all elements of the nerve, the fibres pass through it, and it cannot be separated without sacrificing the nerve.

Q12. What are the anatomical sites of lipoma?

BDS + MBBS ★★★

> Subcutaneous (commonest), subfascial, intermuscular, intramuscular, subsynovial, subperiosteal, subserous (retroperitoneal), submucous (gut, larynx), extradural and intra-articular.

Pathology and Classification

Q13. What is a lipoma? What are its types?

BDS + MBBS ★☆☆

A benign tumour of mature fat cells, usually encapsulated. Types: encapsulated (commonest), diffuse (not encapsulated, e.g. in the neck), multiple (familial lipomatosis), and painful multiple lipomas (Dercum's disease). Variants include angiolipoma, fibrolipoma and hibernoma.

Q14. What is a sebaceous cyst?

BDS + MBBS ★☆☆

A retention cyst of the skin, more correctly an epidermoid cyst (from the infundibulum of the hair follicle) or a pilar (trichilemmal) cyst on the scalp. It is lined by squamous epithelium and contains keratin and sebaceous material. It occurs where hair follicles are present, so never on the palms or soles.

Q15. What are the complications of a sebaceous cyst?

BDS + MBBS ★★☆

Infection and abscess, ulceration (which may look like a carcinoma, called Cock's peculiar tumour), sebaceous horn formation, calcification, and rarely malignant change.

Q16. What is neurofibromatosis type 1?

BDS + MBBS ★★☆

An autosomal dominant condition (NF1 gene, chromosome 17) with multiple neurofibromas, six or more café-au-lait spots, axillary freckling, Lisch nodules in the iris, optic glioma, bone lesions and plexiform neurofibromas. It carries a risk of malignant peripheral nerve sheath tumour.

Q17. What is a ganglion?

BDS + MBBS ★★☆

A cystic swelling containing thick, clear, jelly-like fluid, arising from myxoid degeneration of fibrous tissue of a joint capsule or tendon sheath, often connected to the joint by a narrow stalk.

Q18. Differentiate an infantile haemangioma from a vascular malformation.

BDS + MBBS ★★☆

Infantile haemangioma: a true tumour, not visible at birth or small, grows rapidly in the first months, then involutes slowly over years. Vascular malformation (port-wine stain, venous, lymphatic, arteriovenous): present at birth, grows with the child and never involutes.

Q19. How does a keloid differ from a hypertrophic scar?

BDS + MBBS ★☆☆

A keloid extends beyond the original wound, continues to grow, does not regress, is common over the sternum, shoulders and ear lobes and in dark skin, and often recurs after excision. A hypertrophic scar stays within the wound margins, appears early, and often improves with time.

Differential Diagnosis

Q20. What is the differential diagnosis of a soft subcutaneous swelling?

BDS + MBBS ★☆☆

Lipoma, sebaceous cyst, dermoid cyst, cold abscess, haemangioma, lymphangioma, neurofibroma, and soft tissue sarcoma.

Q21. Which features of a soft tissue lump suggest sarcoma?

BDS + MBBS ★★☆

> Size over 5 cm, deep to the deep fascia, rapid increase in size, pain, and recurrence after previous excision. Such lumps need urgent imaging and referral to a sarcoma team.

Q22. How will you differentiate a lipoma from a sebaceous cyst?

BDS + MBBS ★☆☆

> A lipoma is soft, lobulated, has a slip sign, is free from the skin and has no punctum. A sebaceous cyst is firm and spherical, attached to the skin with a punctum, and its edge does not slip.

Q23. What is the differential diagnosis of a swelling on the dorsum of the wrist?

BDS + MBBS ★★☆

> Ganglion, tenosynovitis (including tuberculous compound palmar ganglion), lipoma, giant cell tumour of tendon sheath, bony swelling, and carpal boss.

Investigations

Q24. Are investigations needed for a simple subcutaneous lump?

BDS + MBBS ★☆☆

> Usually not; the diagnosis is clinical. Ultrasound is done when the diagnosis is uncertain, and every excised lump is sent for histopathology.

Q25. When is MRI indicated for a lump?

BDS + MBBS ★★☆

> For lumps over 5 cm, deep to the fascia, rapidly growing or painful, or recurrent, to assess for liposarcoma or other sarcoma and to plan surgery.

Q26. How should a suspected sarcoma be biopsied?

BDS + MBBS ★★☆

> By image-guided core needle biopsy, with the track placed so that it can be excised at definitive surgery. Excision biopsy ("shelling out") of a possible sarcoma is avoided as it contaminates tissue planes.

Q27. How will you investigate a haemangioma or vascular malformation?

BDS + MBBS ★★☆

> Doppler ultrasound to assess flow, and MRI for extent and relation to deep structures. Angiography is reserved for high-flow arteriovenous malformations before embolisation.

Management

Q28. How will you treat a lipoma?

BDS + MBBS ★☆☆

> Excision through an incision over it, shelling it out of its capsule. It is done for cosmesis, symptoms, growth, or diagnostic doubt. Large or deep lipomas are imaged before surgery.

Q29. How will you excise a sebaceous cyst?

BDS + MBBS ★☆☆

> Through an elliptical incision that includes the punctum, removing the cyst intact with its wall to prevent recurrence.

Q30. How will you treat an infected sebaceous cyst?

BDS + MBBS ★☆☆

> Incision and drainage of the abscess with antibiotics if there is cellulitis. The cyst wall is excised later, after the inflammation settles, to prevent recurrence.

Q31. How will you treat a ganglion?

BDS + MBBS ★★☆

> Reassurance, as many resolve spontaneously. Aspiration for symptomatic ones, though recurrence is common. Surgical excision with its stalk and a cuff of joint capsule for persistent or painful ganglia.

Q32. How is an infantile haemangioma treated?

BDS + MBBS ★★☆

> Most are observed, as they involute. Oral propranolol is the treatment of choice for problematic haemangiomas (near the eye, airway, ulcerated or large). Surgery is for residual tissue after involution.

Q33. How will you treat a keloid?

BDS + MBBS ★★☆

> Intralesional triamcinolone injections, pressure garments and silicone gel. Excision is combined with intralesional steroid or postoperative radiotherapy, as excision alone has a high recurrence rate.

Q34. How will you treat a neurofibroma?

BDS + MBBS ★★☆

> Excision only if symptomatic, rapidly growing or cosmetically troublesome, accepting that the nerve may be sacrificed. A schwannoma can be enucleated preserving the nerve.

Complications

Q35. What are the complications of excision of a lump?

BDS + MBBS ★☆☆

> Haematoma, infection, wound dehiscence, ugly or keloid scar, nerve injury and recurrence.

Q36. Why does a sebaceous cyst recur after excision?

BDS + MBBS ★★☆

> Because part of the cyst wall is left behind, especially after rupture during removal or excision through an inflamed field.

Q37. Which features suggest malignant change in a neurofibroma?

BDS + MBBS ★★☆

> Rapid increase in size, new pain, change in consistency, and neurological deficit. MRI and PET-CT with biopsy are used to diagnose malignant peripheral nerve sheath tumour.

Q38. What can go wrong after excision of a ganglion?

BDS + MBBS ★★☆

> Recurrence, injury to the radial artery (volar ganglion) or digital nerves, scar sensitivity and joint stiffness.

Recent Advances

Q39. What newer techniques remove lipomas with smaller scars?

BDS + MBBS ★★☆

> Minimal-incision (squeeze) extraction and liposuction-assisted removal for large or multiple lipomas, leaving small scars, with histology still sent.

Q40. What is selumetinib?

BDS + MBBS ★★★

> A MEK inhibitor that shrinks inoperable symptomatic plexiform neurofibromas in children with neurofibromatosis type 1.

Q41. How are small superficial infantile haemangiomas treated topically?

BDS + MBBS ★★☆

> Topical timolol gel, a beta-blocker, is effective for small superficial haemangiomas, avoiding systemic propranolol.

Q42. What treatments are used for vascular malformations?

BDS + MBBS ★★☆

> Pulsed dye laser for port-wine stains, sclerotherapy for venous and lymphatic malformations, embolisation for arteriovenous malformations, and sirolimus for complex lesions.

Q43. What newer treatments are used for keloids?

BDS + MBBS ★★☆

> Intralesional 5-fluorouracil (alone or with steroid), intralesional cryotherapy, laser therapy, and postoperative radiotherapy after excision, combined with pressure and silicone.

Examiner's Favourite (Hard Questions)

Q44. What is Cock's peculiar tumour?

BDS + MBBS ★★★

> An ulcerated, infected sebaceous cyst with exuberant granulation tissue, usually on the scalp, which looks like a squamous cell carcinoma.

Q45. Why does a lipoma show pseudofluctuation?

BDS + MBBS ★★★

> Fat is soft and semi-fluid at body temperature, so it appears to fluctuate, but true fluctuation in two planes is absent and it is not transilluminant (except sometimes in thin areas).

Q46. What is Dercum's disease?

BDS + MBBS ★★★

> Adiposis dolorosa: multiple painful lipomas, usually in obese postmenopausal women, often on the trunk and limbs.

Q47. Why is a sebaceous cyst never seen on the palms and soles?

BDS + MBBS ★★★

> Because these sites have no hair follicles or sebaceous glands. A cyst on the palm or finger is usually an implantation dermoid.

Quick Recall

- ✓ Lipoma: soft, lobulated, slip sign, pseudofluctuation, no punctum.
- ✓ Sebaceous cyst: punctum, attached to skin; excise with an ellipse including the punctum.
- ✓ Neurofibroma moves across the nerve, not along it.
- ✓ Sarcoma warning: over 5 cm, deep, rapid growth, pain, recurrence.
- ✓ Ganglion: wrist dorsum, scapholunate joint; aspiration or excision.
- ✓ Infantile haemangioma involutes; propranolol if problematic.
- ✓ Keloid extends beyond the wound; steroid injection + excision.

CHAPTER

15

PART B: SHORT CASES

Ulcers

Examination of an ulcer, rodent ulcer, squamous cell carcinoma and Marjolin's ulcer

Sample Case Presentation

Mr. O, a 65-year-old farmer who works outdoors, presents with a slowly growing ulcer near the inner corner of the left eye for 2 years. It started as a small pearly nodule, sometimes bleeds and forms a crust, and is painless. On examination there is a 1.5 × 1 cm ulcer at the left medial canthus with a raised, rolled, pearly edge and fine telangiectatic vessels, a central scab, and an indurated base not fixed to bone. The preauricular and submandibular nodes are not enlarged. My provisional diagnosis is basal cell carcinoma (rodent ulcer) of the left medial canthus.

History and Clinical Examination

Q1. Define an ulcer.

BDS + MBBS ★☆☆

A break in the continuity of the covering epithelium (skin or mucous membrane) with molecular death of the surrounding tissue.

Q2. What will you ask in the history of an ulcer?

BDS + MBBS ★☆☆

Duration, how it began (injury, nodule, blister), pain, discharge, bleeding, rate of growth, previous similar ulcers, history of trauma, burns, diabetes, varicose veins, TB, sexually transmitted infection, sun exposure and occupation.

Q3. How will you examine an ulcer?

BDS + MBBS ★☆☆

Note site, size, shape, edge, floor, base, discharge, surrounding skin, tenderness, bleeding on touch, depth and fixity to deeper structures. Then examine the regional lymph nodes, the vascular and nerve supply of the area, and the general condition.

Q4. Describe the types of ulcer edges and their significance.

BDS + MBBS ★☆☆

- Sloping: healing ulcer, venous ulcer.
- Punched out: trophic ulcer, syphilitic gumma.
- Undermined: tuberculous ulcer.
- Raised and rolled (beaded, pearly): basal cell carcinoma.
- Everted: squamous cell carcinoma.

Q5. What is the difference between the floor and the base of an ulcer?

BDS + MBBS ★☆☆

The floor is the exposed surface of the ulcer that is seen. The base is the tissue on which the ulcer rests, which is felt; induration of the base suggests malignancy or chronic inflammation.

Q6. What are the features of a healing ulcer?

BDS + MBBS ★☆☆

> Sloping edge with a blue-white rim of growing epithelium, healthy red granulation tissue in the floor, scanty serous discharge, and no surrounding inflammation.

Q7. What are the characteristics of a trophic (neuropathic) ulcer?

BDS + MBBS ★★☆

> Painless, punched-out ulcer over pressure points (heel, metatarsal heads), with surrounding callus, loss of sensation, and often bone exposed in the floor. It occurs in diabetes, leprosy and spinal cord lesions.

Q8. Why is it essential to examine the regional lymph nodes?

BDS + MBBS ★☆☆

> Enlarged nodes may be due to infection (tender) or metastasis (hard). Squamous cell carcinoma and melanoma spread to nodes, while basal cell carcinoma rarely does.

Surgical Anatomy

Q9. Why is the face the commonest site of basal cell carcinoma?

BDS + MBBS ★★☆

> It is the most sun-exposed area. Most BCCs occur above a line from the angle of the mouth to the ear lobe, especially around the inner canthus, nose and eyelids.

Q10. Which nodes drain the face and scalp?

BDS + MBBS ★★☆

> Preauricular (parotid), postauricular, occipital, submandibular and submental nodes, draining to the deep cervical chain.

Q11. What is the danger of an ulcer at the medial canthus?

BDS + MBBS ★★★

> Neglected tumours here can invade the orbit, the lacrimal apparatus, the ethmoid sinuses and even the cranial cavity, and excision may need removal of the eye.

Pathology and Classification

Q12. Classify ulcers.

BDS + MBBS ★☆☆

> - Non-specific: traumatic, venous, arterial, neuropathic, pressure, infective.
> - Specific: tuberculous, syphilitic, actinomycotic, leprotic.
> - Malignant: basal cell carcinoma, squamous cell carcinoma, malignant melanoma, Marjolin's ulcer.

Q13. What is a basal cell carcinoma?

BDS + MBBS ★☆☆

> A slow-growing, locally invasive malignant tumour of the basal cells of the epidermis, associated with ultraviolet exposure in fair-skinned elderly people. Types: nodular (commonest), superficial, morphoeic (infiltrative), pigmented and cystic. It almost never metastasises.

Q14. What are the risk factors for squamous cell carcinoma of the skin?

BDS + MBBS ★☆☆

> Sun exposure, fair skin, older age, chronic scars and ulcers (Marjolin's), arsenic and tar exposure, ionising radiation, immunosuppression, HPV, and premalignant lesions such as actinic keratosis and Bowen's disease.

Q15. What is Marjolin's ulcer?

BDS + MBBS
★★☆

A squamous cell carcinoma arising in a chronic scar or ulcer, such as a burn scar, venous ulcer or chronic osteomyelitis sinus. It is slow growing, painless and spreads late to nodes.

Q16. What are the features of a tuberculous ulcer?

BDS + MBBS
★★☆

Undermined, thin, bluish edge, pale granulation tissue in the floor, caseous discharge, often over a tuberculous lymph node or bone, with matted regional nodes.

Q17. What is a premalignant skin lesion? Give examples.

BDS + MBBS
★★☆

A lesion with an increased risk of becoming malignant: actinic (solar) keratosis, Bowen's disease (squamous cell carcinoma in situ), leukoplakia of mucosa, xeroderma pigmentosum, and chronic scars.

Q18. What are the ABCDE features of melanoma?

MBBS
★★★

Asymmetry, Border irregularity, Colour variation, Diameter over 6 mm, and Evolution (change in size, shape or colour). Bleeding, itching and ulceration are late features.

Differential Diagnosis

Q19. How will you differentiate a basal cell carcinoma from a squamous cell carcinoma?

BDS + MBBS
★☆☆

BCC: slow growing over years, raised rolled pearly edge with telangiectasia, rarely spreads to nodes. SCC: faster growing over months, everted edge, indurated base, bleeds easily, and spreads to regional nodes.

Q20. What are the causes of a non-healing ulcer?

BDS + MBBS
★☆☆

Infection, poor blood supply, venous hypertension, diabetes, malnutrition and anaemia, continued trauma or pressure, foreign body or underlying osteomyelitis, steroids, and malignant change.

Q21. What is the differential diagnosis of an ulcer on the lower lip?

BDS + MBBS
★★☆

Squamous cell carcinoma (commonest malignancy of the lip), traumatic ulcer, herpes labialis, syphilitic chancre, keratoacanthoma and basal cell carcinoma (more common on the upper lip).

Q22. What is a keratoacanthoma?

BDS + MBBS
★★★

A rapidly growing dome-shaped nodule with a central keratin plug on sun-exposed skin, which looks like SCC and may regress spontaneously. Because it cannot be reliably distinguished from SCC, it is excised.

Investigations

Q23. What is the most important investigation for a suspected malignant ulcer?

BDS + MBBS
★☆☆

Biopsy: incisional biopsy from the edge including some normal tissue for large ulcers, or excision biopsy with a margin for small lesions.

Q24. Why is a biopsy taken from the edge and not the centre of an ulcer?

BDS + MBBS ★☆☆

The centre usually contains slough and necrotic tissue, while the growing edge contains viable tumour or the diagnostic pathology.

Q25. What other investigations will you do for a chronic ulcer?

BDS + MBBS ★☆☆

Swab for culture and sensitivity, blood sugar, full blood count and ESR, X-ray of the underlying bone for osteomyelitis or invasion, Doppler and ABPI for vascular status, and FNAC of enlarged nodes.

Q26. When will you do imaging for a skin cancer?

BDS + MBBS ★★☆

When there is fixity to bone or deep structures, involvement of the orbit or skull, palpable nodes, or a large or recurrent tumour: CT for bone, MRI for soft tissue and perineural spread, and ultrasound of the nodes.

Management

Q27. What are the general principles of managing an ulcer?

BDS + MBBS ★☆☆

Treat the cause (diabetes, venous or arterial disease, infection), debride slough, control infection, dress the wound, improve nutrition and anaemia, off-load pressure, and cover the defect with a graft or flap when it is clean and granulating. Non-healing ulcers are biopsied.

Q28. How will you treat a basal cell carcinoma?

BDS + MBBS ★★☆

Surgical excision with a margin of about 4 mm for small well-defined tumours, wider for morphoeic or recurrent tumours. Mohs micrographic surgery for high-risk facial sites. Radiotherapy for elderly patients unfit for surgery. Topical imiquimod or 5-fluorouracil and cryotherapy for superficial BCC.

Q29. How will you treat a squamous cell carcinoma of the skin?

BDS + MBBS ★★☆

Wide excision with a margin of 4–6 mm (wider for high-risk tumours), with reconstruction. Lymph node dissection for involved nodes. Radiotherapy for unfit patients, close margins or perineural invasion.

Q30. What is the reconstructive ladder?

BDS + MBBS ★★☆

A stepwise approach to closing defects from simplest to most complex: healing by secondary intention, direct closure, skin graft (split or full thickness), local flap, regional flap, and free flap.

Q31. How will you treat a Marjolin's ulcer?

BDS + MBBS ★☆☆

Wide local excision with a 2 cm margin and reconstruction, or amputation if bone or joint is involved, with regional node dissection for palpable nodes. Radiotherapy is less effective in scar tissue.

Q32. How is a tuberculous ulcer treated?

BDS + MBBS ★☆☆

Antituberculous chemotherapy for 6 months, with excision of the underlying lymph node or curettage of bone if needed.

Q33. Which skin graft is preferred for the face and why?

BDS + MBBS
★★☆

> Full-thickness skin graft (from the postauricular or supraclavicular area), because it gives better colour and texture match and contracts less than a split-thickness graft.

Complications

Q34. What happens if a basal cell carcinoma is neglected?

BDS + MBBS
★★☆

> It erodes deeply into cartilage, bone, the orbit and the skull, causing severe disfigurement and occasionally death from haemorrhage or meningitis; hence the name rodent ulcer.

Q35. What are the causes of skin graft failure?

BDS + MBBS
★☆☆

> Haematoma or seroma under the graft, shearing movement, infection (especially beta-haemolytic streptococcus), poor vascular bed (bare bone, tendon or cartilage), and incorrect graft orientation.

Q36. What are the complications of radiotherapy for skin cancer?

BDS + MBBS
★★☆

> Radiation dermatitis, poor healing, skin atrophy and telangiectasia, alopecia, chondronecrosis, and radiation-induced malignancy years later.

Q37. What causes recurrence of a skin cancer after excision?

BDS + MBBS
★★☆

> Inadequate or involved margins, morphoeic or infiltrative subtypes, perineural spread, and high-risk sites around the eyes, nose and ears.

Recent Advances

Q38. What are hedgehog pathway inhibitors?

BDS + MBBS
★★★

> Vismodegib and sonidegib, oral drugs that block the hedgehog signalling pathway, used for locally advanced or metastatic basal cell carcinoma not suitable for surgery or radiotherapy.

Q39. What is the role of immunotherapy in skin cancer?

BDS + MBBS
★★★

> Cemiplimab (anti-PD-1) treats advanced cutaneous squamous cell carcinoma, and immunotherapy and BRAF/MEK inhibitors are used for advanced and high-risk resected melanoma.

Q40. How has dermoscopy changed skin cancer diagnosis?

BDS + MBBS
★★☆

> A hand-held magnifying device with light shows pigment and vascular patterns invisible to the naked eye, improving early diagnosis of BCC, SCC and melanoma and reducing unnecessary excisions.

Q41. What are dermal substitutes?

BDS + MBBS
★★☆

> Bilayered matrices (such as Integra) that form a new dermis in a wound bed, later covered with a thin skin graft, useful over exposed tendon or bone and for large defects.

Q42. What is sentinel lymph node biopsy in melanoma?

BDS + MBBS
★★★

> Removal of the first draining node in clinically node-negative melanoma thicker than about 0.8 mm, for staging and to guide adjuvant therapy. Completion lymph node dissection is no longer routine when the sentinel node is positive.

Examiner's Favourite (Hard Questions)

Q43. Why does basal cell carcinoma rarely spread to lymph nodes?

BDS + MBBS
★★★

> It depends on its surrounding stroma for growth and grows slowly by local invasion; its cells are not able to survive and grow independently in lymph nodes.

Q44. What is Mohs micrographic surgery?

BDS + MBBS
★★★

> Excision in stages with immediate microscopic examination of the entire margin, repeated until it is clear. It gives the highest cure rate while sparing normal tissue, so it is used at important facial sites and for recurrent tumours.

Q45. Why is a Marjolin's ulcer painless and slow growing?

BDS + MBBS
★★★

> The scar tissue in which it arises has few nerve endings and poor lymphatic and blood supply. Lymph node spread occurs late, but once the tumour invades normal tissue beyond the scar, it spreads to nodes.

Q46. Why is BCC called a rodent ulcer?

BDS + MBBS
★★★

> Because, if neglected, it slowly gnaws and destroys tissue, including cartilage and bone, like a rodent.

Quick Recall

- ✓ Edges: sloping (healing, venous), punched out (trophic, syphilitic), undermined (TB), rolled (BCC), everted (SCC).
- ✓ Biopsy from the edge, not the centre.
- ✓ BCC: rolled pearly edge, telangiectasia, rarely metastasises; excise with 4 mm margin.
- ✓ SCC: everted edge, indurated, spreads to nodes; excise with 4–6 mm margin.
- ✓ Marjolin's: SCC in a chronic scar; painless, slow, late nodes.
- ✓ Reconstructive ladder: secondary healing → direct closure → graft → flaps.
- ✓ Graft failure: haematoma, shear, infection, poor bed.

CHAPTER

16

PART B: SHORT CASES

Oral Cancer and Premalignant Lesions

Carcinoma tongue, buccal mucosa carcinoma, leukoplakia and oral submucous fibrosis

Sample Case Presentation

Mr. P, a 55-year-old shopkeeper who has chewed betel quid with tobacco and naswar for 30 years and smokes cigarettes, presents with a painful ulcer on the right side of the tongue for 3 months, with pain radiating to the right ear and difficulty in eating. On examination there is a 3 × 2 cm ulcer on the right lateral border of the middle third of the tongue with an everted edge, necrotic floor and an indurated base, bleeding on touch. Tongue movements are normal. There is a 2 cm hard, mobile lymph node at right level II. The teeth are stained and there is a white patch on the buccal mucosa. My provisional diagnosis is squamous cell carcinoma of the right lateral border of the tongue with ipsilateral nodal metastasis.

History and Clinical Examination

Q1. What risk factors will you ask about in a patient with an oral ulcer?

BDS + MBBS ★☆☆

Tobacco smoking, smokeless tobacco (naswar, gutka, paan with tobacco), betel nut (areca) chewing, alcohol, poor oral hygiene, sharp or broken teeth and ill-fitting dentures, HPV infection, previous oral lesions, and family history.

Q2. What are the symptoms of oral cancer?

BDS + MBBS ★☆☆

A non-healing ulcer or lump, pain, bleeding, difficulty in chewing and swallowing, slurred speech, loose teeth or ill-fitting dentures, trismus, referred ear pain, foul breath, weight loss and a neck swelling.

Q3. Why does carcinoma of the tongue cause ear pain?

BDS + MBBS ★★☆

The lingual nerve (supplying the anterior two-thirds of the tongue) and the auriculotemporal nerve (supplying the ear) are both branches of the mandibular division of the trigeminal nerve, so pain is referred to the ear.

Q4. How will you examine the oral cavity?

BDS + MBBS ★☆☆

With good light, gloves and a tongue depressor: lips, buccal mucosa, gums, teeth, hard and soft palate, tongue (dorsum, lateral borders and undersurface), floor of mouth and retromolar area. Palpate every lesion for induration and bimanually palpate the floor of mouth. Examine the neck nodes.

Q5. What is the significance of induration in an oral ulcer?

BDS + MBBS ★☆☆

Induration of the base indicates infiltration by malignant cells. Any indurated ulcer persisting for more than 2–3 weeks must be biopsied.

Q6. What is the significance of trismus in oral cancer?

BDS + MBBS
★★☆

Inability to open the mouth suggests infiltration of the pterygoid muscles or masseter, usually from a retromolar or posterior buccal tumour, indicating advanced (T4) disease. It can also be due to oral submucous fibrosis.

Q7. What does restriction of tongue movement indicate?

BDS + MBBS
★★☆

Deep infiltration of the extrinsic muscles of the tongue or floor of mouth, or involvement of the hypoglossal nerve, indicating advanced disease.

Q8. Which neck nodes are commonly involved in carcinoma of the tongue?

BDS + MBBS
★☆☆

The submandibular (level Ib) and upper and middle jugular nodes (levels II and III), especially the jugulodigastric and jugulo-omohyoid nodes.

Surgical Anatomy

Q9. What are the subsites of the oral cavity?

BDS + MBBS
★☆☆

Lips, buccal mucosa, upper and lower alveolus and gingiva, retromolar trigone, floor of mouth, hard palate, and anterior two-thirds of the tongue (oral tongue).

Q10. Describe the lymphatic drainage of the tongue.

BDS + MBBS
★★☆

The tip drains to the submental nodes, the lateral parts of the anterior tongue to the ipsilateral submandibular and deep cervical nodes, and the central part and posterior third drain bilaterally. This is why tumours near the midline can spread to both sides of the neck.

Q11. What is the nerve supply of the tongue?

BDS + MBBS
★☆☆

Anterior two-thirds: general sensation by the lingual nerve (V3), taste by the chorda tympani (VII). Posterior third: glossopharyngeal nerve for both. All muscles by the hypoglossal nerve except palatoglossus (vagus via the pharyngeal plexus).

Q12. How does oral cancer invade the mandible?

MBBS
★★★

In the dentate mandible, through the occlusal surface and tooth sockets; in the edentulous mandible, through the occlusal ridge and then into the canal of the inferior alveolar nerve, along which it can spread.

Q13. Why is the lateral border of the tongue the commonest site of carcinoma tongue?

BDS + MBBS
★★☆

It is the site of greatest exposure to tobacco and carcinogens pooling in saliva, and of chronic trauma from sharp teeth.

Pathology and Classification

Q14. What are the premalignant lesions and conditions of the oral cavity?

BDS + MBBS
★☆☆

Lesions: leukoplakia, erythroplakia and speckled leukoplakia. Conditions: oral submucous fibrosis, lichen planus, syphilitic glossitis, and Plummer–Vinson syndrome.

Q15. What is leukoplakia?

BDS + MBBS ★☆☆

A white patch or plaque on the oral mucosa that cannot be rubbed off and cannot be characterised clinically or pathologically as any other disease. It may show hyperkeratosis, dysplasia or carcinoma on biopsy.

Q16. Which oral lesion carries the highest risk of malignancy?

BDS + MBBS ★★☆

Erythroplakia, a red velvety patch, which shows severe dysplasia or carcinoma in most cases at biopsy. Speckled (red and white) leukoplakia also has a high risk.

Q17. What is oral submucous fibrosis?

BDS + MBBS ★★☆

A chronic, progressive fibrosis of the oral submucosa caused mainly by areca (betel) nut chewing. It presents with burning on eating spicy food, blanching, palpable fibrous bands and progressive trismus. It is premalignant.

Q18. What is the commonest histological type of oral cancer?

BDS + MBBS ★☆☆

Squamous cell carcinoma, accounting for more than 90%. Others include verrucous carcinoma, minor salivary gland tumours, melanoma and lymphoma.

Q19. What is field cancerisation?

BDS + MBBS ★★☆

Exposure of the entire upper aerodigestive tract mucosa to carcinogens produces widespread premalignant change, so patients are at risk of multiple and second primary cancers. This is why lifelong follow-up and panendoscopy are needed.

Q20. What determines T staging of oral cancer in the current TNM system?

MBBS ★★★

Both the surface size of the tumour and its depth of invasion: T1 up to 2 cm with depth up to 5 mm; T2 up to 2 cm with depth over 5 mm, or 2–4 cm with depth up to 10 mm; T3 over 4 cm or depth over 10 mm; T4 invading adjacent structures such as bone, skin or deep muscle.

Differential Diagnosis

Q21. What is the differential diagnosis of an ulcer on the tongue?

BDS + MBBS ★☆☆

Traumatic (dental) ulcer, aphthous ulcer, tuberculous ulcer, syphilitic ulcer (chancre or gumma), herpetic ulcer, and squamous cell carcinoma.

Q22. What is the differential diagnosis of a white patch in the mouth?

BDS + MBBS ★☆☆

Leukoplakia, candidiasis (rubs off), lichen planus (lacy striae), frictional keratosis, smoker's palate, and white sponge naevus.

Q23. How long should a traumatic ulcer be observed before biopsy?

BDS + MBBS ★☆☆

After removing the cause (smoothing a sharp tooth or adjusting a denture), a traumatic ulcer should heal within 2–3 weeks. If it does not, it must be biopsied.

Q24. What is verrucous carcinoma?

BDS + MBBS
★★★

A well-differentiated, slow-growing, exophytic warty variant of squamous cell carcinoma, often in tobacco chewers, on the buccal mucosa and gums. It invades by pushing margins, rarely spreads to nodes, and is treated by surgery.

Investigations

Q25. What is the most important investigation for a suspected oral cancer?

BDS + MBBS
★☆☆

Incisional biopsy from the edge of the lesion under local anaesthesia for histological confirmation.

Q26. What imaging is needed for oral cancer?

BDS + MBBS
★★☆

Orthopantomogram (OPG) for teeth and mandible, CT for bone invasion and neck nodes, MRI for soft tissue extent and depth of tongue tumours, chest imaging for metastases or second primary, and PET-CT for advanced disease.

Q27. What is the role of toluidine blue staining?

BDS + MBBS
★★☆

It stains areas of dysplastic and malignant mucosa, helping to select biopsy sites and detect additional lesions. It is an adjunct, not a substitute for biopsy.

Q28. Why is a dental assessment needed before treatment?

BDS + MBBS
★★☆

To remove diseased and unsalvageable teeth before radiotherapy, reducing the risk of osteoradionecrosis, and to plan oral rehabilitation.

Q29. Why is panendoscopy done in a patient with oral cancer?

MBBS
★★☆

To assess the extent of the tumour and to detect synchronous second primaries in the pharynx, larynx and oesophagus, due to field cancerisation.

Q30. How will you evaluate a neck node in oral cancer?

BDS + MBBS
★☆☆

Clinical examination, ultrasound with FNAC, and CT or MRI of the neck to determine the number, size, level and extranodal extension.

Management

Q31. What is the principle of treatment of early oral cancer?

BDS + MBBS
★☆☆

Surgery is the main treatment: wide local excision of the primary with a 1 cm margin (e.g. partial glossectomy) and elective neck dissection when the risk of occult nodal disease is significant (depth of invasion more than about 3–4 mm).

Q32. How will you treat advanced oral cancer?

BDS + MBBS
★★☆

Composite resection of the primary with the involved mandible and neck dissection (commando operation), reconstruction with a flap, and postoperative radiotherapy or chemoradiotherapy. Unresectable tumours receive chemoradiotherapy or palliation.

Q33. When is a marginal and when a segmental mandibulectomy done?

MBBS ★★☆

Marginal (rim) mandibulectomy when the tumour abuts or minimally erodes the alveolus, preserving mandibular continuity. Segmental mandibulectomy when there is gross bone invasion or the canal is involved, followed by reconstruction (e.g. fibula free flap).

Q34. Which flaps are used for oral reconstruction?

BDS + MBBS ★★☆

Radial forearm free flap for tongue and floor of mouth, anterolateral thigh free flap for larger defects, fibula free flap for mandible, and pectoralis major myocutaneous flap where microvascular surgery is not available.

Q35. What are the indications for postoperative radiotherapy?

BDS + MBBS ★★☆

T3 or T4 tumours, close or positive margins, multiple positive nodes, extranodal extension, and perineural or lymphovascular invasion. Concurrent chemotherapy is added for positive margins or extranodal extension.

Q36. How will you manage leukoplakia?

BDS + MBBS ★☆☆

Stop tobacco, betel and alcohol, remove irritants, and biopsy the lesion. Dysplastic or high-risk lesions are excised (scalpel or laser) and all patients are followed up regularly.

Q37. How is oral submucous fibrosis treated?

BDS + MBBS ★★☆

Stop areca nut chewing, intralesional steroid and hyaluronidase injections, mouth-opening exercises, antioxidants, and surgical release of fibrous bands with flap cover in severe trismus. Lifelong surveillance for cancer.

Q38. What advice will you give a patient after treatment for oral cancer?

BDS + MBBS ★☆☆

Stop tobacco, betel nut and alcohol completely, maintain oral hygiene and dental care, report any new ulcer, and attend regular follow-up for recurrence and second primaries.

Complications

Q39. What is osteoradionecrosis?

BDS + MBBS ★★☆

Death of irradiated bone (usually mandible) that fails to heal, often triggered by dental extraction after radiotherapy. It causes pain, exposed bone, fistulae and fracture. Prevented by dental care before radiotherapy and treated by debridement, pentoxifylline and tocopherol, or resection with reconstruction.

Q40. What are the complications of radiotherapy for oral cancer?

BDS + MBBS ★☆☆

Mucositis, xerostomia, loss of taste, dental caries (radiation caries), trismus, osteoradionecrosis, and skin changes.

Q41. What are the complications of composite resection?

BDS + MBBS ★★☆

Airway obstruction (needing tracheostomy), flap failure, orocutaneous fistula, infection, difficulty in swallowing and speech, aspiration, and cosmetic deformity.

Q42. Why do these patients often need a temporary tracheostomy?

BDS + MBBS
★★☆

Swelling of the tongue and floor of mouth after major resection and flap reconstruction can obstruct the airway, and the airway may be difficult to secure if bleeding occurs.

Recent Advances

Q43. What did the Tata Memorial trial show about the neck in early oral cancer?

BDS + MBBS
★★★

Elective neck dissection at the time of surgery gave better survival than watchful waiting with therapeutic dissection on relapse in early cN0 oral cancer (D'Cruz, 2015).

Q44. What is the role of immunotherapy in head and neck squamous cancer?

BDS + MBBS
★★★

Pembrolizumab, alone or with chemotherapy, is first-line treatment for recurrent or metastatic disease in PD-L1-positive tumours (KEYNOTE-048), and neoadjuvant and adjuvant pembrolizumab improves outcome in resectable locally advanced disease (KEYNOTE-689).

Q45. What is virtual surgical planning in jaw reconstruction?

BDS + MBBS
★★☆

Computer-aided design with 3D-printed cutting guides and pre-bent plates allows precise mandibulectomy and fibula flap shaping, with option of dental implants for rehabilitation.

Q46. How does IMRT benefit oral cancer patients?

BDS + MBBS
★★☆

Intensity-modulated radiotherapy shapes the radiation dose around the tumour, sparing the salivary glands and reducing xerostomia and other side effects.

Q47. Does screening reduce oral cancer deaths?

BDS + MBBS
★★☆

Yes: visual oral examination by trained health workers reduced oral cancer mortality in tobacco and alcohol users in a large trial in India, so opportunistic screening is advised in high-risk populations.

Examiner's Favourite (Hard Questions)

Q48. Why is oral cancer so common in Pakistan and South Asia?

BDS + MBBS
★★★

Because of widespread use of smokeless tobacco (naswar, gutka), betel quid with tobacco and areca nut, often kept in the mouth for long periods, combined with smoking, poor oral hygiene and late presentation.

Q49. Why is depth of invasion important in carcinoma of the tongue?

MBBS
★★★

The deeper the tumour, the higher the risk of occult neck metastasis and the worse the prognosis. It guides the decision for elective neck dissection and is included in T staging.

Q50. What is a commando operation?

BDS + MBBS
★★★

Combined Mandibulectomy and Neck Dissection Operation: en bloc resection of the primary oral tumour, part of the mandible and the cervical lymph nodes.

Q51. What is a second primary tumour and how common is it?

BDS + MBBS
★★★

A new, separate cancer arising in the upper aerodigestive tract or lungs, due to field cancerisation, occurring in a few percent of patients each year after treatment. It is a major cause of death in survivors who continue to use tobacco.

Quick Recall

- ✓ Risk factors: tobacco (smoked and smokeless), betel and areca nut, alcohol, sharp teeth.
- ✓ Referred otalgia: lingual and auriculotemporal nerves, both V3.
- ✓ Erythroplakia carries the highest risk; OSMF from areca nut causes trismus.
- ✓ Any oral ulcer not healing in 2–3 weeks: biopsy.
- ✓ Early: wide excision with 1 cm margin + neck dissection when depth of invasion is significant.
- ✓ Advanced: composite resection, flap reconstruction, postoperative radiotherapy.
- ✓ Dental clearance before radiotherapy to prevent osteoradionecrosis.

CHAPTER
17

PART B: SHORT CASES

Cleft Lip and Palate

Embryology, classification, feeding, timing of repair and long-term care

Sample Case Presentation

Baby Q, a 3-month-old boy, is brought by his parents with a defect in the upper lip and palate since birth. He has difficulty in feeding, with milk coming out of the nose, and is gaining weight slowly. His mother had fever in early pregnancy and there is no family history of clefts. On examination the child is active and weighs 5 kg. There is a complete cleft of the left side of the upper lip extending into the nostril, with a flattened, widened left nostril, a cleft of the alveolus, and a cleft of the hard and soft palate. No other anomaly is found. My provisional diagnosis is left-sided complete unilateral cleft lip and palate.

History and Clinical Examination

Q1. What will you ask in the history of a child with cleft lip and palate?

BDS + MBBS
★☆☆

- Feeding difficulty, nasal regurgitation, choking and weight gain.
- Antenatal history: drugs (phenytoin, steroids, retinoids), smoking, alcohol, infections, folate deficiency.
- Family history of clefts and consanguinity.
- Ear infections and hearing, speech (in older children), and other congenital anomalies.

Q2. How will you examine a child with a cleft?

BDS + MBBS
★☆☆

Note whether the cleft is of the lip, alveolus, palate or a combination; unilateral or bilateral; complete or incomplete; the nasal deformity; and the width of the cleft. Examine for other anomalies (heart, limbs, jaw size), and assess the airway, general condition, weight and haemoglobin.

Q3. What is a submucous cleft palate? How is it recognised?

BDS + MBBS
★★☆

A cleft of the palatal muscles with intact overlying mucosa. It is recognised by the triad of bifid uvula, a notch in the posterior border of the hard palate, and a bluish midline translucent area (zona pellucida). It may cause hypernasal speech.

Q4. What is Simonart's band?

BDS + MBBS
★★☆

A thin bridge of skin and soft tissue across the upper part of an otherwise complete cleft lip, at the nostril sill. Its presence makes the cleft technically incomplete.

Q5. What is the Pierre Robin sequence?

BDS + MBBS
★★☆

Micrognathia (small mandible) leading to glossoptosis (tongue falling back) and a U-shaped cleft palate. These babies are at risk of airway obstruction and are nursed prone, sometimes needing a nasopharyngeal airway or mandibular distraction.

Q6. Why do children with cleft palate get ear infections?

BDS + MBBS ★☆☆

> The tensor and levator veli palatini muscles, which open the Eustachian tube, are abnormally inserted. Poor ventilation of the middle ear leads to otitis media with effusion (glue ear) and hearing loss.

Q7. Which syndrome is associated with lower lip pits and clefts?

BDS + MBBS ★★☆

> Van der Woude syndrome, an autosomal dominant condition and the commonest syndromic cleft. Clefts are also seen in 22q11 deletion (velocardiofacial) syndrome and Stickler syndrome.

Embryology and Surgical Anatomy

Q8. How does the upper lip develop and how does a cleft lip arise?

BDS + MBBS ★☆☆

> The upper lip forms by fusion of the medial nasal process (forming the philtrum and premaxilla) with the maxillary process on each side, at about 6 weeks. Failure of fusion causes a cleft lateral to the philtrum.

Q9. How does the palate develop?

BDS + MBBS ★☆☆

> The primary palate (premaxilla, in front of the incisive foramen) forms from the medial nasal processes. The secondary palate forms from the palatine shelves of the maxillary processes, which become horizontal and fuse in the midline from front to back between 8 and 12 weeks.

Q10. Why is the incisive foramen important in classification?

BDS + MBBS ★★☆

> It is the landmark between the primary and secondary palate. Clefts in front of it involve the lip and alveolus; clefts behind it involve the hard and soft palate.

Q11. Describe the normal anatomy of the upper lip relevant to repair.

BDS + MBBS ★★☆

> Cupid's bow, the philtral columns and dimple, the white roll at the mucocutaneous junction, the red vermilion, and the orbicularis oris muscle. Repair aims to restore all of these, especially muscle continuity and the white roll alignment.

Q12. What is the function of the levator veli palatini and how is it abnormal in a cleft?

BDS + MBBS ★★☆

> It forms a muscular sling that elevates the soft palate to close the nasopharynx during speech and swallowing (velopharyngeal closure). In a cleft palate it runs forward and inserts abnormally into the back of the hard palate, so it must be repositioned (intravelar veloplasty).

Q13. Why is the nose deformed in a unilateral cleft lip?

BDS + MBBS ★★★

> The lower lateral cartilage on the cleft side is displaced and flattened, the alar base is pulled laterally and backward, the columella is short and deviated to the non-cleft side, and the nasal floor and septum are displaced.

Pathology and Classification

Q14. What is the incidence of cleft lip and palate?

BDS + MBBS ★☆☆

About 1 in 700 live births. Cleft lip with or without palate is commoner in males and on the left side; isolated cleft palate is commoner in females and more often associated with syndromes.

Q15. What are the causes of clefts?

BDS + MBBS ★☆☆

Multifactorial: genetic predisposition plus environmental factors such as maternal smoking, alcohol, anticonvulsants (phenytoin, valproate), retinoids, steroids, folate deficiency and maternal diabetes. Some are part of syndromes.

Q16. Classify cleft lip and palate.

BDS + MBBS ★☆☆

- Cleft lip: unilateral or bilateral, complete or incomplete (microform is the mildest).
- Cleft of primary palate (lip and alveolus), secondary palate (hard and soft palate), or both.
- Veau's classification of palate: I soft palate only; II hard and soft palate; III unilateral complete lip and palate; IV bilateral complete lip and palate.
- Kernahan's striped Y is used for diagrammatic recording.

Q17. What is the risk of recurrence in siblings?

BDS + MBBS ★★☆

With one affected child and unaffected parents, the risk for a subsequent child is about 4%. It is higher if a parent is affected or there is more than one affected relative.

Differential Diagnosis and Associations

Q18. What are the causes of velopharyngeal insufficiency?

BDS + MBBS ★★☆

Cleft palate (repaired or unrepaired), submucous cleft, short palate, neuromuscular disorders, and after adenoidectomy in children with an occult submucous cleft.

Q19. What are the problems faced by a child with cleft lip and palate?

BDS + MBBS ★☆☆

Feeding difficulty, nasal regurgitation, aspiration, poor weight gain, ear infections and hearing loss, speech problems (hypernasality, articulation errors), dental anomalies and malocclusion, maxillary growth problems, cosmetic and psychological issues.

Q20. How does feeding differ between cleft lip alone and cleft palate?

BDS + MBBS ★★☆

A baby with cleft lip alone can usually breastfeed, as the lip defect can be sealed by the breast. A baby with cleft palate cannot create suction and needs special techniques and bottles.

Investigations

Q21. Can a cleft be diagnosed before birth?

BDS + MBBS ★☆☆

Yes. Cleft lip can be detected on antenatal ultrasound at the 18–20 week anomaly scan. Isolated cleft palate is hard to see. Antenatal diagnosis allows counselling of parents.

Q22. What investigations will you do before surgery?

BDS + MBBS ★☆☆

Haemoglobin, full blood count, blood grouping, and assessment for associated anomalies, including echocardiography if a heart murmur or syndrome is suspected.

Q23. Why is hearing assessment important?

BDS + MBBS ★★☆

Middle ear effusion is very common in cleft palate, and hearing loss affects speech development. Audiological assessment is done early and repeated, and grommets are inserted if needed.

Q24. How is velopharyngeal function assessed in an older child?

BDS + MBBS ★★★

By perceptual speech assessment by a speech therapist, nasendoscopy and videofluoroscopy to see the movement of the palate and pharyngeal walls during speech.

Management

Q25. Why is a team approach needed?

BDS + MBBS ★☆☆

Care involves the plastic or cleft surgeon, paediatrician, specialist nurse, speech therapist, orthodontist, ENT surgeon, audiologist, dentist, psychologist and geneticist, from birth to adulthood.

Q26. How will you advise the parents about feeding?

BDS + MBBS ★☆☆

Feed the baby upright in a semi-sitting position, use soft squeezable bottles or special cleft teats, feed slowly with frequent burping, and monitor weight. Breastfeeding is encouraged in cleft lip alone; expressed breast milk can be given by bottle in cleft palate.

Q27. What is the rule of 10s?

BDS + MBBS ★☆☆

A traditional guide for fitness for cleft lip repair: age about 10 weeks, weight about 10 pounds (4.5 kg), and haemoglobin at least 10 g/dl.

Q28. What is the timing of the various cleft operations?

BDS + MBBS ★☆☆

- Lip repair: about 3 months.
- Palate repair: 6–12 months, before the child starts speaking.
- Alveolar bone grafting: 8–11 years, before the permanent canine erupts.
- Surgery for velopharyngeal insufficiency: 3–5 years if needed.
- Orthognathic surgery and rhinoplasty: after growth is complete, in the late teens.

Q29. Name the commonly used techniques of cleft lip repair.

BDS + MBBS ★★☆

Millard rotation-advancement repair (most popular for unilateral clefts) and the Tennison–Randall triangular flap repair. Bilateral clefts are repaired by techniques such as the Mulliken repair. Primary nasal correction is often done at the same time.

Q30. Name the techniques of cleft palate repair.

BDS + MBBS ★★☆

Von Langenbeck (bipedicled flaps), Veau–Wardill–Kilner (V–Y push-back), Bardach two-flap palatoplasty, and Furlow double-opposing Z-plasty. Modern repairs include intravelar veloplasty to reconstruct the levator sling.

Q31. What is presurgical orthopaedics?

BDS + MBBS ★★☆

> Use of appliances such as nasoalveolar moulding (NAM) or lip taping in the first months of life to narrow a wide cleft and improve nasal shape, making lip repair easier and giving better results.

Q32. What is the role of the speech therapist?

BDS + MBBS ★☆☆

> Assessment and therapy for articulation and resonance problems after palate repair, and identification of velopharyngeal insufficiency needing further surgery.

Complications

Q33. What are the early complications of cleft repair?

BDS + MBBS ★☆☆

> Airway obstruction (especially after palate repair), bleeding, wound infection and dehiscence.

Q34. What is an oronasal fistula and how is it managed?

BDS + MBBS ★★☆

> A persistent opening between the mouth and nose after palate repair, usually at the junction of the hard and soft palate, due to tension or poor healing. It causes nasal regurgitation and speech problems and is closed with local flaps when symptomatic.

Q35. What is velopharyngeal insufficiency and how is it treated?

BDS + MBBS ★★☆

> Failure of the soft palate to close off the nasopharynx during speech, causing hypernasal speech and nasal air escape. Treated with speech therapy and surgery: palate re-repair, pharyngeal flap or sphincter pharyngoplasty.

Q36. Why do some cleft patients develop a retruded midface?

BDS + MBBS ★★☆

> Scarring from palate surgery in early childhood restricts the forward and downward growth of the maxilla, causing midface retrusion and a class III malocclusion, which may need orthognathic surgery (Le Fort I advancement) later.

Q37. What are the late complications after cleft lip repair?

BDS + MBBS ★☆☆

> Visible scar, mismatch of the white roll and vermilion, short lip, whistle deformity, and residual nasal deformity, which may need revision surgery.

Recent Advances

Q38. How has antenatal diagnosis improved cleft care?

BDS + MBBS ★★☆

> 3D ultrasound and fetal MRI detect clefts antenatally, allowing parents to meet the cleft team before birth for counselling and feeding plans.

Q39. What is primary rhinoplasty?

BDS + MBBS ★★☆

> Correction of the cleft nasal deformity at the time of lip repair, which improves nasal symmetry without harming nasal growth and reduces the need for later surgery.

Q40. What newer techniques treat fistula and velopharyngeal insufficiency?

BDS + MBBS
★★☆

> Buccal myomucosal flaps to lengthen the palate or close fistulae, and fat grafting to the posterior pharyngeal wall for mild velopharyngeal insufficiency.

Q41. What is distraction osteogenesis in cleft patients?

BDS + MBBS
★★★

> Gradual advancement of the cut maxilla with a distraction device to correct severe maxillary hypoplasia, allowing larger movements with less relapse than conventional Le Fort I advancement.

Q42. Are there alternatives to iliac crest bone graft for the alveolar cleft?

BDS + MBBS
★★★

> Recombinant bone morphogenetic protein-2 on a carrier has been studied to avoid donor site morbidity, but iliac crest cancellous bone remains the standard.

Examiner's Favourite (Hard Questions)

Q43. Why is the lip repaired early but the palate later?

BDS + MBBS
★★★

> Early lip repair improves feeding, appearance and parent bonding. Palate repair is delayed until 6–12 months to balance two needs: repair before speech develops for good speech, and not too early to reduce damage to maxillary growth and allow safer anaesthesia.

Q44. Why is alveolar bone grafting done before the permanent canine erupts?

BDS + MBBS
★★★

> Bone placed in the alveolar cleft allows the permanent canine to erupt through it into a good position, stabilises the maxillary segments, closes the oronasal fistula, and supports the nasal base.

Q45. What is the advantage of Furlow palatoplasty?

BDS + MBBS
★★★

> The double-opposing Z-plasty lengthens the soft palate and repositions the levator muscles into a transverse sling, improving velopharyngeal closure and speech.

Q46. Why must adenoidectomy be done cautiously in a child with a submucous cleft?

BDS + MBBS
★★★

> The adenoids help close the nasopharynx in a child with a short or poorly functioning palate. Removing them can unmask velopharyngeal insufficiency and cause hypernasal speech.

Quick Recall

- ✓ Lip: medial nasal + maxillary process fusion at 6 weeks; palate fuses at 8–12 weeks.
- ✓ Incisive foramen separates primary and secondary palate.
- ✓ Submucous cleft: bifid uvula, palatal notch, zona pellucida.
- ✓ Rule of 10s: 10 weeks, 10 lb, Hb 10 g/dl.
- ✓ Timing: lip 3 months, palate 6–12 months, alveolar bone graft 8–11 years.
- ✓ Millard for lip; Furlow and intravelar veloplasty for palate.
- ✓ Long-term: fistula, VPI, glue ear, maxillary hypoplasia; team care to adulthood.

CHAPTER

18

PART B: SHORT CASES

Scrotal Swellings

Hydrocele, varicocele, epididymal cyst, testicular tumour and acute scrotum

Sample Case Presentation

Mr. R, a 45-year-old labourer, presents with a painless swelling of the right half of the scrotum for 2 years, gradually increasing in size and causing a dragging discomfort. There is no history of trauma, fever or urinary symptoms. On examination there is a 10 × 8 cm smooth, pyriform swelling in the right scrotum. I can get above the swelling, there is no cough impulse, and it is not reducible. It is fluctuant and brilliantly transilluminant, and the testis cannot be felt separately. The cord and the left side are normal. My provisional diagnosis is right primary vaginal hydrocele.

History and Clinical Examination

Q1. What will you ask in the history of a scrotal swelling?

BDS + MBBS ★☆☆

- Duration, rate of growth, pain, and whether it disappears on lying down or increases on coughing.
- Sudden onset of pain (torsion, epididymo-orchitis), fever, urinary symptoms, sexual history.
- Trauma, previous hernia or scrotal surgery, undescended testis.
- Infertility, loss of weight, backache or cough (metastatic testicular tumour).

Q2. What are the three key questions in examining a scrotal swelling?

BDS + MBBS ★☆☆

Can I get above the swelling? Is the testis separately palpable? Does the swelling transilluminate? Together these localise the swelling and suggest its nature.

Q3. Why can you get above a hydrocele but not an inguinoscrotal hernia?

BDS + MBBS ★☆☆

A hydrocele is confined to the scrotum around the testis, so the normal cord can be felt above it. A hernia descends from the abdomen through the inguinal canal, so its upper limit cannot be reached.

Q4. Which scrotal swellings transilluminate?

BDS + MBBS ★☆☆

Vaginal hydrocele, encysted hydrocele of the cord and epididymal cyst (brilliantly). A thick-walled or chronic hydrocele, haematocele, pyocele and solid testicular tumours do not.

Q5. How will you examine a suspected varicocele?

BDS + MBBS ★☆☆

With the patient standing: it feels like a "bag of worms" above and behind the testis, becomes more prominent on coughing or Valsalva, and empties when the patient lies down with the scrotum elevated. Compare the size of the two testes.

Q6. How will you examine the testis and epididymis?

BDS + MBBS
★☆☆

Support the scrotum and gently palpate the testis between the fingers and thumb for size, consistency, surface and testicular sensation, then palpate the epididymis behind it (head, body, tail) and the vas in the cord.

Q7. Why will you examine the abdomen in a patient with a testicular swelling?

MBBS
★★☆

Testicular lymphatics drain to the para-aortic nodes, so a mass may be felt in the abdomen. The supraclavicular nodes, chest and breasts (gynaecomastia from hCG) are also examined.

Q8. What are the features of testicular torsion?

BDS + MBBS
★★☆

Sudden severe testicular pain in an adolescent, often with vomiting. The testis lies high with a horizontal lie, is very tender, and the cremasteric reflex is usually absent.

Surgical Anatomy

Q9. What are the coverings of the testis?

BDS + MBBS
★☆☆

From outside: skin, dartos, external spermatic fascia, cremasteric muscle and fascia, internal spermatic fascia, the parietal and visceral layers of the tunica vaginalis, and the tunica albuginea.

Q10. What is the tunica vaginalis?

BDS + MBBS
★☆☆

A closed serous sac derived from the processus vaginalis, covering the front and sides of the testis. A collection of fluid between its two layers is a hydrocele.

Q11. What is the lymphatic drainage of the testis and the scrotum?

BDS + MBBS
★☆☆

The testis drains along the testicular vessels to the para-aortic nodes at the level of the renal vessels. The scrotal skin drains to the superficial inguinal nodes.

Q12. Why is varicocele commoner on the left side?

BDS + MBBS
★★☆

The left testicular vein is longer, drains at a right angle into the left renal vein, may have no valve at its termination, and can be compressed by the loaded sigmoid colon or between the aorta and superior mesenteric artery (nutcracker).

Q13. Describe the descent of the testis.

BDS + MBBS
★★☆

The testis develops near the kidney, descends to the deep ring by about 7 months of gestation guided by the gubernaculum, and passes through the inguinal canal into the scrotum by birth, preceded by the processus vaginalis.

Q14. What is the bell-clapper deformity?

MBBS
★★★

An abnormally high investment of the tunica vaginalis on the cord, so the testis hangs freely within it like the clapper of a bell and can twist. It is usually bilateral, which is why the other testis is fixed at surgery.

Pathology and Classification

Q15. Classify hydrocele.

BDS + MBBS ★☆☆

- Primary (idiopathic) vaginal hydrocele: most common, in adults.
- Congenital: communicates with the peritoneal cavity through a patent processus vaginalis.
- Infantile: tunica and processus are fluid filled up to the deep ring but not communicating.
- Encysted hydrocele of the cord, and hydrocele of the canal of Nuck in females.
- Secondary: due to tumour, infection, trauma or filariasis.

Q16. What are the causes of a secondary hydrocele?

BDS + MBBS ★★☆

Testicular tumour, epididymo-orchitis, tuberculosis, trauma, filariasis, and after hernia or varicocele surgery. It is usually lax, and the testis may be palpable.

Q17. Classify testicular tumours.

MBBS ★☆☆

- Germ cell tumours (about 95%): seminoma, and non-seminomatous germ cell tumours (embryonal carcinoma, teratoma, yolk sac tumour, choriocarcinoma, mixed).
- Non-germ cell: Leydig cell and Sertoli cell tumours.
- Secondary: lymphoma (commonest testicular tumour in older men).

Q18. What are the risk factors for testicular cancer?

MBBS ★★☆

Undescended testis (even after orchidopexy), previous testicular cancer, family history, germ cell neoplasia in situ, infertility, and Klinefelter's syndrome.

Q19. What is the difference between an epididymal cyst and a spermatocele?

BDS + MBBS ★★☆

Both lie above and behind the testis, separate from it. An epididymal cyst contains clear fluid, is often multiple and brilliantly transilluminant. A spermatocele contains milky fluid with sperm and is less translucent.

Q20. What causes a varicocele?

BDS + MBBS ★★☆

Incompetent valves in the testicular vein causing dilatation of the pampiniform plexus. A sudden left varicocele in an older man may be due to a left renal tumour blocking the testicular vein.

Differential Diagnosis

Q21. Give the differential diagnosis of a scrotal swelling.

BDS + MBBS ★☆☆

Inguinoscrotal hernia, hydrocele, epididymal cyst, varicocele, testicular tumour, epididymo-orchitis, haematocele, torsion, and sebaceous cysts of the scrotal skin.

Q22. What is the differential diagnosis of an acute painful scrotum?

BDS + MBBS ★☆☆

Testicular torsion, torsion of the appendix testis, epididymo-orchitis, strangulated hernia, trauma, haemorrhage into a tumour, and idiopathic scrotal oedema in children.

Q23. How will you differentiate torsion from epididymo-orchitis?

BDS + MBBS ★★☆

> Torsion: adolescent, sudden onset, high horizontal testis, absent cremasteric reflex, no urinary symptoms. Epididymo-orchitis: older or sexually active, gradual onset, fever, dysuria, tender swollen epididymis. Doppler helps, but if torsion cannot be excluded, the scrotum must be explored.

Q24. What is the "blue dot sign"?

BDS + MBBS ★★☆

> A small bluish spot seen through the scrotal skin at the upper pole of the testis in torsion of the appendix of testis (hydatid of Morgagni) in children.

Investigations

Q25. What is the main imaging investigation for scrotal swellings?

BDS + MBBS ★☆☆

> Scrotal ultrasound with Doppler. It differentiates cystic from solid lesions, shows the testis within a hydrocele, detects tumours, assesses blood flow in torsion and inflammation, and confirms varicocele.

Q26. Why is ultrasound essential in a young man with a hydrocele?

BDS + MBBS ★★☆

> Because a tense hydrocele can hide an underlying testicular tumour, which causes a secondary hydrocele.

Q27. What tumour markers are used in testicular cancer?

MBBS ★★☆

> Alpha-fetoprotein (raised in yolk sac and embryonal tumours, never in pure seminoma), beta-hCG (choriocarcinoma, some seminomas) and LDH (tumour bulk). They are used for diagnosis, staging, prognosis and follow-up.

Q28. How is testicular cancer staged?

MBBS ★★☆

> CT of chest, abdomen and pelvis for para-aortic nodes and lung metastases, together with tumour markers after orchidectomy.

Q29. Why is scrotal biopsy or FNAC of a suspected testicular tumour forbidden?

BDS + MBBS ★★★

> It breaches the scrotum, risking tumour spread to the scrotal skin and inguinal nodes, which changes the lymphatic drainage and the treatment needed.

Q30. What investigations are done for a varicocele in an infertile man?

BDS + MBBS ★★☆

> Semen analysis, scrotal Doppler ultrasound, and hormonal profile when indicated. A new varicocele in an older man needs ultrasound of the kidneys.

Management

Q31. What are the operations for a vaginal hydrocele?

BDS + MBBS ★☆☆

> Jaboulay's operation (excision and eversion of the sac behind the testis) for large thick-walled hydroceles, Lord's plication for thin-walled sacs, and excision of the sac for very thick or large hydroceles.

Q32. Why is aspiration of a hydrocele not preferred?

BDS + MBBS
★★☆

> Fluid reaccumulates, there is a risk of infection and haematocele, and an underlying tumour may be missed. Aspiration with sclerotherapy is reserved for unfit patients.

Q33. How is a congenital hydrocele treated?

BDS + MBBS
★☆☆

> Most resolve by 1–2 years as the processus closes. Persistent ones are treated by herniotomy (ligation of the patent processus vaginalis at the deep ring) through an inguinal incision.

Q34. How will you treat a suspected testicular tumour?

MBBS
★★☆

> Radical inguinal orchidectomy: through an inguinal incision, the cord is clamped early at the deep ring before handling the testis, and the testis is removed with the cord divided at the deep ring. Further treatment depends on histology and stage: surveillance, chemotherapy (BEP) or radiotherapy for seminoma.

Q35. What are the indications for varicocele treatment and how is it done?

BDS + MBBS
★★☆

> Pain or dragging discomfort, infertility with abnormal semen, testicular atrophy in adolescents, and cosmetic concern. Options: microsurgical subinguinal or inguinal ligation, laparoscopic ligation, or radiological embolisation.

Q36. How will you manage testicular torsion?

BDS + MBBS
★☆☆

> Emergency scrotal exploration without delay, ideally within 6 hours. Untwist the testis, assess viability, fix it (orchidopexy) and also fix the opposite testis. A non-viable testis is removed.

Q37. How is epididymo-orchitis treated?

BDS + MBBS
★☆☆

> Scrotal support, rest, analgesics and antibiotics guided by the likely organism (coliforms in older men, chlamydia and gonorrhoea in young sexually active men). An abscess needs drainage.

Q38. When and why is orchidopexy done for undescended testis?

BDS + MBBS
★★☆

> At 6–18 months of age, to preserve fertility, allow examination for later tumour, prevent torsion and trauma, repair the associated hernia, and for psychological reasons.

Complications

Q39. What are the complications of hydrocele surgery?

BDS + MBBS
★☆☆

> Scrotal haematoma (common because the lax scrotal tissue does not tamponade bleeding), infection, oedema, recurrence, and injury to the epididymis, vas or testicular vessels.

Q40. What are the complications of a long-standing hydrocele?

BDS + MBBS
★☆☆

> Discomfort and difficulty in walking and intercourse, rupture, haematocele after trauma, infection (pyocele), calcification, and atrophy of the testis from pressure.

Q41. What happens if torsion is not treated in time?

BDS + MBBS
★★☆

Testicular infarction and atrophy. Salvage is high within 6 hours and falls sharply after 12–24 hours.

Q42. What are the complications of varicocele surgery?

BDS + MBBS
★★☆

Hydrocele (from lymphatic ligation, reduced by microsurgery), recurrence, injury to the testicular artery causing atrophy, and haematoma.

Recent Advances

Q43. What is microsurgical subinguinal varicocelectomy?

BDS + MBBS
★★☆

Ligation of the dilated veins under an operating microscope through a small incision below the inguinal ring, preserving the testicular artery and lymphatics, with the lowest recurrence and hydrocele rates.

Q44. When is testis-sparing surgery used?

BDS + MBBS
★★★

For small (under about 2 cm) testicular masses with likely benign features, or tumours in a solitary testis or bilateral tumours, guided by ultrasound and frozen section, to preserve hormonal function and fertility.

Q45. How has the management of stage I testicular tumours changed?

BDS + MBBS
★★★

Active surveillance is preferred for most stage I seminomas and non-seminomas, with one dose of carboplatin or short adjuvant chemotherapy for selected higher-risk patients, avoiding overtreatment.

Q46. What is miR-371a-3p?

BDS + MBBS
★★★

A serum microRNA that is a sensitive marker of germ cell tumours (including seminoma, which lacks AFP) and is being evaluated for diagnosis and detection of relapse.

Q47. Is sclerotherapy an alternative to hydrocele surgery?

BDS + MBBS
★★☆

Aspiration with sclerotherapy (e.g. polidocanol or doxycycline) is a less invasive option for older or unfit patients, with higher recurrence than surgery.

Examiner's Favourite (Hard Questions)

Q48. Why is a testicular tumour removed through an inguinal and not a scrotal incision?

MBBS
★★★

To avoid disturbing the scrotal lymphatics, which would allow spread to the inguinal nodes, and to allow high ligation of the cord at the deep ring with early vascular control.

Q49. What is Prehn's sign and is it reliable?

BDS + MBBS
★★★

Elevation of the scrotum relieves pain in epididymo-orchitis but not in torsion. It is unreliable and should never be used to rule out torsion.

Q50. Why is the testis not palpable separately in a vaginal hydrocele?

BDS + MBBS
★★★

> Because the fluid surrounds the testis on the front and sides within the tunica vaginalis. In an epididymal cyst, the testis is felt separately in front of and below the swelling.

Q51. Which testicular tumour is most radiosensitive and which secretes AFP?

MBBS
★★★

> Seminoma is highly radiosensitive and chemosensitive. AFP is secreted by yolk sac tumour and embryonal carcinoma; a raised AFP means the tumour is not a pure seminoma.

Quick Recall

- ✓ Three questions: get above it? testis separate? transilluminates?
- ✓ Hydrocele: can get above, testis not separate, transilluminant. Epididymal cyst: testis separate.
- ✓ Varicocele: bag of worms, standing, left side; sudden left varicocele in elderly = check kidney.
- ✓ Testis drains to para-aortic nodes; scrotum to inguinal nodes.
- ✓ Testicular tumour: ultrasound + AFP, hCG, LDH; inguinal orchidectomy; never scrotal biopsy.
- ✓ Torsion: explore within 6 hours; fix both testes.
- ✓ Hydrocele surgery: Jaboulay or Lord's; watch for scrotal haematoma.

CHAPTER

19

PART B: SHORT CASES

Umbilical, Paraumbilical and Incisional Hernia

Ventral hernias of the abdominal wall and their repair

Sample Case Presentation

Mrs. S, a 50-year-old obese housewife with five children, presents with a swelling just above the umbilicus for 3 years that increases on coughing and straining and partly reduces on lying down. She has had two episodes of pain in it that settled. On examination there is a 6 × 5 cm swelling above the umbilicus, pushing the umbilicus downward into a crescent shape. It has an expansile cough impulse and is partly reducible; the contents feel doughy. A defect of about 3 cm can be felt in the linea alba after partial reduction. My provisional diagnosis is paraumbilical hernia containing omentum.

History and Clinical Examination

Q1. What will you ask in the history of a ventral hernia?

BDS + MBBS ★☆☆

- Duration, increase on coughing or straining, reducibility, pain.
- Episodes of severe pain, vomiting or constipation (obstruction).
- Previous abdominal surgery, wound infection after surgery (incisional hernia).
- Obesity, pregnancies, chronic cough, constipation, prostatism, smoking, diabetes and steroid use.

Q2. How will you differentiate a true umbilical hernia from a paraumbilical hernia?

BDS + MBBS ★☆☆

A true umbilical hernia passes through the umbilical scar itself, everting the umbilicus, and is common in infants. A paraumbilical hernia protrudes through the linea alba just above or below the umbilicus, displacing the umbilicus into a crescent, and is common in obese middle-aged women.

Q3. How will you examine an incisional hernia?

BDS + MBBS ★☆☆

Inspect the scar and the swelling with the patient lying and then raising the head and legs. Note the size of the swelling and of the defect, reducibility, cough impulse, the condition of the skin, other defects along the scar, and divarication of the recti. Assess the fitness of the patient.

Q4. What is divarication of the recti? How is it different from a hernia?

BDS + MBBS ★☆☆

Separation of the two recti through a widened, thin linea alba, producing a midline bulge on raising the head. There is no defined fascial defect or sac, so it does not strangulate, and it usually needs no surgery.

Q5. Why is a paraumbilical hernia often irreducible?

BDS + MBBS
★★☆

Its neck is narrow and the contents (usually omentum, sometimes transverse colon) become adherent to the sac, often forming loculi.

Q6. What features suggest strangulation of a paraumbilical hernia?

BDS + MBBS
★☆☆

Sudden severe pain, a tense, tender, irreducible swelling with no cough impulse, redness of the overlying skin, vomiting and abdominal distension, with fever and tachycardia.

Q7. What is "loss of domain" in a large incisional hernia?

BDS + MBBS
★★☆

When a large part of the abdominal contents has lived in the hernia sac for a long time, the abdominal cavity contracts and cannot accommodate them back. Forced reduction raises intra-abdominal pressure and causes respiratory difficulty and compartment syndrome.

Surgical Anatomy

Q8. What is the linea alba?

BDS + MBBS
★☆☆

A tendinous midline band formed by the interlacing aponeuroses of the three flat abdominal muscles, extending from the xiphoid to the pubic symphysis. It is wider above the umbilicus, where epigastric and paraumbilical hernias occur.

Q9. Describe the rectus sheath above and below the arcuate line.

BDS + MBBS
★★☆

Above the arcuate line, the anterior sheath is formed by the external oblique and half of the internal oblique aponeurosis, and the posterior sheath by the other half of the internal oblique and the transversus aponeurosis. Below the arcuate line, all three aponeuroses pass in front of the rectus, leaving only transversalis fascia behind.

Q10. How does the umbilicus form?

BDS + MBBS
★☆☆

The umbilical ring transmits the umbilical cord vessels and vitello-intestinal duct in the fetus. After birth the cord falls off and the ring closes by scar tissue. Failure of closure causes an infantile umbilical hernia.

Q11. What is the nerve supply of the anterior abdominal wall and its relevance to incisions?

BDS + MBBS
★★☆

Segmental thoracoabdominal nerves (T7–T11), the subcostal nerve (T12) and the iliohypogastric and ilioinguinal nerves (L1). They run obliquely from lateral to medial, so long vertical incisions lateral to the midline (e.g. paramedian) can denervate the rectus, weakening the wall.

Q12. Where does a Spigelian hernia occur?

BDS + MBBS
★★★

Through the Spigelian fascia along the lateral border of the rectus (semilunar line), usually at or below the arcuate line. It lies deep to the external oblique, so it is difficult to feel and often needs ultrasound or CT for diagnosis.

Pathology and Classification

Q13. Classify ventral hernias.

BDS + MBBS ★☆☆

- Primary: epigastric, umbilical, paraumbilical, Spigelian and lumbar hernias.
- Secondary: incisional hernias at sites of previous surgery, including port-site hernias.

Q14. What is the natural history of an infantile umbilical hernia?

BDS + MBBS ★☆☆

Most close spontaneously by 3–4 years of age and rarely strangulate. Surgery is done if they persist beyond about 4 years or are very large.

Q15. What are the risk factors for incisional hernia?

BDS + MBBS ★☆☆

Wound infection (the most important), obesity, poor closure technique, midline incisions, emergency surgery, malnutrition, diabetes, steroids, smoking, chronic cough, ascites and abdominal distension after surgery.

Q16. What is an epigastric hernia?

BDS + MBBS ★★☆

Protrusion of extraperitoneal fat through a small defect in the linea alba between the xiphoid and umbilicus, often without a peritoneal sac. It may be small, painful and multiple.

Q17. Why do paraumbilical hernias occur in obese multiparous women?

BDS + MBBS ★★☆

Repeated pregnancies stretch and thin the linea alba, and obesity increases intra-abdominal pressure and weakens the abdominal wall.

Differential Diagnosis

Q18. What is the differential diagnosis of a swelling at the umbilicus?

BDS + MBBS ★☆☆

Umbilical or paraumbilical hernia, umbilical granuloma (in infants), urachal cyst or sinus, patent vitello-intestinal duct, umbilical endometriosis (cyclical swelling and bleeding), Sister Mary Joseph nodule (metastatic), and sebaceous cyst.

Q19. What is the differential diagnosis of a swelling in the midline above the umbilicus?

BDS + MBBS ★☆☆

Epigastric hernia, paraumbilical hernia, divarication of recti, lipoma, and in thin patients a palpable abdominal aortic aneurysm or epigastric mass.

Q20. Why are paraumbilical hernias more likely to strangulate than incisional hernias?

BDS + MBBS ★★☆

They have a narrow, rigid fibrous neck, whereas most incisional hernias have wide defects through which contents move freely. Small incisional defects, however, can also strangulate.

Investigations

Q21. Is imaging needed for an umbilical or incisional hernia?

BDS + MBBS
★☆☆

Small hernias are diagnosed clinically. Ultrasound or CT is used in obese patients, uncertain diagnosis, suspected multiple defects, large hernias with loss of domain, and recurrent hernias to plan repair.

Q22. How will you prepare a patient for elective incisional hernia repair?

BDS + MBBS
★☆☆

Weight reduction, stopping smoking, control of diabetes, treatment of chest disease, constipation and prostatism, correction of anaemia and nutrition, and assessment of cardiac and respiratory fitness.

Q23. How is a patient with loss of domain prepared for repair?

MBBS
★★★

By preoperative progressive pneumoperitoneum (gradual air insufflation over weeks) and/or botulinum toxin injection into the lateral abdominal muscles to relax and lengthen them, allowing the contents to be returned safely.

Management

Q24. How will you treat an infantile umbilical hernia?

BDS + MBBS
★☆☆

Reassure the parents and observe, as most close spontaneously. Strapping with coins is not used. Surgery (herniotomy with repair of the defect) if it persists after about 4 years, is large, or becomes complicated.

Q25. How will you treat an adult paraumbilical hernia?

BDS + MBBS
★☆☆

Surgical repair, because these hernias tend to enlarge and strangulate. Very small defects (under 1–2 cm) may be closed with sutures; larger defects are repaired with mesh (preperitoneal or sublay, or onlay) or laparoscopically.

Q26. What is Mayo's repair?

BDS + MBBS
★★☆

A "vest over pants" repair of a paraumbilical hernia, overlapping the upper and lower edges of the linea alba transversely with sutures. It has a high recurrence rate and has largely been replaced by mesh repair.

Q27. Describe the positions in which mesh can be placed.

BDS + MBBS
★★☆

- Onlay: on the anterior rectus sheath.
- Inlay: bridging the defect edges (high recurrence, avoided).
- Sublay (retromuscular, Rives–Stoppa): behind the rectus, in front of the posterior sheath; preferred.
- Underlay (intraperitoneal onlay mesh, IPOM): inside the abdomen, as in laparoscopic repair, using a coated mesh.

Q28. What is the Rives–Stoppa repair?

BDS + MBBS
★★☆

An open repair of a midline incisional hernia in which a large mesh is placed in the retromuscular space behind the rectus muscles, with closure of the posterior sheath and linea alba over it. It has low recurrence and infection rates.

Q29. What is component separation?

MBBS
★★★

A technique for large midline defects in which the external oblique aponeurosis (anterior) or the transversus abdominis (posterior, TAR) is released to allow the rectus muscles to move medially and close the midline, usually reinforced with mesh.

Q30. How will you manage a strangulated paraumbilical hernia?

BDS + MBBS
★★☆

Resuscitation, nasogastric tube, antibiotics and emergency surgery. The sac is opened, the neck divided, and the contents assessed; gangrenous omentum is excised and non-viable bowel resected. The defect is closed with sutures if there is contamination, or with mesh if the field is clean.

Q31. What are the advantages of laparoscopic ventral hernia repair?

BDS + MBBS
★★☆

Smaller wounds, less wound infection, shorter hospital stay, ability to detect and cover multiple defects, and quicker recovery. It needs a coated intraperitoneal mesh and carries a risk of bowel injury.

Q32. How can incisional hernia be prevented when closing a midline laparotomy?

BDS + MBBS
★★☆

Mass closure with a continuous slowly absorbable suture using the small-bites technique (bites 5 mm from the edge, 5 mm apart) and a suture length to wound length ratio of at least 4:1, and prophylactic mesh in high-risk patients.

Complications

Q33. What are the complications of a ventral hernia?

BDS + MBBS
★☆☆

Irreducibility, obstruction, strangulation, skin ulceration over a large hernia, and pain.

Q34. What are the complications of mesh repair?

BDS + MBBS
★☆☆

Seroma (commonest), haematoma, wound and mesh infection, recurrence, chronic pain, and adhesions, fistula or bowel erosion with intraperitoneal mesh.

Q35. What is abdominal compartment syndrome after hernia repair?

MBBS
★★★

Raised intra-abdominal pressure after returning large contents into a small abdomen, causing respiratory failure, reduced venous return, renal failure and bowel ischaemia. It is detected by bladder pressure monitoring and may need reopening of the abdomen.

Q36. How will you manage an infected mesh?

BDS + MBBS
★★☆

Drainage of any collection and antibiotics. Macroporous polypropylene meshes in the sublay position can often be salvaged with drainage and negative-pressure wound therapy; persistent infection, sinus or fistula requires mesh removal.

Q37. Why does an incisional hernia recur?

BDS + MBBS
★★☆

Persisting risk factors (obesity, smoking, infection), inadequate mesh overlap, mesh placed under tension or as an inlay, missed defects, and wound infection.

Recent Advances

Q38. What are eTEP and robotic retromuscular repairs?

BDS + MBBS
★★★

Minimally invasive techniques that place mesh in the retromuscular (Rives) space, through the extended-view totally extraperitoneal (eTEP) approach or robotically, avoiding intraperitoneal mesh and its adhesions.

Q39. What did the PRIMA trial show?

BDS + MBBS
★★☆

Prophylactic mesh at midline laparotomy closure in high-risk patients (aortic aneurysm, obesity) significantly reduced incisional hernia.

Q40. What do current guidelines advise for umbilical hernia repair in adults?

BDS + MBBS
★★☆

Mesh repair is recommended for most umbilical hernias with defects of about 1 cm or more, usually in the preperitoneal position, as it reduces recurrence compared with suture repair.

Q41. What are biosynthetic absorbable meshes?

BDS + MBBS
★★☆

Meshes made of slowly absorbable polymers that give temporary reinforcement while host tissue grows in, used in contaminated or high-risk fields where permanent synthetic mesh may become infected.

Q42. How is diastasis recti with umbilical hernia managed today?

BDS + MBBS
★★☆

Endoscopic or minimally invasive techniques (such as subcutaneous endoscopic repair) plicate the linea alba and place mesh, treating both the diastasis and hernia through small incisions.

Examiner's Favourite (Hard Questions)

Q43. What is the small-bites technique and why does it work?

BDS + MBBS
★★★

Closure of the linea alba with small bites close to the wound edge and close together, including only the aponeurosis. It spreads tension, avoids including muscle and fat that become necrotic, and has been shown to reduce wound dehiscence and incisional hernia.

Q44. How much overlap should a mesh have?

BDS + MBBS
★★★

At least 3–5 cm beyond the edges of the defect in all directions, because the mesh shrinks after implantation and needs to grip healthy tissue.

Q45. What is a Richter's hernia and why is it dangerous in small ventral defects?

BDS + MBBS
★★★

Only part of the circumference of the bowel wall is trapped. It can become gangrenous without causing complete obstruction, so diagnosis is delayed. It occurs in small, rigid defects such as port sites and femoral hernias.

Q46. Why is a port-site hernia common at the umbilicus after laparoscopy?

BDS + MBBS
★★★

The umbilical port is usually the largest (10–12 mm), is used for specimen extraction, and lies in a naturally weak area. The fascia at ports of 10 mm or more should be closed.

Quick Recall

- ✓ True umbilical: through the scar, infants, everted umbilicus. Paraumbilical: beside it, obese multiparous women, crescentic umbilicus.
- ✓ Infantile umbilical hernia closes by 3–4 years; observe.
- ✓ Divarication of recti: no sac, no strangulation, no surgery usually.
- ✓ Wound infection is the biggest risk factor for incisional hernia.
- ✓ Mesh: sublay (Rives–Stoppa) preferred; inlay avoided; overlap 3–5 cm.
- ✓ Prevent incisional hernia: small bites, 4:1 suture to wound length.
- ✓ Loss of domain: pneumoperitoneum, botulinum toxin, component separation.

CHAPTER

20

PART B: SHORT CASES

Fistula-in-Ano and Pilonidal Sinus

Anorectal abscess, fistula-in-ano, pilonidal disease and sphincter-saving laser surgery

Sample Case Presentation

Mr. T, a 35-year-old driver, presents with intermittent discharge of pus near the anus for 1 year. It started after a painful perianal abscess that burst on its own. The discharge stops for a few weeks and then recurs with pain and swelling. There is no bleeding, change in bowel habit or weight loss. On examination there is an external opening with granulation tissue at the 5 o'clock position, about 3 cm from the anal verge, with an indurated cord running towards the anal canal. On digital rectal examination an internal opening is felt as a small pit in the posterior midline at the dentate line. The anal sphincter tone is normal. My provisional diagnosis is low posterior fistula-in-ano, probably intersphincteric or low trans-sphincteric.

History and Clinical Examination

Q1. What will you ask in the history of a patient with fistula-in-ano?

BDS + MBBS
★☆☆

- Discharge of pus, blood or faeces, pain and swelling that settle when it drains.
- Previous perianal abscess and its treatment, previous fistula surgery.
- Bowel habit, diarrhoea, weight loss, abdominal pain (Crohn's disease).
- Cough, fever, TB contact (tuberculosis), diabetes, HIV.
- Continence for flatus, liquid and solid stool before surgery.

Q2. What is a fistula-in-ano?

BDS + MBBS
★☆☆

A chronic abnormal track lined by granulation tissue connecting an internal opening in the anal canal or rectum to an external opening on the perianal skin.

Q3. State Goodsall's rule.

BDS + MBBS
★☆☆

With the patient in the lithotomy position, an external opening anterior to a transverse line through the anus usually leads straight (radially) to the internal opening. An opening posterior to the line usually follows a curved track to an internal opening in the posterior midline. Anterior openings more than 3 cm from the anus may behave like posterior ones.

Q4. How will you examine a patient with fistula-in-ano?

BDS + MBBS
★☆☆

Inspect for external openings and scars, palpate for an indurated cord, perform digital rectal examination to feel the internal opening and assess sphincter tone, and do proctoscopy to see the internal opening. Gentle probing is done only under anaesthesia.

Q5. Why should a fistula not be probed vigorously in the clinic?

BDS + MBBS ★★☆

It is painful, and forceful probing can create a false track and a new internal opening, converting a simple fistula into a complex one.

Q6. What are the features of a pilonidal sinus?

BDS + MBBS ★☆☆

Usually a young, hairy, overweight man who sits a lot (e.g. drivers), with one or more midline pits in the natal cleft over the sacrococcygeal area, often with tufts of hair, and lateral openings that discharge pus. Acute abscess causes a painful swelling to one side of the midline.

Q7. What features suggest a specific cause of fistula?

BDS + MBBS ★★☆

Multiple openings, recurrent or complex fistulae, a fistula with an unhealthy undermined opening, rectovaginal fistula, and associated diarrhoea suggest Crohn's disease or TB. A hard, fixed mass suggests carcinoma.

Surgical Anatomy

Q8. What is the significance of the dentate (pectinate) line?

BDS + MBBS ★☆☆

It marks the junction of endoderm and ectoderm. Above it the lining is columnar, insensitive to pain, with venous drainage to the portal system and lymph to the internal iliac nodes. Below it the lining is squamous, sensitive to pain, with systemic venous drainage and lymph to the inguinal nodes. The anal glands open into the crypts at this line.

Q9. Describe the anal sphincters.

BDS + MBBS ★☆☆

The internal sphincter is a thickened continuation of the circular smooth muscle of the rectum, involuntary, providing resting tone. The external sphincter is striated, voluntary, with subcutaneous, superficial and deep parts, continuous with the puborectalis above.

Q10. What is the anorectal ring and why is it important?

BDS + MBBS ★★☆

A muscular ring at the anorectal junction formed by the puborectalis, the deep external sphincter and the upper internal sphincter, felt on rectal examination. Division of this ring causes faecal incontinence, so fistulae passing above it must not be laid open.

Q11. Name the anorectal spaces where abscesses form.

BDS + MBBS ★★☆

Perianal, ischiorectal (ischioanal), intersphincteric, supralevator (pelvirectal), and the deep postanal space, which allows horseshoe spread.

Q12. What is the cryptoglandular theory?

BDS + MBBS ★★☆

Most anorectal abscesses and fistulae begin with infection of an anal gland in the intersphincteric space through its duct opening into an anal crypt. The infection spreads in various directions to form an abscess, and the persisting track becomes a fistula.

Pathology and Classification

Q13. Describe Parks' classification of fistula-in-ano.

BDS + MBBS ★☆☆

- Intersphincteric (commonest): runs in the intersphincteric plane to the perianal skin.
- Trans-sphincteric: crosses the external sphincter into the ischiorectal fossa.
- Suprasphincteric: passes above the puborectalis then down through the levator.
- Extrasphincteric: from the rectum through the levator, outside the sphincters, usually from pelvic disease or trauma.

Q14. What is the difference between a simple and a complex fistula?

BDS + MBBS ★☆☆

Simple: low intersphincteric or low trans-sphincteric fistula involving little sphincter. Complex: high trans-sphincteric, suprasphincteric or extrasphincteric, anterior in women, horseshoe, multiple tracks, recurrent, or associated with Crohn's, radiation or poor continence.

Q15. Classify anorectal abscesses.

BDS + MBBS ★☆☆

Perianal (commonest), ischiorectal, intersphincteric, supralevator, and horseshoe abscesses spreading around the anal canal through the deep postanal space.

Q16. What causes a pilonidal sinus?

BDS + MBBS ★☆☆

It is an acquired condition. Loose hairs are driven into the skin of the natal cleft by friction and sitting, forming a sinus that becomes infected. Hairiness, deep natal cleft, obesity, sitting occupations and poor hygiene predispose.

Q17. What are the specific causes of fistula-in-ano?

BDS + MBBS ★★☆

Crohn's disease, tuberculosis, carcinoma of the anal canal or rectum, trauma, foreign body, radiation, actinomycosis, lymphogranuloma venereum and HIV.

Differential Diagnosis

Q18. What is the differential diagnosis of a discharging sinus near the anus?

BDS + MBBS ★☆☆

Fistula-in-ano, pilonidal sinus, hidradenitis suppurativa, infected sebaceous cyst or furuncle, Bartholin's abscess in women, tuberculous or Crohn's fistula, and carcinoma.

Q19. How will you differentiate a pilonidal sinus from a fistula-in-ano?

BDS + MBBS ★☆☆

A pilonidal sinus lies in the natal cleft over the sacrum, contains hair, has midline pits and no communication with the anal canal. A fistula is nearer the anus, has an internal opening in the anal canal, and an indurated track towards it.

Q20. What is the differential diagnosis of acute perianal pain?

BDS + MBBS ★☆☆

Anal fissure, perianal abscess, thrombosed external haemorrhoid (perianal haematoma), prolapsed thrombosed internal haemorrhoids, and proctalgia fugax.

Q21. What is hidradenitis suppurativa?

BDS + MBBS ★★☆

Chronic inflammation of the apocrine sweat glands in the axillae, groins and perineum, forming multiple abscesses, sinuses and scars. It is not connected to the anal canal.

Investigations

Q22. How is a fistula-in-ano usually assessed?

BDS + MBBS ★☆☆

Clinically and by examination under anaesthesia (EUA) with gentle probing, often injecting dilute hydrogen peroxide or methylene blue through the external opening to find the internal opening.

Q23. What is the investigation of choice for a complex fistula?

BDS + MBBS ★★☆

MRI of the pelvis (fistula protocol). It shows the relation of the track to the sphincters and levators, secondary extensions, horseshoe tracks and abscesses. Endoanal ultrasound is an alternative.

Q24. When will you investigate for Crohn's disease or tuberculosis?

BDS + MBBS ★★☆

For multiple, recurrent or complex fistulae, unusual appearance, or associated symptoms: colonoscopy with biopsies, biopsy of the track for histology, AFB stain, culture and GeneXpert, and chest X-ray.

Q25. Why is a fistulogram rarely used today?

BDS + MBBS ★★☆

It is less accurate than MRI in showing the relation of the track to the sphincters and often misses secondary extensions.

Management

Q26. How will you treat a perianal abscess?

BDS + MBBS ★☆☆

Prompt incision and drainage under anaesthesia, deroofing the abscess with a cruciate or elliptical incision close to the anal verge, without searching vigorously for a fistula. Antibiotics are added for cellulitis, diabetes or immunosuppression.

Q27. How is a low fistula-in-ano treated?

BDS + MBBS ★☆☆

Fistulotomy (laying open of the track) over a probe, curetting the granulation tissue and leaving the wound open to heal from the base. It has a high cure rate and minimal risk to continence when little sphincter is divided.

Q28. What is a seton and what are its types?

BDS + MBBS ★★☆

A thread or elastic placed through the fistula track. A loose (draining) seton keeps the track drained and controls sepsis, especially in high and Crohn's fistulae. A cutting seton is tightened gradually to divide the sphincter slowly, allowing fibrosis to hold the muscle ends.

Q29. What are the sphincter-saving procedures for high fistulae?

BDS + MBBS ★★☆

LIFT (ligation of the intersphincteric fistula tract), endorectal advancement flap, fistula laser closure (FiLaC), video-assisted anal fistula treatment (VAAFT), fistula plug and fibrin glue. They avoid dividing the sphincter at the cost of a higher recurrence rate.

Q30. What is fistula laser closure (FiLaC)?

BDS + MBBS ★★☆

A radial laser fibre is passed through the cleaned track and withdrawn slowly while delivering energy, which destroys the lining and shrinks the track. The internal opening is usually closed. It preserves the sphincter and allows quick recovery with little pain.

Q31. How is a fistula in Crohn's disease managed?

BDS + MBBS ★★☆

Control sepsis with drainage and loose setons, then medical treatment with antibiotics, immunomodulators and anti-TNF biologics. Fistulotomy is reserved for simple low fistulae; destructive surgery is avoided because of the risk of incontinence.

Q32. How will you manage an acute pilonidal abscess?

BDS + MBBS ★☆☆

Incision and drainage through an incision placed off the midline, with removal of hair and debris, followed by definitive treatment once the inflammation settles.

Q33. What are the options for chronic pilonidal sinus?

BDS + MBBS ★★☆

- Minimally invasive: pit picking (Bascom), laser ablation (SiLaC), endoscopic treatment (EPSiT).
- Excision with off-midline closure: Karydakis flap, Bascom cleft lift, Limberg (rhomboid) flap.
- Excision with healing by secondary intention or lay-open, with longer healing time.

Hair removal and hygiene reduce recurrence after all methods.

Complications

Q34. What are the complications of fistula surgery?

BDS + MBBS ★☆☆

Faecal incontinence (major concern with division of sphincter), recurrence, bleeding, delayed wound healing, anal stenosis and keyhole deformity.

Q35. Why does a fistula recur?

BDS + MBBS ★☆☆

Missed internal opening or secondary tracks, inadequate drainage, premature skin healing over the track, complex anatomy, and underlying Crohn's disease or TB.

Q36. What are the complications of pilonidal surgery?

BDS + MBBS ★★☆

Wound infection, wound breakdown, prolonged healing of midline wounds, and recurrence, which is common with midline closure.

Q37. What is the risk of a long-standing untreated fistula?

BDS + MBBS ★★★

Repeated abscesses, extension into complex tracks with sphincter damage, and rarely squamous carcinoma or adenocarcinoma arising in a chronic fistula track.

Recent Advances

Q38. What is the role of MRI-based classification?

BDS + MBBS
★★☆

MRI classifications (such as the St James's University Hospital grading) describe the track, extensions and abscess before surgery, reducing missed tracks and recurrence in complex fistulae.

Q39. Should a perianal abscess cavity be packed after drainage?

BDS + MBBS
★★☆

The PPAC2 trial found that routine internal packing caused more pain without reducing fistula formation or recurrence, so many surgeons now avoid it.

Q40. What is TROPIS?

BDS + MBBS
★★★

Transanal opening of the intersphincteric space: the intersphincteric part of a high fistula is laid open from inside the anal canal, letting it heal while sparing the external sphincter.

Q41. What is the status of stem cell therapy for Crohn's perianal fistula?

BDS + MBBS
★★★

Local injection of adipose-derived stem cells (darvadstrocel) showed promise in early trials, but a later phase III trial did not confirm benefit, so it is not a standard treatment.

Q42. How can pilonidal sinus recurrence be reduced?

BDS + MBBS
★★☆

Laser hair removal of the natal cleft after treatment, off-midline closure and minimally invasive techniques (pit picking, SiLaC, EPSiT) reduce recurrence and speed recovery.

Examiner's Favourite (Hard Questions)

Q43. Why do midline wounds in the natal cleft heal poorly?

BDS + MBBS
★★★

The cleft is deep, moist, under friction and tension, and collects hair and bacteria. Off-midline closure flattens the cleft and keeps the scar away from the midline, reducing breakdown and recurrence.

Q44. Why is fistulotomy avoided for anterior fistulae in women?

BDS + MBBS
★★★

The anterior external sphincter is short and may already be weakened by childbirth, so even low anterior fistulotomy can cause incontinence. Sphincter-saving techniques are preferred.

Q45. What is a horseshoe fistula?

BDS + MBBS
★★★

A fistula in which infection from a posterior midline gland spreads through the deep postanal space into both ischiorectal fossae, producing tracks on both sides with external openings on either side and a single posterior internal opening.

Q46. What is the main advantage of laser treatment for fistula and pilonidal sinus?

BDS + MBBS
★★★

It is minimally invasive and sphincter-preserving, with small wounds, less pain, day-case treatment and quick return to work. Its success depends on proper case selection, and recurrence is higher than with fistulotomy in simple fistulae.

Quick Recall

- ✓ Goodsall: anterior openings run straight; posterior openings curve to the posterior midline.
- ✓ Cryptoglandular origin in the intersphincteric space.
- ✓ Parks: intersphincteric, trans-, supra- and extrasphincteric.
- ✓ Never divide the anorectal ring: incontinence.
- ✓ Low fistula: fistulotomy. High fistula: seton, LIFT, flap, FiLaC.
- ✓ MRI pelvis for complex fistula; investigate for Crohn's and TB.
- ✓ Pilonidal: off-midline drainage and closure; pit picking or laser for minimal disease.

CHAPTER

21

PART B: SHORT CASES

Benign Breast Disease

Fibroadenoma, breast cyst, mastalgia, nipple discharge, breast abscess and gynaecomastia

Sample Case Presentation

Miss U, a 20-year-old university student, presents with a painless lump in the right breast for 4 months, which she noticed while bathing. It has not changed in size and is not related to her periods. There is no nipple discharge and no family history of breast disease. On examination there is a 2.5 × 2 cm smooth, firm, rubbery, well-defined, non-tender lump in the upper outer quadrant of the right breast. It is highly mobile within the breast tissue and slips away under the fingers. The skin and nipple are normal and there are no axillary lymph nodes. My provisional diagnosis is fibroadenoma of the right breast.

History and Clinical Examination

Q1. What will you ask in the history of a young woman with a breast lump?

BDS + MBBS ★☆☆

- Age, duration, change in size, pain and its relation to the menstrual cycle.
- Nipple discharge, skin changes, recent pregnancy or lactation.
- Trauma to the breast, previous breast lumps or surgery.
- Oral contraceptive use, family history of breast or ovarian cancer.

Q2. Why is a fibroadenoma called a "breast mouse"?

BDS + MBBS ★☆☆

Because it is smooth, firm, well defined and so highly mobile within the breast that it slips away from the examining fingers.

Q3. What are the clinical features of a breast cyst?

BDS + MBBS ★☆☆

A smooth, well-defined, firm or tense swelling that may appear suddenly and be painful, usually in women of 35–50 years (perimenopausal). It may be multiple and bilateral, and disappears on aspiration.

Q4. What are the features of fat necrosis of the breast?

BDS + MBBS ★★☆

A history of trauma (sometimes trivial), often in large fatty breasts or after surgery or radiotherapy, with bruising followed by a hard, irregular lump that may be tethered to the skin, mimicking carcinoma. Biopsy is needed to exclude cancer.

Q5. How will you assess a patient with breast pain?

BDS + MBBS ★★☆

Ask whether the pain is cyclical (related to menstrual cycle, bilateral, upper outer quadrants, premenstrual) or non-cyclical, and ask the patient to keep a pain chart for two cycles. Examine the breast and the chest wall to exclude a lump or musculoskeletal cause.

Q6. How will you examine a male patient with breast enlargement?

BDS + MBBS
★☆☆

Differentiate true glandular tissue (firm, rubbery disc under the areola) from fat (pseudogynaecomastia), look for a hard eccentric lump (male breast cancer), examine the testes for a tumour, look for signs of liver disease and thyroid disease, and review the drugs.

Developmental Anomalies

Q7. What are accessory nipples and breasts?

BDS + MBBS
★☆☆

Extra nipples (polythelia) or breast tissue (polymastia) along the milk line from the axilla to the groin. Accessory breast tissue in the axilla may enlarge during pregnancy and lactation.

Q8. What is Poland syndrome?

BDS + MBBS
★★☆

Congenital absence of the sternal head of pectoralis major with underdevelopment or absence of the breast on that side, often with hand anomalies (syndactyly) and chest wall defects.

Q9. What is juvenile (virginal) hypertrophy of the breast?

BDS + MBBS
★★☆

Massive, rapid enlargement of one or both breasts at puberty due to abnormal sensitivity to oestrogens. It is treated by reduction mammoplasty.

Pathology and Classification

Q10. What is meant by ANDI?

BDS + MBBS
★☆☆

Aberrations of Normal Development and Involution: a concept that most benign breast conditions are minor deviations of normal breast development (fibroadenoma at 15–25 years), cyclical change (mastalgia, nodularity at 25–40 years), and involution (cysts, duct ectasia at 35–55 years), rather than diseases.

Q11. Classify benign breast disease.

BDS + MBBS
★☆☆

- Developmental: accessory nipples and breasts, Poland syndrome, juvenile hypertrophy.
- ANDI: fibroadenoma, cyclical mastalgia and nodularity, cysts, sclerosing adenosis, duct ectasia.
- Inflammatory: lactational and non-lactational abscess, periductal mastitis, tuberculosis.
- Neoplastic: duct papilloma, lipoma, phyllodes tumour.
- Traumatic: fat necrosis, haematoma.

Q12. What is the pathology of a fibroadenoma?

BDS + MBBS
★☆☆

A benign tumour arising from the breast lobule, with proliferation of both stroma and glandular elements, surrounded by a pseudocapsule. Variants include giant fibroadenoma (over 5 cm), juvenile fibroadenoma in adolescents, and complex fibroadenoma.

Q13. What is a duct papilloma?

BDS + MBBS ★★☆

A benign papillary growth in a large subareolar duct, usually in women of 35–55 years, presenting with bloodstained discharge from a single duct. Multiple peripheral papillomas carry a slightly higher cancer risk.

Q14. What is the difference between duct ectasia and periductal mastitis?

BDS + MBBS ★★☆

Duct ectasia is dilatation of the subareolar ducts with thick secretions in older perimenopausal women, causing discharge and slit-like nipple retraction. Periductal mastitis is inflammation around the ducts in younger women, strongly linked to smoking, causing pain, abscess and mammary duct fistula.

Q15. Which organism causes lactational breast abscess and how?

BDS + MBBS ★☆☆

Staphylococcus aureus, entering through cracked nipples during breastfeeding, with milk stasis contributing.

Q16. Which benign breast lesions increase the risk of breast cancer?

BDS + MBBS ★★☆

Atypical ductal and lobular hyperplasia (about 4–5 times risk) and lobular neoplasia (LCIS). Usual hyperplasia, sclerosing adenosis and papillomas carry a slight increase. Simple fibroadenoma, cysts and duct ectasia do not significantly increase the risk.

Q17. What is a galactocele?

BDS + MBBS ★★☆

A milk-filled retention cyst that develops during or after lactation due to blockage of a duct. It is treated by aspiration.

Differential Diagnosis

Q18. How will you differentiate cyclical from non-cyclical mastalgia?

BDS + MBBS ★☆☆

Cyclical: younger women, bilateral, diffuse, upper outer quadrants, worse before periods and relieved after. Non-cyclical: older women, often unilateral and localised, unrelated to periods; causes include duct ectasia, periductal mastitis and chest wall pain (Tietze's syndrome).

Q19. What are the causes of gynaecomastia?

BDS + MBBS ★☆☆

Physiological (neonatal, puberty, old age), drugs (spironolactone, digoxin, cimetidine, anabolic steroids, antiandrogens, cannabis), liver cirrhosis, hypogonadism (Klinefelter's), testicular tumours (hCG or oestrogen secreting), hyperthyroidism, renal failure and adrenal tumours.

Q20. What is the significance of nipple discharge from a single duct compared with multiple ducts?

BDS + MBBS ★★☆

Discharge from multiple ducts, bilateral and non-bloody, is usually physiological or due to duct ectasia. Spontaneous discharge from a single duct, especially bloodstained, suggests a duct papilloma or carcinoma and needs investigation.

Q21. What is the differential diagnosis of a breast lump in a lactating woman?

BDS + MBBS ★★☆

> Lactational abscess, galactocele, blocked duct, lactating adenoma, and pregnancy-associated breast cancer, which must not be missed.

Q22. What is the differential diagnosis of a breast lump in a 40-year-old woman?

BDS + MBBS ★☆☆

> Breast cyst, fibrocystic change (nodularity), carcinoma, fibroadenoma, fat necrosis, phyllodes tumour and abscess. Every lump at this age needs full triple assessment.

Investigations

Q23. How will you investigate a breast lump in a 20-year-old woman?

BDS + MBBS ★☆☆

> By triple assessment: clinical examination, ultrasound (mammography is not used under 35 because of dense breasts), and core needle biopsy where indicated. A classical fibroadenoma under 25 years may be diagnosed on ultrasound alone in some units.

Q24. What are the ultrasound features of a fibroadenoma?

BDS + MBBS ★★☆

> A well-defined, oval, hypoechoic, solid lesion that is wider than tall, with smooth margins, sometimes with gentle lobulation and posterior enhancement.

Q25. When is cyst fluid sent for cytology?

BDS + MBBS ★★☆

> Routine fluid is not sent. Cytology is needed if the fluid is bloodstained, if a mass remains after aspiration, or if the cyst recurs repeatedly; these need imaging and biopsy.

Q26. How will you investigate a bloodstained nipple discharge?

BDS + MBBS ★★☆

> Clinical examination, ultrasound and mammography (over 35), discharge cytology, and if needed ductography or ductoscopy to locate the lesion, followed by microdochectomy for histology.

Q27. What is the classical mammographic appearance of an old fibroadenoma?

BDS + MBBS ★★☆

> Coarse "popcorn" calcification in an involuting fibroadenoma in an older woman.

Q28. How will you investigate gynaecomastia?

BDS + MBBS ★★☆

> Liver, renal and thyroid function, serum testosterone, oestradiol, LH, FSH, prolactin, beta-hCG and AFP, testicular ultrasound when hormone results or examination suggest a tumour, and breast imaging and biopsy for a suspicious lump.

Q29. What is the role of core biopsy in a presumed fibroadenoma?

BDS + MBBS ★★☆

> It confirms the diagnosis and excludes phyllodes tumour and carcinoma, and is advised in women over 25 years and for lumps over 3 cm, growing lumps or atypical imaging.

Management

Q30. How will you manage a fibroadenoma?

BDS + MBBS ★☆☆

After triple assessment confirms the diagnosis, small fibroadenomas (under 3 cm) can be left with reassurance, as many stay the same or regress. Excision is advised for lumps over 3 cm, growing lumps, uncertain histology, or patient preference. Vacuum-assisted excision is an option for small lesions.

Q31. How will you treat a simple breast cyst?

BDS + MBBS ★☆☆

By needle aspiration to dryness, which is both diagnostic and therapeutic. The patient is reviewed; residual mass, bloodstained fluid or repeated recurrence needs further evaluation.

Q32. How will you manage mastalgia?

BDS + MBBS ★★☆

Exclude cancer and reassure, use a well-fitting supportive bra, keep a pain chart, give topical NSAIDs and simple analgesia, and review hormonal drugs. Evening primrose oil is not proven. Severe resistant cases may receive tamoxifen or danazol under specialist care, considering their side effects.

Q33. How is a duct papilloma treated?

BDS + MBBS ★★☆

Microdochectomy: excision of the affected duct, identified by gentle probing or the discharging duct, through a periareolar incision, with histology to exclude carcinoma.

Q34. How is duct ectasia with troublesome discharge treated?

BDS + MBBS ★★☆

Total duct excision (Hadfield's operation), removing all the major subareolar ducts through a periareolar incision.

Q35. How will you treat a lactational breast abscess?

BDS + MBBS ★☆☆

Antibiotics (flucloxacillin or co-amoxiclav) with repeated ultrasound-guided needle aspiration. Incision and drainage if the skin is thin or necrotic. The mother should continue breastfeeding or express milk from the affected side.

Q36. How will you treat a mammary duct fistula?

BDS + MBBS ★★☆

Excision of the fistula track together with the diseased duct (fistulectomy with duct excision), or laying open the track, with antibiotics and advice to stop smoking.

Q37. How is gynaecomastia treated?

BDS + MBBS ★★☆

Treat the cause or stop the responsible drug, reassure in puberty as most resolve. Tamoxifen can help painful early gynaecomastia. Persistent cases are treated by subcutaneous mastectomy (Webster's periareolar incision) with or without liposuction.

Q38. How will you treat periductal mastitis?

BDS + MBBS ★★☆

Antibiotics covering anaerobes (co-amoxiclav, or flucloxacillin with metronidazole), analgesia and stopping smoking. An abscess is aspirated or drained, and recurrent disease is treated by excision of the diseased ducts.

Recent Advances

Q39. What is vacuum-assisted excision?

BDS + MBBS
★★☆

Removal of small benign breast lesions such as fibroadenomas, papillomas and B3 lesions through a single small cut under ultrasound or stereotactic guidance with a vacuum-assisted needle, avoiding open surgery.

Q40. What is cryoablation of fibroadenoma?

BDS + MBBS
★★☆

Freezing the fibroadenoma with an ultrasound-guided probe, which destroys it gradually without a surgical scar, for biopsy-proven small fibroadenomas.

Q41. What are B3 lesions?

BDS + MBBS
★★★

Lesions of uncertain malignant potential on core biopsy (atypical ductal hyperplasia, papilloma, radial scar, lobular neoplasia). Many are now managed by vacuum-assisted excision and surveillance instead of surgical excision.

Q42. What is idiopathic granulomatous mastitis?

BDS + MBBS
★★★

A chronic inflammatory condition of young parous women with painful masses, abscesses and sinuses, mimicking cancer and TB. It is diagnosed by biopsy and treated with steroids, methotrexate and drainage, avoiding extensive surgery.

Q43. What newer imaging is used in breast assessment?

BDS + MBBS
★★☆

Contrast-enhanced mammography, abbreviated MRI and digital breast tomosynthesis improve detection in dense breasts, and artificial intelligence is being used to support mammogram reading.

Examiner's Favourite (Hard Questions)

Q44. What is Mondor's disease?

BDS + MBBS
★★★

Superficial thrombophlebitis of a vein of the breast or anterior chest wall, felt as a tender cord that becomes more visible when the arm is raised. It is self-limiting and treated with analgesics.

Q45. Why should a smoker with periductal mastitis stop smoking?

BDS + MBBS
★★★

Smoking damages the subareolar ducts, and continued smoking leads to recurrent abscess, mammary duct fistula and poor results after surgery.

Q46. Why is aspirated cyst fluid not sent routinely for cytology?

BDS + MBBS
★★★

Simple cysts are almost never malignant and cytology of clear fluid has a very low yield. Only bloodstained fluid, residual mass or recurrence suggests an intracystic tumour.

Q47. Can a fibroadenoma become malignant?

BDS + MBBS
★★★

Very rarely. Carcinoma (usually lobular in situ) is occasionally found within a fibroadenoma. The main concern is distinguishing it from a phyllodes tumour, which grows faster and is larger.

Quick Recall

- ✓ ANDI: fibroadenoma (15–25), cyclical change (25–40), cysts and duct ectasia (35–55).
- ✓ Fibroadenoma: breast mouse; leave under 3 cm if triple assessment benign.
- ✓ Cyst: aspirate; cytology only if bloodstained, residual mass or recurrence.
- ✓ Single-duct bloodstained discharge: papilloma (or cancer); microdochectomy.
- ✓ Periductal mastitis and mammary duct fistula: smokers.
- ✓ Lactational abscess: Staph aureus; aspiration + antibiotics; keep breastfeeding.
- ✓ Gynaecomastia: examine testes, review drugs, check liver and hormones.

CHAPTER

22

PART C: GENERAL SURGERY VIVA TOPICS

Shock

Classification, assessment and resuscitation of the shocked patient

Clinical Scenario

A 25-year-old motorcyclist is brought to the emergency department after a road traffic accident. He is pale, cold and sweaty, and anxious. His pulse is 130 per minute, blood pressure 85/60 mmHg, respiratory rate 30 per minute, and capillary refill 4 seconds. There is an obvious deformity of the right thigh and tenderness in the left upper abdomen. Examiners use such a scenario to ask about the recognition, classification and management of haemorrhagic shock.

Definitions and Physiology

Q1. Define shock.

BDS + MBBS ★☆☆

Shock is a state of inadequate tissue perfusion and oxygen delivery to meet the metabolic demands of the cells, leading to cellular hypoxia, anaerobic metabolism and, if uncorrected, organ failure and death.

Q2. Classify shock.

BDS + MBBS ★☆☆

- Hypovolaemic: haemorrhage, burns, vomiting, diarrhoea, third-space loss.
- Cardiogenic: myocardial infarction, arrhythmia, cardiomyopathy.
- Obstructive: tension pneumothorax, cardiac tamponade, massive pulmonary embolism.
- Distributive: septic, anaphylactic, neurogenic.
- Endocrine: Addisonian crisis, hypothyroidism.

Q3. What are the compensatory mechanisms in hypovolaemic shock?

BDS + MBBS ★★☆

Sympathetic activation (tachycardia, vasoconstriction, diversion of blood from skin and gut to vital organs), the renin–angiotensin–aldosterone system and ADH (retaining salt and water), and shift of fluid from the interstitial space into the vessels.

Q4. What happens at the cellular level in shock?

BDS + MBBS ★★☆

Lack of oxygen forces cells into anaerobic metabolism, producing lactic acid and little ATP. Cell membrane pumps fail, cells swell, lysosomes release enzymes, and inflammatory mediators are released, leading to cell death and organ dysfunction.

Q5. What are the stages of shock?

BDS + MBBS ★★☆

Compensated: perfusion maintained by compensatory mechanisms, blood pressure normal. Decompensated: mechanisms fail, hypotension and organ dysfunction appear. Irreversible: cellular damage is so severe that the patient dies despite resuscitation.

Q6. What determines oxygen delivery to the tissues?

MBBS
★★★

Oxygen delivery = cardiac output × arterial oxygen content. Cardiac output depends on heart rate and stroke volume (preload, contractility, afterload); oxygen content depends mainly on haemoglobin and its saturation.

Q7. Why is tachycardia usually the first sign of hypovolaemic shock?

BDS + MBBS
★☆☆

As stroke volume falls, the sympathetic system increases heart rate to maintain cardiac output. Blood pressure is maintained by vasoconstriction until about 30% of the blood volume is lost.

Clinical Assessment

Q8. What are the clinical features of shock?

BDS + MBBS
★☆☆

Tachycardia, tachypnoea, cold clammy pale skin, delayed capillary refill, narrow pulse pressure, hypotension (late), reduced urine output, anxiety, confusion and reduced consciousness.

Q9. Describe the classes of haemorrhagic shock.

BDS + MBBS
★★☆

- Class I: up to 15% blood loss, minimal signs.
- Class II: 15–30%, tachycardia, narrowed pulse pressure, anxiety.
- Class III: 30–40%, hypotension, marked tachycardia, confusion, reduced urine output.
- Class IV: over 40%, severe hypotension, lethargy, negligible urine output, life-threatening.

Q10. Why is blood pressure a poor early indicator of shock?

BDS + MBBS
★☆☆

Compensatory vasoconstriction keeps the blood pressure normal until a large volume (about 30%) is lost, particularly in young fit patients. Waiting for hypotension delays treatment.

Q11. In which patients may the usual signs of shock be misleading?

BDS + MBBS
★★☆

Young athletes (good compensation), elderly patients, those on beta-blockers (no tachycardia), patients with pacemakers, pregnant women (increased blood volume), and hypothermic patients.

Q12. What are the features of neurogenic shock?

BDS + MBBS
★★☆

Hypotension with bradycardia and warm, dry, flushed peripheries, due to loss of sympathetic tone after spinal cord injury above T6. It must be distinguished from haemorrhage, which may coexist.

Q13. What is Beck's triad?

BDS + MBBS
★★☆

Features of cardiac tamponade: hypotension, distended neck veins (raised JVP) and muffled heart sounds. Pulsus paradoxus may also be present.

Q14. How does early septic shock differ from hypovolaemic shock clinically?

BDS + MBBS
★★☆

In early (warm) septic shock the patient is flushed and warm, with bounding pulses, wide pulse pressure and fever, due to vasodilatation. In late (cold) septic shock, peripheries become cold like hypovolaemic shock.

Q15. What are the signs of tension pneumothorax?

BDS + MBBS
★★☆

Respiratory distress, tachycardia, hypotension, tracheal deviation away from the affected side (late), absent breath sounds and hyper-resonance on the affected side, and distended neck veins. It is a clinical diagnosis treated before X-ray.

Q16. What is capillary refill time and what is its significance?

BDS + MBBS
★☆☆

Pressure is applied to the nail bed or skin for 5 seconds and released; colour should return within 2 seconds. A longer time indicates poor peripheral perfusion, although cold surroundings also prolong it.

Investigations and Monitoring

Q17. How will you monitor a shocked patient?

BDS + MBBS
★☆☆

Pulse, blood pressure, respiratory rate, oxygen saturation, temperature, conscious level, capillary refill, hourly urine output by catheter, ECG, and in severe cases central venous and arterial pressure monitoring, with serial lactate and blood gases.

Q18. What is the target urine output during resuscitation?

BDS + MBBS
★☆☆

At least 0.5 ml/kg/hour in adults and 1 ml/kg/hour in children.

Q19. What is the significance of serum lactate and base deficit?

BDS + MBBS
★★☆

They reflect anaerobic metabolism and the severity of tissue hypoperfusion. Raised levels indicate shock even when vital signs appear normal (occult hypoperfusion), and their clearance shows adequate resuscitation.

Q20. Which bedside investigations will you send in haemorrhagic shock?

BDS + MBBS
★☆☆

Blood group and cross-match, full blood count, coagulation profile, urea and electrolytes, arterial blood gas with lactate, and a pregnancy test in women of reproductive age.

Q21. What is the role of FAST scan?

BDS + MBBS
★★☆

Focused Assessment with Sonography for Trauma is a rapid bedside ultrasound to detect free fluid in the peritoneum (Morison's pouch, splenorenal area, pelvis) and pericardium. eFAST also looks for pneumothorax. A positive FAST in an unstable patient indicates the need for laparotomy.

Q22. What are the Sepsis-3 definitions?

MBBS
★★☆

Sepsis is life-threatening organ dysfunction caused by a dysregulated host response to infection (an increase in SOFA score of 2 or more). Septic shock is sepsis needing vasopressors to keep mean arterial pressure at 65 mmHg or more, with lactate over 2 mmol/l despite adequate fluids.

Q23. What is the role of central venous pressure monitoring?

BDS + MBBS
★★☆

It reflects right heart filling. The trend and the response to a fluid challenge are more useful than a single value: it is low in hypovolaemia and high in cardiogenic shock, tamponade and tension pneumothorax.

Management

Q24. What are the principles of managing hypovolaemic shock?

BDS + MBBS
★☆☆

Airway and breathing with high-flow oxygen, two large-bore IV cannulae, stop the bleeding (pressure, splints, pelvic binder, surgery or angioembolisation), restore volume with warmed blood and blood products, monitor the response, and find and treat the cause.

Q25. What is damage control resuscitation?

BDS + MBBS
★★☆

A strategy for major haemorrhage: permissive hypotension (systolic pressure around 80–90 mmHg until bleeding is controlled, unless head injury), limited crystalloid, early balanced transfusion of red cells, plasma and platelets (about 1:1:1), tranexamic acid, prevention of hypothermia, and rapid surgical or radiological control of bleeding.

Q26. What is the role of tranexamic acid in trauma?

BDS + MBBS
★★☆

It is an antifibrinolytic that reduces death from bleeding when given within 3 hours of injury: 1 g IV over 10 minutes, then 1 g over 8 hours. Given late, it may be harmful.

Q27. How do you classify the response to initial fluid resuscitation?

BDS + MBBS
★★☆

Rapid responders (stable, probably less than 20% loss), transient responders (improve then deteriorate, ongoing bleeding, need blood and surgery), and non-responders (persistent shock, need immediate surgery or a non-haemorrhagic cause is present).

Q28. How will you manage septic shock in the first hour?

BDS + MBBS
★★☆

Measure lactate, take blood cultures, give broad-spectrum IV antibiotics, give 30 ml/kg of balanced crystalloid for hypotension or lactate of 4 or more, start vasopressors (noradrenaline) to keep mean arterial pressure at 65 mmHg or more, and achieve source control (drainage, debridement).

Q29. How will you treat anaphylactic shock?

BDS + MBBS
★☆☆

Stop the trigger, call for help, airway and oxygen, intramuscular adrenaline 0.5 mg (0.5 ml of 1:1000) into the anterolateral thigh in adults, repeated after 5 minutes if needed, IV fluids, and then antihistamine and hydrocortisone.

Q30. How will you treat tension pneumothorax and cardiac tamponade?

BDS + MBBS
★★☆

Tension pneumothorax: immediate needle or finger decompression (in adults at the 4th or 5th intercostal space just anterior to the mid-axillary line, or 2nd intercostal space in the mid-clavicular line), followed by chest drain. Tamponade: pericardiocentesis as a temporary measure and surgical drainage.

Q31. Which fluid will you use for resuscitation?

BDS + MBBS
★★☆

Balanced crystalloids (Hartmann's solution or Ringer's lactate) for initial resuscitation, and blood and blood products for haemorrhage. Starch-based colloids are avoided as they increase kidney injury. Excess normal saline causes hyperchloraemic acidosis.

Q32. How is neurogenic shock treated?

MBBS
★★☆

Fluids to correct relative hypovolaemia, vasopressors (e.g. noradrenaline) for persistent hypotension, atropine for symptomatic bradycardia, spinal immobilisation, and exclusion of coexisting haemorrhage.

Q33. What is a massive transfusion protocol?

BDS + MBBS
★☆☆

A pre-agreed hospital system that delivers red cells, plasma, platelets and cryoprecipitate rapidly in fixed ratios once major haemorrhage is declared, with monitoring of coagulation, calcium, potassium and temperature.

Q34. How will you manage cardiogenic shock?

BDS + MBBS
★★☆

Oxygen, cautious fluids, treatment of the cause (reperfusion for myocardial infarction, correction of arrhythmias), inotropes such as dobutamine, vasopressors, and mechanical circulatory support in selected patients.

Complications

Q35. What are the complications of shock?

BDS + MBBS
★☆☆

Acute kidney injury, acute respiratory distress syndrome, disseminated intravascular coagulation, stress ulceration, liver dysfunction, myocardial depression, and multiple organ dysfunction syndrome.

Q36. What is multiple organ dysfunction syndrome?

BDS + MBBS
★★☆

Progressive dysfunction of two or more organ systems after a severe insult such as shock, sepsis or trauma, driven by systemic inflammation. Mortality rises with each organ that fails.

Q37. What is ischaemia–reperfusion injury?

BDS + MBBS
★★☆

Damage that occurs when blood flow returns to ischaemic tissue: oxygen free radicals, neutrophil activation and release of potassium, acid and myoglobin cause further cell injury and systemic effects.

Q38. What is acute respiratory distress syndrome?

MBBS
★★☆

Acute non-cardiogenic pulmonary oedema with bilateral infiltrates and severe hypoxaemia, caused by inflammatory damage to the alveolar–capillary membrane after shock, sepsis, trauma or massive transfusion. Treated with lung-protective ventilation.

Q39. What are the complications of massive transfusion?

BDS + MBBS
★★☆

Hypothermia, dilutional coagulopathy and thrombocytopenia, hypocalcaemia (citrate), hyperkalaemia, acidosis, transfusion-related lung injury and circulatory overload.

Q40. Why does acute kidney injury occur in shock?

BDS + MBBS
★★☆

Reduced renal perfusion first causes prerenal failure; prolonged ischaemia causes acute tubular necrosis. Myoglobin, contrast and nephrotoxic drugs add to the injury.

Recent Advances

Q41. What is REBOA?

BDS + MBBS
★★★

Resuscitative endovascular balloon occlusion of the aorta: a balloon inserted through the femoral artery into the aorta temporarily controls non-compressible haemorrhage below the diaphragm as a bridge to surgery.

Q42. What is the role of whole blood and prehospital transfusion?

BDS + MBBS
★★☆

Early transfusion of whole blood or red cells with plasma in the field or on arrival treats haemorrhagic shock more physiologically than crystalloid and may improve survival.

Q43. What are viscoelastic tests?

BDS + MBBS
★★★

Thromboelastography (TEG) and rotational thromboelastometry (ROTEM) measure clot formation in real time, guiding targeted use of plasma, platelets, fibrinogen and tranexamic acid in massive bleeding.

Q44. Why are balanced crystalloids preferred over normal saline?

BDS + MBBS
★★☆

Large trials (e.g. SMART) found fewer major kidney events and deaths with balanced crystalloids than with saline in critically ill patients, as saline causes hyperchloraemic acidosis.

Q45. What is the RUSH protocol?

BDS + MBBS
★★☆

Rapid Ultrasound in Shock: a bedside scan of the heart (pump), inferior vena cava and fluid spaces (tank), and aorta and veins (pipes) to identify the type of shock quickly.

Examiner's Favourite (Hard Questions)

Q46. What is the lethal triad of trauma?

BDS + MBBS
★★★

Hypothermia, acidosis and coagulopathy. Each worsens the others, and together they cause uncontrollable bleeding and death. Damage control surgery and resuscitation aim to prevent it.

Q47. Why are vasopressors not the treatment for hypovolaemic shock?

BDS + MBBS
★★★

The problem is lack of volume. Vasopressors further constrict vessels and reduce tissue perfusion without restoring blood volume. Volume (blood) replacement and control of bleeding are needed.

Q48. What are the endpoints of resuscitation?

BDS + MBBS
★★★

Normalisation of heart rate, blood pressure, mental state and capillary refill, urine output of at least 0.5 ml/kg/hour, and clearance of lactate and base deficit.

Q49. What is damage control surgery?

MBBS
★★★

A staged approach in critically injured patients: a short initial operation to control bleeding and contamination (packing, ligation, temporary closure), correction of physiology in the ICU, and definitive repair 24–48 hours later.

Quick Recall

- ✓ Shock = inadequate tissue perfusion and oxygen delivery.
- ✓ Types: hypovolaemic, cardiogenic, obstructive, distributive, endocrine.
- ✓ Tachycardia comes first; hypotension appears after about 30% loss.
- ✓ Urine output target: 0.5 ml/kg/h adult, 1 ml/kg/h child.
- ✓ Major haemorrhage: permissive hypotension, 1:1:1 transfusion, TXA within 3 hours.
- ✓ Septic shock: cultures, antibiotics, 30 ml/kg crystalloid, noradrenaline, source control.
- ✓ Anaphylaxis: IM adrenaline 0.5 mg (1:1000). Lethal triad: hypothermia, acidosis, coagulopathy.

CHAPTER

23

PART C: GENERAL SURGERY VIVA TOPICS

Burns

Assessment, fluid resuscitation, wound care and complications of burns

Clinical Scenario

A 30-year-old woman weighing 60 kg is brought 2 hours after a gas cylinder explosion in her kitchen. She has burns of the face, front of the chest and abdomen and both upper limbs, with blisters and areas of white, painless skin. Her voice is hoarse, there is soot in the nostrils and the eyebrows are singed. Examiners use such a scenario to ask about airway, percentage of burns, fluid calculation and wound management.

Classification and Pathophysiology

Q1. What are the types of burns according to cause?

BDS + MBBS ★☆☆

Thermal (flame, scald, contact), electrical, chemical (acid and alkali), radiation, and cold injury (frostbite).

Q2. Classify burns according to depth.

BDS + MBBS ★☆☆

- Superficial (epidermal): red, painful, no blisters (sunburn); heals in a week.
- Superficial partial thickness: blisters, pink moist base, very painful, blanches; heals in 2 weeks.
- Deep partial thickness: blotchy red or white, reduced sensation, does not blanch; slow healing with scarring, usually needs grafting.
- Full thickness: white, leathery or charred, painless; needs excision and grafting.

Q3. Describe Jackson's zones of a burn.

BDS + MBBS ★★☆

Zone of coagulation (central, irreversible tissue death), zone of stasis (reduced perfusion, potentially salvageable with good resuscitation), and zone of hyperaemia (outer, increased blood flow, recovers).

Q4. Why do major burns cause hypovolaemic shock?

BDS + MBBS ★★☆

Inflammatory mediators released from the burn increase capillary permeability throughout the body, so plasma leaks into the tissues, causing massive oedema and loss of circulating volume, maximal in the first 8–12 hours.

Q5. How does inhalation injury damage the airway?

BDS + MBBS ★★☆

Heat damages the upper airway, causing oedema that may obstruct it within hours. Smoke chemicals damage the lower airways and alveoli. Carbon monoxide and cyanide cause systemic poisoning by preventing oxygen use.

Q6. Why are alkali burns worse than acid burns?

BDS + MBBS
★★☆

Acids cause coagulative necrosis, which limits penetration. Alkalis cause liquefactive necrosis and saponification of fat, allowing them to penetrate deeper and keep damaging tissue.

Q7. What is special about electrical burns?

BDS + MBBS
★★☆

Small entry and exit wounds may hide extensive deep muscle damage along the current path, causing myoglobinuria, renal failure, compartment syndrome and cardiac arrhythmias.

Q8. How will you assess burn depth clinically?

BDS + MBBS
★☆☆

By appearance, presence of blisters, blanching and capillary refill, and pin-prick sensation. Depth can progress over the first 48 hours, so burns are reassessed.

Assessment

Q9. What is the first aid for a burn?

BDS + MBBS
★☆☆

Stop the burning process, remove clothing and jewellery, cool the burn with cool running water for 20 minutes (up to 3 hours after injury), keep the patient warm, and cover the burn with cling film or a clean dressing.

Q10. How will you estimate the percentage of body surface area burned?

BDS + MBBS
★☆☆

By the rule of nines in adults: head and neck 9%, each upper limb 9%, front of trunk 18%, back of trunk 18%, each lower limb 18%, perineum 1%. The patient's palm with fingers is about 1%, useful for small or scattered burns. Lund and Browder charts are more accurate, especially in children.

Q11. Why is the rule of nines different in children?

BDS + MBBS
★☆☆

Children have a relatively larger head and smaller lower limbs. In an infant, the head is about 18% and each lower limb about 14%, so Lund and Browder charts are used.

Q12. What are the signs of inhalation injury?

BDS + MBBS
★☆☆

Burns in an enclosed space, facial burns, singed nasal hairs and eyebrows, soot in the mouth or nose, carbonaceous sputum, hoarseness, stridor, wheeze and respiratory distress.

Q13. Which burns should be referred to a burns unit?

BDS + MBBS
★☆☆

Large burns (over 10% in adults or 5% in children), full-thickness burns, burns of the face, hands, feet, genitalia, perineum and major joints, circumferential burns, inhalation injury, electrical and chemical burns, burns at extremes of age, and suspected non-accidental injury.

Q14. How will you assess for carbon monoxide poisoning?

BDS + MBBS
★★☆

Headache, confusion, nausea and cherry-red skin (late). Pulse oximetry is falsely normal, so carboxyhaemoglobin is measured on arterial or venous blood gas. Treatment is 100% oxygen, and hyperbaric oxygen in selected cases.

Q15. Why is erythema not included in the burn percentage?

BDS + MBBS ★☆☆

> Simple erythema (superficial epidermal burn) does not cause significant fluid loss. Including it overestimates the burn and leads to over-resuscitation.

Q16. Which features suggest a non-accidental burn in a child?

BDS + MBBS ★★☆

> Delay in seeking help, an inconsistent history, glove-and-stocking scalds with sharp margins, symmetrical burns, cigarette burns, burns of the buttocks and perineum, and other injuries of different ages.

Investigations

Q17. What investigations will you do in a major burn?

BDS + MBBS ★☆☆

> Full blood count, haematocrit, urea, electrolytes, creatinine, blood sugar, arterial blood gas with carboxyhaemoglobin and lactate, blood group and cross-match, chest X-ray, and urine for myoglobin.

Q18. What additional tests are needed in electrical burns?

BDS + MBBS ★★☆

> ECG and cardiac monitoring for arrhythmias, creatine kinase and urine myoglobin for muscle damage, and renal function.

Q19. What is the role of bronchoscopy in burns?

MBBS ★★☆

> It confirms and grades inhalation injury below the vocal cords, and allows clearance of soot and secretions.

Q20. How will you monitor a burns patient for infection?

BDS + MBBS ★★☆

> Daily wound inspection, wound swabs or tissue biopsy for culture, blood cultures when febrile or deteriorating, and monitoring of white count and CRP. Fever alone is common due to the hypermetabolic state.

Management

Q21. What is the Parkland formula?

BDS + MBBS ★☆☆

> Fluid in the first 24 hours = 4 ml × body weight (kg) × % TBSA burned, of Hartmann's (Ringer's lactate) solution. Half is given in the first 8 hours from the time of the burn, and the other half over the next 16 hours.

Q22. Calculate the fluid for a 60 kg adult with 40% burns.

BDS + MBBS ★☆☆

> 4 × 60 × 40 = 9600 ml in 24 hours. 4800 ml in the first 8 hours from the time of injury (600 ml/hour), and 4800 ml over the next 16 hours (300 ml/hour), adjusted according to urine output.

Q23. When is IV fluid resuscitation needed in burns?

BDS + MBBS ★☆☆

> In burns over 15% TBSA in adults and over 10% in children. Children also need maintenance fluid with dextrose in addition to the resuscitation fluid.

Q24. How will you monitor the adequacy of fluid resuscitation?

BDS + MBBS ★☆☆

> Hourly urine output by catheter: 0.5 ml/kg/hour in adults, 1 ml/kg/hour in children, and 1–1.5 ml/kg/hour in electrical burns with myoglobinuria. The formula is only a guide; the rate is adjusted to the urine output.

Q25. When will you intubate a burns patient?

BDS + MBBS ★★☆

> Early, when there are signs of airway burn or inhalation injury (stridor, hoarseness, deep facial burns, soot in the airway), reduced consciousness, or before transfer, because airway oedema worsens rapidly and later intubation becomes very difficult.

Q26. What is escharotomy and when is it done?

BDS + MBBS ★★☆

> Incision through the full-thickness burn eschar down to the fat to release constriction. It is done for circumferential full-thickness burns of the limbs causing ischaemia, or of the chest restricting ventilation, along mid-medial and mid-lateral lines.

Q27. How will you manage the burn wound?

BDS + MBBS ★★☆

> Superficial burns: cleaning and non-adherent dressings. Partial thickness: silver sulfadiazine or silver-impregnated dressings and biological dressings. Deep partial and full thickness: early tangential excision and split-skin grafting, within the first few days, to reduce infection and scarring.

Q28. What other measures are needed in a burns patient?

BDS + MBBS ★☆☆

> Adequate analgesia (IV opioids), tetanus prophylaxis, early enteral nutrition with high calories and protein, stress ulcer prophylaxis, DVT prophylaxis, physiotherapy and splinting, and psychological support. Prophylactic systemic antibiotics are not given.

Q29. How will you manage a chemical burn?

BDS + MBBS ★☆☆

> Remove contaminated clothing and irrigate copiously with water for at least 30 minutes (longer for alkalis and eye injuries), avoid neutralising agents, and use specific treatments such as calcium gluconate for hydrofluoric acid.

Q30. Compare split-thickness and full-thickness skin grafts.

BDS + MBBS ★★☆

> Split-thickness grafts contain epidermis and part of the dermis, are taken with a dermatome (usually from the thigh), take easily and cover large areas, but contract more. Full-thickness grafts contain the whole dermis, are used for small areas such as the face and hands, contract less and look better, and the donor site is closed directly.

Q31. What is meshing of a skin graft and why is it done?

BDS + MBBS ★★☆

> Making multiple slits in a split-thickness graft so it can be expanded (e.g. 1.5:1 to 3:1) to cover a larger area and allow fluid to drain from under it. It leaves a mesh pattern on healing.

Q32. What are the nutritional needs of a burns patient?

BDS + MBBS ★★☆

> High energy (e.g. Curreri formula: 25 kcal/kg plus 40 kcal per % TBSA) and protein of 1.5–2 g/kg/day, started early by the enteral route within 24 hours, with vitamins and trace elements.

Complications

Q33. List the complications of major burns.

BDS + MBBS ★☆☆

- Early: hypovolaemic shock, airway obstruction, inhalation injury, acute kidney injury, compartment syndrome.
- Intermediate: sepsis, Curling's ulcer, ARDS, hypermetabolism, thromboembolism.
- Late: hypertrophic scars, contractures, Marjolin's ulcer, psychological problems.

Q34. What is Curling's ulcer?

BDS + MBBS ★★☆

An acute stress ulcer of the stomach or duodenum in patients with major burns, due to mucosal ischaemia. It can cause bleeding or perforation and is prevented by early enteral feeding and acid suppression.

Q35. Which organism commonly infects burns?

BDS + MBBS ★★☆

Staphylococcus aureus and Streptococcus pyogenes early, and Pseudomonas aeruginosa and other Gram-negative organisms later. Streptococcal infection can destroy skin grafts.

Q36. How are burn contractures prevented and treated?

BDS + MBBS ★★☆

Prevention: early excision and grafting, splinting in the anti-contracture position, physiotherapy and pressure garments. Treatment: release with Z-plasty, skin grafts or flaps.

Q37. What is the hypermetabolic response to burns?

MBBS ★★☆

A prolonged rise in metabolic rate, catecholamines and cortisol, causing muscle wasting, weight loss, insulin resistance and poor healing. It is reduced by early excision, high-protein nutrition, warm environment and drugs such as propranolol and oxandrolone.

Q38. How do you recognise burn wound sepsis?

BDS + MBBS ★★☆

Change in the wound (dark discolouration, conversion to deeper burn, graft loss) with systemic signs: fever or hypothermia, tachycardia, tachypnoea, ileus, hyperglycaemia, thrombocytopenia and confusion.

Recent Advances

Q39. What is enzymatic debridement?

BDS + MBBS ★★☆

A bromelain-based enzyme (NexoBrid) applied to deep burns removes eschar selectively within hours, preserving viable dermis and reducing the need for surgical excision and grafting.

Q40. What is spray-on skin?

BDS + MBBS ★★☆

Autologous skin cell suspension (e.g. ReCell): a small skin sample is processed into cells sprayed onto the burn, covering a large area from a small donor site.

Q41. What are dermal substitutes in burns?

BDS + MBBS ★★☆

> Matrices such as Integra or biodegradable temporising matrix applied after excision to form a neodermis, later covered with a thin graft, improving function and appearance.

Q42. How is laser Doppler imaging used in burns?

BDS + MBBS ★★☆

> It measures skin blood flow to predict burn depth and healing potential within 48–72 hours, helping decide early which burns need excision and grafting.

Q43. What is the role of laser in burn scars?

BDS + MBBS ★★☆

> Fractional CO2 laser remodels hypertrophic burn scars, improving thickness, pliability, itch and pain, and is combined with pressure garments and silicone.

Examiner's Favourite (Hard Questions)

Q44. Why is fluid calculated from the time of the burn and not from admission?

BDS + MBBS ★★★

> Capillary leak and fluid loss start at the time of injury. If a patient arrives late, the fluid due in the first 8 hours must be given in the remaining time to catch up.

Q45. What is "fluid creep"?

BDS + MBBS ★★★

> Giving much more fluid than the Parkland formula predicts, which causes oedema, abdominal and limb compartment syndromes, pulmonary oedema and graft failure. Close titration to urine output prevents it.

Q46. Why are burns patients prone to hypothermia?

BDS + MBBS ★★★

> Loss of skin barrier allows heat loss by evaporation, and cooling, exposure and cold fluids add to it. The patient should be kept warm, as hypothermia worsens coagulopathy and outcome.

Q47. Why do full-thickness burns feel painless?

BDS + MBBS ★★★

> The nerve endings in the dermis are destroyed. Sensation is therefore a useful clinical test of burn depth.

Quick Recall

- ✓ Cool with running water for 20 minutes.
- ✓ Rule of nines; palm = 1%; Lund and Browder for children; ignore erythema.
- ✓ Parkland: 4 ml × kg × %TBSA; half in first 8 hours from time of burn.
- ✓ Urine output: 0.5 adult, 1 child, 1–1.5 ml/kg/h in electrical burns.
- ✓ Inhalation injury: intubate early.
- ✓ Escharotomy for circumferential full-thickness burns of limbs or chest.
- ✓ Early excision and grafting; no prophylactic systemic antibiotics.

CHAPTER

24

PART C: GENERAL SURGERY VIVA TOPICS

Wounds and Wound Healing

Classification of wounds, phases of healing, wound closure and complications

Clinical Scenario

A 20-year-old labourer presents 4 hours after injuring his forearm on a rusty iron sheet at a construction site. There is a 6 cm ragged laceration on the forearm contaminated with soil, with intact distal circulation, sensation and movement. He does not know his tetanus vaccination status. Examiners use such a scenario to ask about wound classification, cleaning, debridement, closure and tetanus prophylaxis.

Definitions and Physiology

Q1. Define a wound.

BDS + MBBS
★☆☆

A breach in the continuity of the skin or mucous membrane and the underlying tissues, caused by physical, chemical or thermal injury or by surgery.

Q2. How are surgical wounds classified according to contamination?

BDS + MBBS
★☆☆

- Clean: no viscus opened (e.g. hernia repair); infection rate under 2%.
- Clean-contaminated: viscus opened under controlled conditions (e.g. cholecystectomy).
- Contaminated: spillage from a viscus, fresh traumatic wounds, acute inflammation.
- Dirty: pus, perforated viscus, old traumatic wounds; highest infection rate.

Q3. Describe the phases of wound healing.

BDS + MBBS
★☆☆

- Haemostasis: vasoconstriction, platelet plug and clot (minutes).
- Inflammation: neutrophils then macrophages clear debris (days 1–4).
- Proliferation: fibroblasts lay down collagen, angiogenesis forms granulation tissue, epithelialisation (day 4 to 3 weeks).
- Remodelling (maturation): collagen reorganised and cross-linked, scar matures over months to a year.

Q4. What is healing by primary, secondary and tertiary intention?

BDS + MBBS
★☆☆

Primary: clean wound edges brought together by sutures, healing quickly with minimal scar. Secondary: wound left open to heal by granulation, contraction and epithelialisation (e.g. abscess cavity). Tertiary (delayed primary closure): contaminated wound left open for a few days, then closed when clean.

Q5. How does the strength of a wound change with time?

BDS + MBBS ★★☆

A wound has little strength in the first few days. Strength increases rapidly as collagen is deposited and reaches about 80% of normal skin at maximum, after several months; it never regains full strength. Type III collagen is gradually replaced by type I.

Q6. What factors affect wound healing?

BDS + MBBS ★☆☆

Local: infection, poor blood supply, foreign body, haematoma, tension, movement, radiation, oedema. Systemic: age, malnutrition (protein, vitamin C, zinc), diabetes, anaemia, jaundice, uraemia, steroids, chemotherapy, smoking and malignancy.

Q7. What is the role of vitamin C in wound healing?

BDS + MBBS ★★☆

It is needed for the hydroxylation of proline and lysine in collagen synthesis. Deficiency (scurvy) causes weak wounds and breakdown of old scars.

Q8. Which cell is responsible for wound contraction?

BDS + MBBS ★★☆

The myofibroblast, a fibroblast with contractile properties, which pulls the wound edges together during healing by secondary intention.

Q9. What is granulation tissue?

BDS + MBBS ★★☆

Red, granular tissue in the floor of a healing wound formed by new capillary loops, fibroblasts and inflammatory cells. Healthy granulation is red, firm and bleeds easily; unhealthy granulation is pale, oedematous or exuberant.

Clinical Assessment

Q10. Classify mechanical wounds.

BDS + MBBS ★☆☆

Abrasion, contusion, laceration, incised wound, puncture or stab wound, crush injury, degloving injury, gunshot and blast injuries, and bites.

Q11. How will you assess a wound?

BDS + MBBS ★☆☆

History of mechanism, time, contamination and tetanus status. Examine site, size, depth, edges, contamination, foreign bodies, tissue loss and damage to underlying structures (vessels, nerves, tendons, bone, joints), checking the distal circulation, sensation and movement.

Q12. What is a tetanus-prone wound?

BDS + MBBS ★☆☆

A wound more than 6 hours old before surgical treatment, a puncture wound, a wound with devitalised tissue, contamination with soil or manure, burns, compound fractures, and wounds in septic patients.

Q13. What is Rank and Wakefield's classification?

BDS + MBBS ★★☆

Tidy wounds: clean incised wounds with healthy edges, suitable for primary closure. Untidy wounds: crushed, torn, contaminated wounds with devitalised tissue, needing debridement and often delayed closure.

Q14. What is a degloving injury?

BDS + MBBS ★★☆

Shearing force strips the skin and subcutaneous tissue off the underlying fascia or muscle, tearing the perforating vessels and leaving the flap with poor blood supply. It commonly occurs in limbs caught under wheels.

Q15. What is crush syndrome?

BDS + MBBS ★★☆

After prolonged compression of muscle, release of pressure allows potassium, myoglobin and acid from the damaged muscle to enter the circulation, causing arrhythmias, acute kidney injury and compartment syndrome.

Q16. What are the features of a gunshot wound?

BDS + MBBS ★★☆

A small entry wound with an abrasion collar and a larger, ragged exit wound. High-velocity missiles create a temporary cavity, damaging tissue far beyond the track, so wide debridement and delayed closure are needed.

Investigations

Q17. When will you X-ray a wound?

BDS + MBBS ★☆☆

When there is suspicion of a radio-opaque foreign body (glass, metal), underlying fracture or joint penetration. Ultrasound can detect non-radio-opaque foreign bodies such as wood.

Q18. How will you investigate a chronic non-healing wound?

BDS + MBBS ★☆☆

Blood sugar and HbA1c, full blood count, albumin, vascular assessment (pulses, ABPI), wound swab or tissue culture, X-ray or MRI for osteomyelitis, and biopsy of the edge to exclude malignancy.

Q19. What is the role of a wound swab?

BDS + MBBS ★★☆

It identifies organisms and their sensitivity in clinically infected wounds. Routine swabs of uninfected wounds are not useful because all open wounds are colonised.

Management

Q20. What are the principles of wound management?

BDS + MBBS ★☆☆

Resuscitation and assessment, analgesia and anaesthesia, thorough cleaning and irrigation, debridement of dead tissue and foreign material, haemostasis, repair of deep structures, closure (primary or delayed), dressing, immobilisation and elevation, tetanus prophylaxis and antibiotics when indicated.

Q21. What is debridement?

BDS + MBBS ★☆☆

Removal of dead, devitalised and contaminated tissue and foreign material from a wound until healthy bleeding tissue is reached. It may be surgical (sharp), mechanical, enzymatic, autolytic or biological (maggots).

Q22. When will you not close a wound primarily?

BDS + MBBS ★★☆

Heavily contaminated or dirty wounds, wounds more than about 6–8 hours old (except on the face and scalp), bites (other than facial), crush injuries with devitalised tissue, and war or gunshot wounds. These are cleaned, debrided and closed after a few days (delayed primary closure).

Q23. How will you give tetanus prophylaxis?

BDS + MBBS ★☆☆

Clean minor wound: a booster of tetanus toxoid if immunisation is incomplete or the last dose was more than 10 years ago. Tetanus-prone wound: toxoid if not up to date, plus human tetanus immunoglobulin (250–500 IU) if immunisation is incomplete or unknown, given at a different site.

Q24. Classify suture materials with examples.

BDS + MBBS ★☆☆

- Absorbable natural: catgut (largely abandoned).
- Absorbable synthetic: polyglactin (Vicryl), polyglycolic acid, polydioxanone (PDS), poliglecaprone (Monocryl).
- Non-absorbable natural: silk.
- Non-absorbable synthetic: polypropylene (Prolene), nylon, polyester.

They are also monofilament (less infection, more memory) or braided (easier knots, harbour bacteria).

Q25. When are skin sutures removed?

BDS + MBBS ★☆☆

Face: 3–5 days; scalp: 7–10 days; trunk and abdomen: 10 days; limbs: 10–14 days; over joints and in the back: 14 days. Later removal is needed in elderly, diabetic or malnourished patients.

Q26. What is negative pressure wound therapy?

BDS + MBBS ★★☆

A sealed foam dressing connected to a vacuum pump that applies controlled suction. It removes exudate, reduces oedema, improves blood flow and promotes granulation, and is used for large open wounds, diabetic wounds and to prepare beds for grafting.

Q27. How will you manage a dog bite?

BDS + MBBS ★★☆

Thorough irrigation with soap and water, debridement, leaving the wound open except on the face, antibiotics (co-amoxiclav), tetanus prophylaxis, and rabies post-exposure prophylaxis (vaccine, plus rabies immunoglobulin for category III bites).

Q28. What special care is needed when repairing a lip laceration?

BDS + MBBS ★★☆

The vermilion border (white roll) must be aligned exactly with the first stitch, because even a 1 mm step is visible. The muscle, mucosa and skin are repaired in layers.

Q29. What are the qualities of an ideal suture material?

BDS + MBBS ★☆☆

Adequate tensile strength until healing, minimal tissue reaction, easy handling with secure knots, predictable absorption, resistance to infection, sterility and low cost.

Q30. How will you choose the size of suture?

BDS + MBBS ★★☆

Finest sutures (5/0 or 6/0) on the face, 3/0 or 4/0 on the limbs and trunk, 2/0 to 3/0 for subcutaneous layers, and heavy sutures (size 1 loop) for abdominal fascia.

Q31. What alternatives to sutures can be used for skin closure?

BDS + MBBS ★★☆

Adhesive skin strips, tissue glue (cyanoacrylate) and skin staples, useful for clean, low-tension wounds, children and the scalp.

Q32. How will you choose a wound dressing?

BDS + MBBS ★★☆

Closed clean wounds need a simple dry dressing for about 48 hours. Open wounds are kept moist: alginate or foam for exudate, hydrogel for dry wounds, and antimicrobial dressings (silver, iodine) for infected wounds.

Complications

Q33. What are the complications of wounds?

BDS + MBBS ★☆☆

Haemorrhage, haematoma, infection, dehiscence, delayed healing, hypertrophic scar and keloid, contracture, sinus formation, stitch granuloma, incisional hernia and painful neuroma.

Q34. What is burst abdomen and when does it occur?

BDS + MBBS ★☆☆

Complete dehiscence of an abdominal wound with protrusion of bowel, usually around the 7th to 10th postoperative day. It is often preceded by a serosanguinous ("salmon-pink") discharge from the wound.

Q35. How will you manage burst abdomen?

BDS + MBBS ★★☆

Reassure the patient, cover the bowel with sterile saline-soaked packs, give analgesia and IV fluids, and return the patient to theatre for resuturing with deep tension sutures or mass closure. Correct the underlying causes.

Q36. What is the difference between contraction and contracture?

BDS + MBBS ★★☆

Contraction is a normal active process that reduces wound size during healing. Contracture is the pathological shortening of a scar after healing, causing deformity and restriction of movement, especially across joints.

Q37. What causes a persistent sinus in a healed wound?

BDS + MBBS ★★☆

A retained foreign body such as a non-absorbable suture (stitch granuloma), dead bone, infected mesh, specific infection (TB, actinomycosis), or malignancy.

Q38. How will you manage a wound haematoma?

BDS + MBBS ★★☆

Small haematomas are observed. Large or expanding ones are evacuated and the bleeding point controlled, with coagulation checked. A neck haematoma after thyroid surgery is an emergency.

Q39. What is a stitch abscess?

BDS + MBBS ★☆☆

A small localised infection around a skin suture, seen as a red, tender spot with pus at the stitch. Removing the stitch usually cures it.

Recent Advances

Q40. What is incisional negative pressure wound therapy?

BDS + MBBS ★★☆

A negative pressure dressing applied over a closed surgical incision in high-risk patients (obesity, diabetes, contaminated surgery) to reduce surgical site infection and wound breakdown.

Q41. What are triclosan-coated sutures?

BDS + MBBS ★★☆

Sutures coated with the antiseptic triclosan, recommended by the WHO to reduce surgical site infection, especially in abdominal closure.

Q42. What biological therapies promote healing of chronic wounds?

BDS + MBBS ★★★

Platelet-rich plasma, topical growth factors such as becaplermin (PDGF) for diabetic ulcers, and cellular and tissue-based skin substitutes for non-healing wounds.

Q43. What is topical oxygen therapy?

BDS + MBBS ★★☆

Delivery of oxygen directly to a chronic wound by a portable device, shown to improve healing of diabetic foot ulcers in some trials.

Q44. What is the concept of wound hygiene?

BDS + MBBS ★★☆

Regular cleansing, debridement, refashioning of wound edges and dressing at each change to remove biofilm, which delays healing in chronic wounds.

Examiner's Favourite (Hard Questions)

Q45. Why do facial and scalp wounds heal well and can be closed late?

BDS + MBBS ★★★

They have an excellent blood supply, which resists infection and promotes healing, so they can be closed primarily even after many hours following thorough cleaning.

Q46. How do steroids impair healing and how can this be countered?

BDS + MBBS ★★★

Steroids suppress inflammation, macrophage function, fibroblast activity and collagen synthesis. Vitamin A partly reverses their effect on wound healing.

Q47. What is the difference between a laceration and an incised wound?

BDS + MBBS ★★★

A laceration is a tear by blunt force, with irregular, bruised edges and tissue bridges. An incised wound is made by a sharp object, with clean edges, longer than deep, and bleeds freely.

Q48. Why do monofilament sutures cause less infection than braided ones?

BDS + MBBS ★★★

Braided sutures have interstices where bacteria can hide from immune cells and antibiotics (wicking effect). Monofilaments have a smooth surface.

Quick Recall

- ✓ Phases: haemostasis, inflammation, proliferation, remodelling.
- ✓ Primary, secondary and tertiary (delayed primary) intention.
- ✓ Clean, clean-contaminated, contaminated, dirty wounds.
- ✓ Do not close dirty, old, crushed or bite wounds primarily (except face).
- ✓ Tetanus-prone wound with unknown status: toxoid + human immunoglobulin.
- ✓ Sutures out: face 3–5 days, scalp 7–10, trunk 10, limbs 10–14.
- ✓ Burst abdomen: salmon-pink discharge, day 7–10; cover and resuture.

CHAPTER

25

PART C: GENERAL SURGERY VIVA TOPICS

Fluids, Electrolytes and Nutrition

Body water, IV fluids, electrolyte disorders, acid–base balance and surgical nutrition

Clinical Scenario

A 65-year-old man weighing 70 kg is on the second day after a laparotomy for small bowel obstruction. He is nil by mouth, with 1.5 litres of nasogastric aspirate in 24 hours and a urine output of 25 ml per hour. He feels weak and his abdomen is distended with absent bowel sounds. His serum sodium is 132 mmol/l and potassium 2.9 mmol/l. Examiners use such a scenario to ask about fluid requirements, replacement of losses and correction of electrolyte disturbances.

Physiology

Q1. Describe the distribution of body water.

BDS + MBBS
★☆☆

Total body water is about 60% of body weight in an adult man (less in women and elderly). Two-thirds is intracellular and one-third extracellular; of the extracellular fluid, about three-quarters is interstitial and one-quarter is plasma. A 70 kg man has about 42 litres of water.

Q2. What are the daily maintenance requirements of an adult?

BDS + MBBS
★☆☆

Water about 25–30 ml/kg/day, sodium about 1 mmol/kg/day, potassium about 1 mmol/kg/day, and about 50–100 g of glucose per day to limit starvation ketosis.

Q3. What is the composition of common IV fluids?

BDS + MBBS
★☆☆

- 0.9% saline: sodium 154, chloride 154 mmol/l.
- Hartmann's: sodium 131, chloride 111, potassium 5, calcium 2, lactate 29 mmol/l.
- 5% dextrose: 50 g glucose per litre, no electrolytes; effectively free water.

Q4. Why is 5% dextrose not used for resuscitation?

BDS + MBBS
★★☆

Once the glucose is metabolised, it behaves as free water and distributes through all body compartments, so only about one-twelfth stays in the circulation. It can also cause hyponatraemia.

Q5. What is the metabolic response to surgery with regard to fluids?

BDS + MBBS
★★☆

Stress increases ADH, aldosterone and cortisol, causing retention of sodium and water and loss of potassium for the first few days after surgery. Urine output falls, and excess sodium-containing fluid easily causes oedema.

Q6. What is third-space loss?

BDS + MBBS ★★☆

Sequestration of fluid in spaces where it does not take part in circulation, such as obstructed bowel lumen and wall, peritoneal cavity in peritonitis, and burned or traumatised tissue. It depletes the circulating volume without visible loss.

Q7. What are the daily normal losses of water?

BDS + MBBS ★☆☆

Urine about 1500 ml, insensible loss from skin and lungs about 800 ml (more with fever), and stool about 100–200 ml, balanced by intake and metabolic water.

Q8. How do gastric and intestinal losses differ in composition?

BDS + MBBS ★★☆

Gastric juice is rich in hydrogen and chloride ions, so its loss causes metabolic alkalosis. Small bowel, pancreatic and biliary fluids are rich in sodium and bicarbonate, so their loss (fistulae, ileostomy, diarrhoea) causes dehydration and metabolic acidosis.

Clinical Assessment

Q9. What are the clinical signs of dehydration?

BDS + MBBS ★☆☆

Thirst, dry mouth and tongue, reduced skin turgor, sunken eyes, tachycardia, postural hypotension, delayed capillary refill, reduced urine output with concentrated urine, and confusion in severe cases.

Q10. What is a fluid balance chart?

BDS + MBBS ★☆☆

A record of all fluid input (oral, IV, feeds) and output (urine, drains, nasogastric aspirate, vomit, stool, stoma) over 24 hours, to calculate the balance and plan fluid therapy, with daily weight where possible.

Q11. What are the "5 Rs" of IV fluid therapy?

BDS + MBBS ★★☆

Resuscitation, Routine maintenance, Replacement of ongoing losses, Redistribution (e.g. oedema, sepsis), and Reassessment.

Q12. How is maintenance fluid calculated in children?

BDS + MBBS ★★☆

By the 4-2-1 rule per hour: 4 ml/kg for the first 10 kg, 2 ml/kg for the next 10 kg, and 1 ml/kg for each kg above 20 kg (equivalent to 100, 50 and 20 ml/kg/day).

Q13. How will you replace nasogastric losses?

BDS + MBBS ★★☆

Measure them and replace volume for volume with 0.9% saline containing potassium (about 20 mmol per litre), in addition to maintenance fluids, because gastric fluid contains sodium, chloride, potassium and acid.

Electrolyte and Acid–Base Disorders

Q14. What are the causes of hyponatraemia in surgical patients?

BDS + MBBS ★☆☆

Excess hypotonic fluids (5% dextrose), SIADH after surgery, losses from vomiting, diarrhoea, fistulae and diuretics replaced with water, TURP syndrome, heart, liver and renal failure.

Q15. Why must chronic hyponatraemia be corrected slowly?

BDS + MBBS
★★☆

Rapid correction (more than about 10 mmol/l in 24 hours) can cause osmotic demyelination syndrome (central pontine myelinolysis), with quadriparesis, dysarthria and coma, because brain cells cannot readapt quickly.

Q16. What are the causes of hypokalaemia in surgery?

BDS + MBBS
★☆☆

Vomiting and nasogastric aspiration, diarrhoea, fistulae, villous adenoma, diuretics, inadequate replacement, insulin and refeeding, and metabolic alkalosis.

Q17. What are the effects of hypokalaemia?

BDS + MBBS
★★☆

Muscle weakness, paralytic ileus, cardiac arrhythmias and increased digoxin toxicity. ECG shows flat T waves, ST depression and U waves.

Q18. What are the rules for giving potassium intravenously?

BDS + MBBS
★★☆

Give it diluted in fluid, never as a bolus; usually no more than 10 mmol/hour through a peripheral line (faster only with cardiac monitoring via a central line); ensure adequate urine output; and check levels regularly.

Q19. How will you treat severe hyperkalaemia?

BDS + MBBS
★★☆

- Protect the heart: IV 10 ml of 10% calcium gluconate.
- Shift potassium into cells: insulin with dextrose (10 units in 50 ml of 50% dextrose), nebulised salbutamol.
- Remove potassium: calcium resonium, stop potassium-retaining drugs, dialysis for refractory cases.

Q20. What are the ECG changes in hyperkalaemia?

BDS + MBBS
★★☆

Tall peaked T waves, flattened P waves, prolonged PR interval, widened QRS complex, sine-wave pattern, and finally ventricular fibrillation or asystole.

Q21. Why does hypokalaemia sometimes not correct despite potassium replacement?

BDS + MBBS
★★★

Coexisting hypomagnesaemia, because magnesium is needed to retain potassium in cells and kidneys. Magnesium must be replaced first.

Q22. What are the causes of metabolic acidosis in surgical patients? What is the anion gap?

BDS + MBBS
★★☆

Lactic acidosis from shock and ischaemic bowel, diabetic ketoacidosis, renal failure, and bicarbonate loss from diarrhoea, fistulae or ureterosigmoidostomy. Anion gap = sodium − (chloride + bicarbonate), normally about 8–12 mmol/l; it is raised in lactic acidosis, ketoacidosis and renal failure, and normal in bicarbonate loss.

Q23. What is refeeding syndrome?

BDS + MBBS ★★☆

Dangerous shifts of phosphate, potassium and magnesium into cells when a malnourished patient is fed, caused by insulin release. It causes hypophosphataemia, arrhythmias, heart failure and respiratory failure. It is prevented by starting feeding slowly, giving thiamine, and monitoring and replacing electrolytes.

Q24. What is SIADH and why is it common after surgery?

BDS + MBBS ★★☆

Inappropriate ADH release causing water retention and dilutional hyponatraemia, with low serum osmolality, concentrated urine with high sodium, and normal volume status. It is triggered by pain, nausea, opioids, chest infection and head injury, and is treated by fluid restriction.

Q25. What are the causes of metabolic alkalosis in surgical patients?

BDS + MBBS ★★☆

Vomiting and nasogastric losses (as in pyloric stenosis), diuretics, hypokalaemia, massive transfusion (citrate converted to bicarbonate) and excess bicarbonate. It is treated with saline and potassium.

Management and Nutrition

Q26. Write a 24-hour maintenance fluid regimen for a 70 kg adult who is nil by mouth.

BDS + MBBS ★☆☆

About 2–2.5 litres of water with about 70 mmol of sodium and 70 mmol of potassium, e.g. 1 litre of 0.9% saline with 20 mmol KCl plus 1.5 litres of 5% dextrose with 20 mmol KCl in each litre, or a ready-made balanced maintenance solution, adjusted to losses and blood results.

Q27. What are the indications for blood transfusion?

BDS + MBBS ★☆☆

Acute haemorrhage with ongoing bleeding or shock, and in stable patients a haemoglobin below 7 g/dl (below 8 g/dl in cardiac disease or symptomatic patients). Restrictive thresholds are as safe as liberal ones.

Q28. What are the routes of nutritional support?

BDS + MBBS ★☆☆

Enteral: oral supplements, nasogastric, nasojejunal, gastrostomy (PEG) and jejunostomy feeding. Parenteral: through a central venous catheter or PICC line. Enteral is preferred whenever the gut works.

Q29. Why is enteral nutrition preferred over parenteral?

BDS + MBBS ★★☆

It maintains the gut mucosa and its barrier function, reduces bacterial translocation and infection, is cheaper and safer, and avoids line sepsis and metabolic complications.

Q30. What are the indications for total parenteral nutrition?

BDS + MBBS ★★☆

When the gut cannot be used or cannot absorb enough: prolonged ileus, high-output enterocutaneous fistula, short bowel syndrome, severe pancreatitis not tolerating enteral feed, and intestinal obstruction in malnourished patients.

Q31. How will you assess the nutritional status of a surgical patient?

BDS + MBBS ★★☆

> History of weight loss and intake, BMI, mid-arm circumference and skinfold thickness, grip strength, serum albumin and prealbumin, lymphocyte count, and screening tools such as MUST.

Q32. Why does normal saline cause hyperchloraemic acidosis?

BDS + MBBS ★★☆

> It contains 154 mmol/l of chloride, far more than plasma. Large volumes raise plasma chloride, which reduces bicarbonate and causes a normal anion gap metabolic acidosis, and may impair kidney function.

Q33. What is a fluid challenge?

BDS + MBBS ★★☆

> Rapid infusion of 250–500 ml of crystalloid over 10–15 minutes while watching pulse, blood pressure, urine output and CVP. Improvement suggests hypovolaemia; it is repeated as needed while watching for overload.

Q34. How will you manage oliguria after surgery?

BDS + MBBS ★☆☆

> Check the catheter for blockage, assess volume status and give a fluid challenge if hypovolaemic, look for and treat causes (bleeding, sepsis, obstruction), stop nephrotoxic drugs, check creatinine and potassium, and avoid diuretics until volume is restored.

Complications

Q35. What are the complications of fluid overload?

BDS + MBBS ★☆☆

> Peripheral and pulmonary oedema, heart failure, ileus and bowel oedema, anastomotic leak, poor wound healing, and dilutional hyponatraemia, especially in elderly and cardiac patients.

Q36. What are the complications of total parenteral nutrition?

BDS + MBBS ★★☆

> Line-related: pneumothorax, catheter sepsis, thrombosis. Metabolic: hyperglycaemia, electrolyte imbalance, refeeding syndrome, fatty liver and cholestasis, and gut mucosal atrophy.

Q37. What are the complications of blood transfusion?

BDS + MBBS ★★☆

> Acute haemolytic reaction (ABO incompatibility), febrile and allergic reactions, transfusion-related acute lung injury (TRALI), circulatory overload (TACO), infection transmission, hyperkalaemia, hypocalcaemia and iron overload.

Q38. How will you manage a suspected acute haemolytic transfusion reaction?

BDS + MBBS ★★☆

> Stop the transfusion, keep the IV line open with saline, check the patient's identity against the blood bag, support the circulation, maintain urine output, send blood and urine samples, and return the bag to the blood bank.

Recent Advances

Q39. What is the current view on restrictive versus liberal fluids in major surgery?

BDS + MBBS ★★☆

The RELIEF trial showed that overly restrictive regimens increased acute kidney injury, so a moderately liberal, near-zero-balance approach is preferred, avoiding both overload and dehydration.

Q40. What changes has ERAS made to preoperative fasting?

BDS + MBBS ★★☆

Clear fluids are allowed up to 2 hours and solids up to 6 hours before anaesthesia, with carbohydrate drinks to reduce insulin resistance and improve comfort.

Q41. What is immunonutrition?

BDS + MBBS ★★☆

Enteral formulas enriched with arginine, omega-3 fatty acids and nucleotides given before major gastrointestinal cancer surgery to reduce infective complications in malnourished patients.

Q42. How is point-of-care ultrasound used to assess fluid status?

BDS + MBBS ★★☆

Assessment of the inferior vena cava, lung B-lines and cardiac function at the bedside helps decide whether a patient needs fluid or is overloaded.

Q43. What is patient blood management?

BDS + MBBS ★★☆

Detecting and treating preoperative anaemia (e.g. with intravenous iron), minimising blood loss and using restrictive transfusion thresholds to reduce unnecessary transfusion and its risks.

Examiner's Favourite (Hard Questions)

Q44. Why should potassium not be added to fluids in an oliguric patient?

BDS + MBBS ★★★

The kidneys excrete most potassium. If urine output is poor, potassium accumulates and can cause fatal hyperkalaemia; it is given only once renal function and urine output are adequate, with blood levels checked.

Q45. Why is urine output low in the first 24 hours after surgery even with adequate fluids?

BDS + MBBS ★★★

The stress response raises ADH and aldosterone, causing water and sodium retention. A urine output of 0.5 ml/kg/hour is acceptable, and excess fluid should not be given only to increase urine volume.

Q46. What is the danger of a high-output enterocutaneous fistula?

BDS + MBBS ★★★

Large losses of water, sodium, potassium and bicarbonate cause dehydration, electrolyte imbalance and acidosis, together with malnutrition and skin damage. Sepsis, nutrition and losses ("SNAP") must be managed.

Q47. Why do surgeons worry about TURP syndrome?

BDS + MBBS ★★★

Absorption of large volumes of hypotonic irrigation fluid (glycine) during transurethral resection causes dilutional hyponatraemia, fluid overload, confusion, seizures and visual disturbance.

Quick Recall

- ✓ TBW 60%: two-thirds ICF, one-third ECF; plasma one-quarter of ECF.
- ✓ Maintenance: 25–30 ml/kg water, 1 mmol/kg Na and K per day.
- ✓ Resuscitate with balanced crystalloid or blood, never 5% dextrose.
- ✓ NG losses: replace with saline + KCl volume for volume.
- ✓ IV potassium: diluted, max about 10 mmol/h peripherally, only with urine output.
- ✓ Hyperkalaemia: calcium gluconate, insulin + dextrose, salbutamol, then removal.
- ✓ Correct chronic hyponatraemia slowly; prevent refeeding syndrome with slow feeding and thiamine.

CHAPTER

26

PART C: GENERAL SURGERY VIVA TOPICS

Surgical Infections

Abscess, cellulitis, necrotising soft tissue infection, tetanus, gas gangrene and antibiotic prophylaxis

Clinical Scenario

A 55-year-old diabetic man presents with severe pain and swelling of the perineum and scrotum for 2 days, high fever and confusion. The scrotal skin is dusky with patches of black skin and crepitus is felt on palpation. His pulse is 120 per minute and blood pressure 90/60 mmHg. Examiners use such a scenario to ask about necrotising infections, sepsis, and the principles of surgical treatment of infection.

Principles and Pathology

Q1. What is a surgical site infection and how is it classified?

BDS + MBBS
★☆☆

Infection of the wound or operated organ within 30 days of surgery (or 1 year with an implant). It is classified as superficial incisional (skin and subcutaneous tissue), deep incisional (fascia and muscle), and organ or space infection (e.g. intra-abdominal abscess).

Q2. What are the risk factors for surgical site infection?

BDS + MBBS
★☆☆

Patient factors: diabetes, obesity, smoking, malnutrition, immunosuppression, remote infection. Operative factors: contaminated or dirty surgery, long operation, poor technique, haematoma, dead tissue, hypothermia, shaving with a razor, and inappropriate antibiotic prophylaxis.

Q3. What is the difference between cellulitis and an abscess?

BDS + MBBS
★☆☆

Cellulitis is a spreading non-suppurative infection of the skin and subcutaneous tissue, usually streptococcal, with diffuse redness and oedema, treated with antibiotics. An abscess is a localised collection of pus surrounded by a pyogenic membrane, usually staphylococcal, which needs drainage.

Q4. What is necrotising fasciitis? What are its types?

BDS + MBBS
★★☆

A rapidly spreading infection of the fascia and subcutaneous tissue with thrombosis of vessels and necrosis. Type I: polymicrobial (aerobes and anaerobes), often in diabetics and perineal (Fournier's gangrene). Type II: monomicrobial, Group A streptococcus, sometimes with Staphylococcus aureus. Type III: Clostridium or Vibrio species.

Q5. What is gas gangrene?

BDS + MBBS
★★☆

Clostridial myonecrosis, usually by Clostridium perfringens, in deep, contaminated wounds with dead muscle. Exotoxins (alpha toxin) cause rapid muscle necrosis, gas formation, haemolysis and profound toxaemia.

Q6. How does tetanus cause its effects?

BDS + MBBS
★★☆

Clostridium tetani spores enter a wound and, under anaerobic conditions, produce tetanospasmin. The toxin travels along nerves to the spinal cord and brainstem and blocks inhibitory neurotransmitter release, causing muscle rigidity and spasms.

Q7. What is meant by "ubi pus, ibi evacua"?

BDS + MBBS
★☆☆

"Where there is pus, let it out." Antibiotics cannot penetrate an abscess cavity adequately, so pus must be drained.

Q8. Which organisms commonly cause surgical infections?

BDS + MBBS
★☆☆

Staphylococcus aureus (abscess, wound infection), Streptococcus pyogenes (cellulitis, necrotising fasciitis), E. coli, enterococci and Bacteroides (abdominal sepsis), Pseudomonas (burns), and Clostridium species (gas gangrene, tetanus).

Q9. What is a carbuncle?

BDS + MBBS
★★☆

Infective gangrene of the subcutaneous tissue caused by Staphylococcus aureus, formed by several interconnected hair follicle abscesses with multiple openings (cribriform appearance), typically on the back of the neck in diabetics. Treated with antibiotics, diabetic control and drainage or excision.

Q10. What is MRSA and how is it controlled?

BDS + MBBS
★★☆

Methicillin-resistant Staphylococcus aureus. It is controlled by screening, decolonisation (nasal mupirocin and chlorhexidine washes), isolation, strict hand hygiene, and treatment with vancomycin, teicoplanin or linezolid.

Clinical Features

Q11. What are the clinical features of an abscess?

BDS + MBBS
★☆☆

Throbbing pain, a red, hot, tender, swollen area that becomes fluctuant, fever, and enlarged regional lymph nodes. Deep abscesses may not be fluctuant and present with swinging fever.

Q12. What are the early clues to necrotising fasciitis?

BDS + MBBS
★★☆

Pain out of proportion to the visible signs, tense oedema extending beyond the redness, rapid spread, skin discolouration, bullae, crepitus, skin anaesthesia, and features of sepsis. Skin changes appear late, so suspicion must be high.

Q13. What is Fournier's gangrene?

BDS + MBBS
★★☆

Necrotising fasciitis of the perineum, scrotum and penis, usually polymicrobial, arising from perianal, urinary or skin infections, often in diabetics and alcoholics. It needs emergency radical debridement.

Q14. What are the clinical features of tetanus?

BDS + MBBS
★★☆

Trismus (lockjaw), risus sardonicus (fixed smile), neck and back rigidity, opisthotonus, painful generalised spasms triggered by noise or touch, dysphagia, laryngeal spasm, and autonomic instability. Consciousness is preserved.

Q15. What are Kanavel's signs?

BDS + MBBS ★★☆

Signs of flexor tendon sheath infection of a finger: finger held in slight flexion, fusiform swelling of the finger, tenderness along the tendon sheath, and severe pain on passive extension. It needs urgent surgical drainage.

Q16. What is a paronychia and a felon?

BDS + MBBS ★☆☆

Paronychia is infection of the nail fold, the commonest hand infection. A felon is an infection of the pulp space of the fingertip, a closed compartment, causing severe throbbing pain; it may cause osteomyelitis of the terminal phalanx if not drained.

Q17. What are lymphangitis and lymphadenitis?

BDS + MBBS ★☆☆

Lymphangitis is infection spreading along lymphatics, seen as red tender streaks from the infected area towards the regional nodes. Lymphadenitis is inflammation of the nodes, which become enlarged and tender. Both indicate spreading infection, usually streptococcal.

Q18. What is erysipelas?

BDS + MBBS ★★☆

A superficial streptococcal cellulitis involving the dermal lymphatics, with a raised, sharply demarcated, bright red edge, usually on the face or legs. It is treated with penicillin.

Investigations

Q19. What investigations will you send in a surgical infection?

BDS + MBBS ★☆☆

Full blood count, CRP, blood sugar, renal function, blood cultures in febrile or septic patients, and pus or tissue for Gram stain, culture and sensitivity (taken before antibiotics where possible).

Q20. What is the role of imaging in soft tissue infection?

BDS + MBBS ★★☆

Ultrasound confirms and localises an abscess and guides drainage. X-ray or CT shows gas in the tissues and deep collections. Imaging must not delay surgery when necrotising infection is clinically suspected.

Q21. What is the LRINEC score?

BDS + MBBS ★★★

A laboratory score (CRP, white count, haemoglobin, sodium, creatinine and glucose) that helps identify necrotising fasciitis. A high score raises suspicion, but a low score does not exclude it; the diagnosis is clinical and confirmed at surgery.

Q22. What is the "finger test" at surgery for necrotising fasciitis?

BDS + MBBS ★★☆

Under anaesthesia a small incision is made down to the fascia. In necrotising fasciitis, there is no bleeding, "dishwater" fluid, and the finger passes easily along the fascial plane, separating it from the overlying tissue.

Q23. What is the role of procalcitonin?

BDS + MBBS ★★☆

It rises in bacterial infection more than in viral infection or sterile inflammation, helping to diagnose bacterial sepsis and to guide when antibiotics can be stopped.

Management

Q24. How will you treat an abscess?

BDS + MBBS ★☆☆

Incision and drainage under adequate anaesthesia: an incision over the point of maximum fluctuation along skin creases, breaking down loculi, irrigating the cavity, and leaving it open to drain. Antibiotics are added for cellulitis, systemic features, diabetes or immunosuppression. Pus is sent for culture.

Q25. What are the principles of antibiotic prophylaxis in surgery?

BDS + MBBS ★☆☆

Use it for clean-contaminated and contaminated operations and for clean operations with implants or high risk. Give a single IV dose within 60 minutes before incision so tissue levels are high when bacteria enter, repeat in long operations or heavy blood loss, and do not continue beyond 24 hours.

Q26. How will you manage necrotising fasciitis?

BDS + MBBS ★★☆

Resuscitation, broad-spectrum IV antibiotics (e.g. piperacillin–tazobactam or a carbapenem with clindamycin, plus cover for MRSA if needed), and urgent radical surgical debridement of all necrotic tissue, with a re-look within 24 hours and repeated debridements, followed by reconstruction. Delay increases mortality.

Q27. How is tetanus treated?

BDS + MBBS ★★☆

Wound debridement, human tetanus immunoglobulin, metronidazole, sedation and muscle relaxants (benzodiazepines, magnesium), quiet dark room, airway protection with early tracheostomy and ventilation in severe cases, nutrition, and active immunisation after recovery.

Q28. How is gas gangrene treated?

BDS + MBBS ★★☆

Resuscitation, high-dose IV penicillin with clindamycin or metronidazole, radical excision of all dead muscle (amputation if needed), and hyperbaric oxygen where available.

Q29. What measures reduce surgical site infection?

BDS + MBBS ★☆☆

Treating remote infections, avoiding razor shaving (use clippers), skin preparation with alcoholic chlorhexidine, timely antibiotic prophylaxis, maintaining normothermia and glucose control, good surgical technique and haemostasis, and proper wound dressing.

Q30. How will you treat a felon and flexor tenosynovitis?

BDS + MBBS ★★☆

Felon: drainage through a lateral or volar incision, avoiding the fingertip pad. Flexor tenosynovitis: elevation, IV antibiotics and urgent surgical drainage and irrigation of the sheath if not improving within 24 hours or if established.

Q31. What is antibiotic stewardship?

BDS + MBBS ★★☆

Responsible use of antibiotics: right drug, right dose, right route and shortest effective duration, guided by cultures and local policies, to reduce resistance, side effects and Clostridioides difficile infection.

Q32. How will you prevent infection of healthcare workers in surgery?

BDS + MBBS
★★☆

Universal precautions: gloves (double gloving), eye protection, safe handling and disposal of sharps, hepatitis B vaccination, and post-exposure prophylaxis after needle-stick injury (washing the wound, reporting, testing and antiretroviral drugs within hours if the source is HIV positive).

Q33. How will you manage an intra-abdominal abscess?

BDS + MBBS
★★☆

Antibiotics and image-guided percutaneous drainage. Surgery is needed for multiloculated or inaccessible abscesses, failure of drainage, or an underlying leak or perforation that needs repair.

Q34. How will you manage a breast abscess?

BDS + MBBS
★★☆

Ultrasound-guided aspiration with antibiotics (flucloxacillin), repeated as needed. Incision and drainage if the skin is thinned or necrotic or the abscess is large. Breastfeeding or expressing from the affected side continues.

Complications

Q35. What are the complications of untreated surgical infection?

BDS + MBBS
★☆☆

Spread of infection (lymphangitis, lymphadenitis), septicaemia, septic shock, metastatic abscesses, organ failure, osteomyelitis, scarring and loss of function.

Q36. Why does an abscess recur after drainage?

BDS + MBBS
★★☆

Inadequate drainage or loculi left behind, premature closure of the skin, an underlying cause such as a foreign body, fistula-in-ano, pilonidal sinus, hidradenitis, diabetes, or resistant organisms (MRSA).

Q37. What is pseudomembranous colitis?

BDS + MBBS
★★☆

Colitis caused by Clostridioides difficile overgrowth after antibiotics, presenting with diarrhoea, abdominal pain and fever. It may lead to toxic megacolon. Treated by stopping the offending antibiotic and giving oral vancomycin or fidaxomicin.

Q38. What are the outcomes of necrotising fasciitis?

BDS + MBBS
★★☆

High mortality, especially with delayed surgery, extensive tissue loss needing grafts or flaps, amputation, prolonged ICU stay and long-term disability.

Q39. What is toxic shock syndrome?

BDS + MBBS
★★☆

A toxin-mediated illness caused by Staphylococcus aureus or Streptococcus pyogenes, with fever, rash, hypotension and multi-organ involvement, which can follow minor wounds, burns or retained packs. Treated by removing the source, antibiotics including clindamycin, and supportive care.

Recent Advances

Q40. What did the STOP-IT trial show?

BDS + MBBS
★★★

After adequate source control of complicated intra-abdominal infection, about 4 days of antibiotics was as effective as longer courses guided by fever and white count.

Q41. What are rapid molecular diagnostics in sepsis?

BDS + MBBS
★★☆

PCR-based panels on positive blood cultures identify organisms and resistance genes within hours, allowing earlier targeted antibiotic therapy.

Q42. Which newer antibiotics treat multidrug-resistant Gram-negative infections?

BDS + MBBS
★★★

Ceftazidime–avibactam, meropenem–vaborbactam, cefiderocol and others are used for carbapenem-resistant organisms, guided by microbiology and stewardship to preserve their effect.

Q43. Should antibiotics be given after drainage of a skin abscess?

BDS + MBBS
★★☆

Trials have shown that adding an antibiotic active against Staphylococcus aureus (such as co-trimoxazole or clindamycin) after drainage modestly improves cure, particularly for small abscesses and in MRSA areas, so it is considered in selected patients.

Q44. What is preoperative decolonisation?

BDS + MBBS
★★☆

Screening for Staphylococcus aureus carriage and treating carriers with nasal mupirocin and chlorhexidine body wash before cardiac and orthopaedic surgery, which reduces surgical site infection.

Examiner's Favourite (Hard Questions)

Q45. Why is clindamycin added in streptococcal necrotising fasciitis?

BDS + MBBS
★★★

It inhibits bacterial protein synthesis and therefore toxin production, and remains effective when there are large numbers of bacteria in the stationary phase, where penicillin is less effective (Eagle effect).

Q46. Why does a pulp space infection cause severe pain and bone damage?

BDS + MBBS
★★★

The pulp is divided by fibrous septa into closed compartments. Pus under pressure causes intense throbbing pain and can compress the vessels to the terminal phalanx, causing osteomyelitis.

Q47. Why is the incubation period important in tetanus?

BDS + MBBS
★★★

A short incubation period (under 7 days) and a short period of onset (time from first symptom to first spasm) indicate severe disease and a worse prognosis.

Q48. Why is timing important in antibiotic prophylaxis?

BDS + MBBS
★★★

The antibiotic must be at its peak in the tissues when contamination occurs during the operation. Doses given too early wear off; doses given after the incision are less effective.

Quick Recall

- ✓ SSI: superficial, deep incisional, organ/space; within 30 days.
- ✓ Cellulitis: antibiotics. Abscess: drain (ubi pus, ibi evacua).
- ✓ Necrotising fasciitis: pain out of proportion; radical debridement + broad-spectrum antibiotics + clindamycin.
- ✓ Fournier's gangrene: perineal NF in diabetics; emergency debridement.
- ✓ Tetanus: trismus, risus sardonicus; immunoglobulin, metronidazole, sedation, airway.
- ✓ Prophylaxis: single dose within 60 minutes before incision; stop within 24 hours.
- ✓ Prevent SSI: clippers, chlorhexidine-alcohol, normothermia, glucose control.

CHAPTER

27

PART C: GENERAL SURGERY VIVA TOPICS

Acute Abdomen

Assessment of acute abdominal pain and management of common surgical emergencies

Clinical Scenario

A 22-year-old man presents with abdominal pain for 18 hours. It started around the umbilicus and then moved to the right lower abdomen, with nausea, one episode of vomiting and loss of appetite. His temperature is 38°C and pulse 104 per minute. There is tenderness and guarding in the right iliac fossa with rebound tenderness at McBurney's point and a positive Rovsing's sign. Examiners use such a scenario to ask about acute appendicitis and the general approach to the acute abdomen.

Assessment

Q1. Define acute abdomen.

BDS + MBBS
★☆☆

Sudden onset of severe abdominal pain, usually of less than a week's duration, which may need urgent surgical or medical intervention.

Q2. Classify the surgical causes of acute abdomen.

BDS + MBBS
★☆☆

- Inflammation: appendicitis, cholecystitis, pancreatitis, diverticulitis.
- Perforation: peptic ulcer, bowel, gallbladder.
- Obstruction: intestinal obstruction, biliary and ureteric colic, volvulus.
- Haemorrhage: ruptured ectopic pregnancy, ruptured aortic aneurysm, ruptured spleen.
- Ischaemia: mesenteric ischaemia, strangulated hernia, torsion of ovarian cyst.

Q3. What is the difference between visceral and somatic (parietal) pain?

BDS + MBBS
★★☆

Visceral pain arises from stretching or inflammation of an organ, is dull, poorly localised and felt in the midline (foregut epigastric, midgut periumbilical, hindgut suprapubic). Somatic pain arises from the parietal peritoneum, is sharp, well localised and worse on movement.

Q4. Why does the pain of appendicitis shift from the umbilicus to the right iliac fossa?

BDS + MBBS
★★☆

Early inflammation stretches the appendix wall, causing visceral midgut pain felt around the umbilicus. When the inflammation reaches the parietal peritoneum, somatic pain localises to the right iliac fossa.

Q5. What are the signs of peritonitis?

BDS + MBBS
★☆☆

An ill, still patient lying with knees flexed, tachycardia, fever, tenderness, guarding, rigidity (board-like in generalised peritonitis), rebound tenderness, pain on coughing or percussion, and absent bowel sounds.

Q6. Name the clinical signs used in acute appendicitis.

BDS + MBBS
★☆☆

Tenderness at McBurney's point, rebound tenderness, Rovsing's sign (pain in the right iliac fossa on pressing the left), psoas sign (pain on extending the right hip; retrocaecal appendix), obturator sign (pain on internal rotation of the flexed hip; pelvic appendix), and tenderness on rectal examination.

Q7. What is the Alvarado score?

BDS + MBBS
★★☆

A clinical score for appendicitis (MANTRELS): migration of pain, anorexia, nausea or vomiting, tenderness in the right iliac fossa (2), rebound tenderness, elevated temperature, leucocytosis (2) and shift to the left; total 10. A high score (7 or more) supports appendicitis; a low score helps exclude it.

Q8. What is Murphy's sign?

BDS + MBBS
★☆☆

With the examiner's fingers under the right costal margin, the patient is asked to breathe in deeply; inspiration stops abruptly because of pain as the inflamed gallbladder descends onto the fingers. It indicates acute cholecystitis.

Q9. What are Cullen's and Grey Turner's signs?

BDS + MBBS
★★☆

Bruising around the umbilicus (Cullen's) and in the flanks (Grey Turner's), due to retroperitoneal haemorrhage tracking along tissue planes, seen in severe acute pancreatitis and ruptured ectopic pregnancy.

Q10. Which medical conditions can mimic an acute abdomen?

BDS + MBBS
★★☆

Myocardial infarction, lower lobe pneumonia, diabetic ketoacidosis, sickle cell crisis, acute porphyria, Addisonian crisis, hypercalcaemia, herpes zoster, and lead poisoning.

Q11. What will you ask in the history of acute abdominal pain?

BDS + MBBS
★☆☆

Site, onset, character, radiation, timing, aggravating and relieving factors and severity; vomiting, bowel habit, urinary symptoms, fever, menstrual history and last period; previous episodes and surgery; drugs such as NSAIDs, steroids and anticoagulants.

Q12. Where is pain referred in acute abdominal conditions?

BDS + MBBS
★★☆

Diaphragmatic irritation (blood or pus) to the shoulder tip through the phrenic nerve (C3–5, Kehr's sign), biliary pain to the right scapula, pancreatic pain to the back, and ureteric colic from loin to groin and testis or labium.

Investigations

Q13. What blood investigations will you do in acute abdomen?

BDS + MBBS
★☆☆

Full blood count, CRP, urea and electrolytes, liver function tests, serum amylase or lipase, blood glucose, arterial blood gas with lactate, blood group and cross-match, and a pregnancy test (beta-hCG) in all women of reproductive age.

Q14. What is the significance of gas under the diaphragm on an erect chest X-ray?

BDS + MBBS ★☆☆

It indicates pneumoperitoneum, usually from perforation of a hollow viscus, most commonly a peptic ulcer. The patient should sit upright for 10 minutes before the X-ray. It is absent in about a quarter of perforations, and is normal for a few days after laparotomy or laparoscopy.

Q15. How will you differentiate small from large bowel obstruction on an abdominal X-ray?

BDS + MBBS ★★☆

Small bowel: central loops with valvulae conniventes crossing the full width of the bowel ("stack of coins"), diameter usually under 5 cm. Large bowel: peripheral loops with haustra that do not cross the full width, larger diameter. A caecum over 9 cm risks perforation.

Q16. What is the X-ray sign of sigmoid volvulus?

BDS + MBBS ★★☆

A large dilated loop of sigmoid colon rising from the pelvis towards the right upper quadrant, shaped like a coffee bean or bent inner tube, without haustra.

Q17. What is the role of ultrasound in acute abdomen?

BDS + MBBS ★☆☆

It is the first imaging for suspected gallbladder disease, gynaecological causes and appendicitis in children and pregnant women, and detects free fluid, abscesses and aortic aneurysm. It is operator dependent and limited by gas and obesity.

Q18. Why has CT become the key investigation in adults with acute abdomen?

BDS + MBBS ★★☆

Contrast-enhanced CT is highly accurate for appendicitis, perforation, obstruction (cause, level and strangulation), diverticulitis, pancreatitis, mesenteric ischaemia and aneurysm, and reduces negative laparotomies. It should not delay surgery in an unstable patient.

Q19. What investigations suggest acute mesenteric ischaemia?

BDS + MBBS ★★☆

Raised lactate and metabolic acidosis, leucocytosis, and CT angiography showing arterial occlusion, bowel wall thickening or lack of enhancement, pneumatosis and portal venous gas. Lactate may be normal early.

Q20. Why will you do an ECG and urine analysis in acute abdomen?

BDS + MBBS ★☆☆

The ECG excludes an inferior myocardial infarction presenting as epigastric pain and assesses fitness. Urine analysis detects infection, blood (stones), glucose and ketones (diabetic ketoacidosis).

Management of Common Conditions

Q21. What is the initial management of a patient with acute abdomen?

BDS + MBBS ★☆☆

Resuscitation with oxygen and IV fluids, adequate analgesia (it does not mask important signs), nil by mouth, nasogastric tube for vomiting or obstruction, urinary catheter for monitoring, antibiotics for sepsis or peritonitis, investigations, and early senior surgical review.

Q22. How is acute appendicitis treated?

BDS + MBBS
★☆☆

Laparoscopic appendicectomy with preoperative antibiotics is the standard. Selected patients with uncomplicated appendicitis confirmed on CT may be treated with antibiotics alone, accepting a recurrence rate of about a quarter to a third. Appendicular mass is treated conservatively and abscess by drainage.

Q23. How will you manage a perforated peptic ulcer?

BDS + MBBS
★★☆

Resuscitation, nasogastric tube, IV antibiotics and proton pump inhibitor, followed by laparoscopic or open repair with an omental patch (Graham patch) and peritoneal lavage. Postoperatively, Helicobacter pylori is eradicated and NSAIDs stopped. Conservative treatment (Taylor's method) is reserved for selected sealed perforations.

Q24. How will you manage adhesive small bowel obstruction?

BDS + MBBS
★★☆

"Drip and suck": IV fluids, nasogastric decompression, correction of electrolytes, and close monitoring; water-soluble contrast (Gastrografin) helps predict resolution. Surgery is needed for signs of strangulation, closed-loop obstruction, peritonitis, or failure to resolve within 48–72 hours.

Q25. What are the signs of strangulation in intestinal obstruction?

BDS + MBBS
★★☆

Continuous rather than colicky pain, tachycardia, fever, localised tenderness, guarding and rebound, raised white count and lactate, and CT signs of reduced bowel wall enhancement. No clinical sign reliably excludes strangulation.

Q26. How is sigmoid volvulus managed?

BDS + MBBS
★★☆

Resuscitation and endoscopic (flexible sigmoidoscopic) decompression with a flatus tube, followed by elective sigmoid colectomy because of the high recurrence rate. Emergency laparotomy with resection (Hartmann's procedure) if there is gangrene, perforation or failed decompression.

Q27. How will you diagnose and manage acute pancreatitis?

BDS + MBBS
★★☆

Diagnosis needs two of three: typical epigastric pain radiating to the back, amylase or lipase more than three times normal, and imaging findings. Treatment: fluids, analgesia, oxygen, early enteral feeding, monitoring for organ failure, ERCP for associated cholangitis, cholecystectomy during the same admission for gallstone pancreatitis, and no routine antibiotics.

Q28. How is acute cholecystitis treated?

BDS + MBBS
★★☆

IV fluids, analgesia and antibiotics, followed by early laparoscopic cholecystectomy, ideally within a week of symptom onset. Unfit patients with severe disease may have percutaneous cholecystostomy.

Q29. How is acute mesenteric ischaemia managed?

BDS + MBBS
★★★

Resuscitation, heparin, and urgent revascularisation (embolectomy or endovascular treatment), with laparotomy to resect non-viable bowel and a planned second look after 24–48 hours. Delay greatly increases mortality.

Q30. How will you manage a suspected ruptured abdominal aortic aneurysm?

BDS + MBBS ★★☆

Recognise it in an older patient with abdominal or back pain, collapse and a pulsatile mass. Call the vascular team, allow permissive hypotension (avoid aggressive fluids), cross-match blood, and proceed to endovascular repair (EVAR) after CT if stable, or straight to theatre if unstable.

Q31. What is the Hinchey classification of perforated diverticulitis?

BDS + MBBS ★★☆

I: pericolic abscess. II: pelvic or distant abscess. III: generalised purulent peritonitis. IV: generalised faecal peritonitis. Stages I and II are treated with antibiotics and drainage; III and IV need surgery (lavage or resection).

Q32. How is ureteric colic managed?

BDS + MBBS ★★☆

Analgesia with NSAIDs, CT KUB to confirm the stone, and medical expulsive therapy (tamsulosin) for small distal stones, most of which under 5 mm pass. An infected obstructed kidney needs urgent drainage by stent or nephrostomy. Larger stones need ureteroscopy or lithotripsy.

Q33. How will you manage a ruptured ectopic pregnancy?

BDS + MBBS ★★☆

Resuscitation with two large-bore cannulae and blood, urgent gynaecological involvement, and emergency laparoscopy or laparotomy with salpingectomy. Anti-D immunoglobulin is given to rhesus-negative women.

Complications

Q34. What are the complications of appendicectomy?

BDS + MBBS ★☆☆

Wound infection, intra-abdominal or pelvic abscess, paralytic ileus, stump leak and faecal fistula, adhesive obstruction, port-site hernia, and rarely infertility in women after perforation.

Q35. What are the features of a pelvic abscess?

BDS + MBBS ★★☆

Swinging fever a few days after surgery for peritonitis or appendicitis, diarrhoea with mucus, urinary frequency, and a tender, boggy mass anteriorly on rectal examination. It is drained through the rectum or percutaneously under imaging.

Q36. What is a subphrenic abscess?

BDS + MBBS ★★☆

A collection of pus under the diaphragm after peritonitis or upper abdominal surgery, causing swinging fever, upper abdominal or shoulder pain, hiccups and basal lung signs ("pus somewhere, pus nowhere, pus under the diaphragm"). It is drained percutaneously under ultrasound or CT.

Q37. What are the systemic consequences of generalised peritonitis?

BDS + MBBS ★★☆

Hypovolaemia from third-space loss, paralytic ileus, sepsis and septic shock, acute kidney injury, respiratory failure, and multiple organ dysfunction.

Q38. How is an enterocutaneous fistula after laparotomy managed?

BDS + MBBS
★★☆

By the SNAP approach: control of Sepsis, Nutrition (often parenteral), definition of Anatomy by imaging, and Protection of the skin, followed by a Plan for surgery if it does not close. Distal obstruction, foreign body, epithelialisation, malignancy and high output prevent spontaneous closure.

Recent Advances

Q39. What is the NELA and why is it important?

BDS + MBBS
★★☆

The National Emergency Laparotomy Audit in the UK showed that risk assessment, consultant-led surgery and anaesthesia, timely antibiotics and critical care admission for high-risk patients reduce mortality after emergency laparotomy.

Q40. Are antibiotics needed for uncomplicated diverticulitis?

BDS + MBBS
★★☆

Trials (DIABOLO, AVOD) showed that uncomplicated diverticulitis in immunocompetent patients can be managed without antibiotics, with observation and analgesia.

Q41. What did the DIVERTI trial show?

BDS + MBBS
★★★

In perforated diverticulitis with peritonitis, primary anastomosis with a diverting ileostomy was as safe as Hartmann's procedure and allowed more patients to have their stoma reversed.

Q42. What has changed in fluid therapy for acute pancreatitis?

BDS + MBBS
★★★

The WATERFALL trial showed that aggressive fluid resuscitation increased fluid overload without improving outcome, so moderate, goal-directed fluid therapy is now advised.

Q43. What is the step-up approach to infected pancreatic necrosis?

BDS + MBBS
★★★

Antibiotics first, then percutaneous or endoscopic drainage, and minimally invasive or endoscopic necrosectomy only if needed, which reduces complications compared with open necrosectomy.

Examiner's Favourite (Hard Questions)

Q44. Why can the signs of acute abdomen be misleading in some patients?

BDS + MBBS
★★★

Elderly patients, those on steroids or immunosuppressants, diabetics and patients with spinal cord injury may have little pain or guarding. In pregnancy the appendix is displaced upward. Children give poor histories and perforate early.

Q45. Why does a retrocaecal appendicitis have few abdominal signs?

BDS + MBBS
★★★

The appendix lies behind the caecum, which protects the anterior parietal peritoneum, so tenderness may be in the flank or loin, the psoas sign may be positive, and guarding may be absent.

Q46. What is Ogilvie's syndrome?

BDS + MBBS
★★★

> Acute colonic pseudo-obstruction: massive colonic dilatation without mechanical obstruction, in elderly, bedridden or postoperative patients. Treated by correcting electrolytes, stopping causative drugs, neostigmine, and colonoscopic decompression; surgery if the caecum perforates.

Q47. Why must every woman of reproductive age with abdominal pain have a pregnancy test?

BDS + MBBS
★★★

> To exclude ectopic pregnancy, a life-threatening cause of acute abdomen, and to guide safe imaging and drug use.

Quick Recall

- ✓ Causes: inflammation, perforation, obstruction, haemorrhage, ischaemia.
- ✓ Visceral pain: midline; somatic pain: localised. Hence shifting pain in appendicitis.
- ✓ Signs: Rovsing, psoas, obturator, Murphy, Cullen, Grey Turner.
- ✓ Erect chest X-ray: gas under diaphragm; CT is the key test in adults.
- ✓ Analgesia does not mask signs. Beta-hCG in every woman of reproductive age.
- ✓ Adhesive obstruction: drip and suck; operate for strangulation or failure in 48–72 hours.
- ✓ Perforated ulcer: omental patch + H. pylori eradication. Volvulus: endoscopic decompression.

CHAPTER
28

PART C: GENERAL SURGERY VIVA TOPICS

Head Injury

Pathophysiology, Glasgow Coma Scale, intracranial haematomas and initial management

Clinical Scenario

A 30-year-old motorcyclist, not wearing a helmet, hit his head in a road accident and was unconscious for a few minutes. He then woke up and talked normally for about 2 hours, after which he developed headache and vomiting and became drowsy. On arrival his GCS is 9 (E2 V3 M4), the left pupil is dilated and sluggish, and there is weakness of the right arm and leg. There is a boggy swelling over the left temporal region. Examiners use such a scenario to ask about extradural haematoma, the GCS and the principles of head injury management.

Pathophysiology

Q1. What is the Monro–Kellie doctrine?

BDS + MBBS
★☆☆

The skull is a rigid box containing brain, blood and CSF. An increase in one component (e.g. a haematoma) must be compensated by a decrease in another (CSF and venous blood displaced). Once compensation is exhausted, intracranial pressure rises steeply.

Q2. What is cerebral perfusion pressure?

BDS + MBBS
★☆☆

Cerebral perfusion pressure = mean arterial pressure − intracranial pressure. A CPP of about 60–70 mmHg is needed to maintain brain perfusion, so both hypotension and raised ICP reduce brain blood flow.

Q3. What is the difference between primary and secondary brain injury?

BDS + MBBS
★☆☆

Primary injury occurs at the moment of impact (contusion, laceration, diffuse axonal injury) and cannot be reversed. Secondary injury develops afterwards from hypoxia, hypotension, raised ICP, haematoma, hypoglycaemia, seizures, hyperthermia and infection, and is preventable. Management aims to prevent secondary injury.

Q4. What is Cushing's reflex?

BDS + MBBS
★★☆

A late response to severely raised intracranial pressure: hypertension, bradycardia and irregular respiration (Cushing's triad). It indicates impending brain herniation.

Q5. What is tentorial (uncal) herniation and what are its signs?

BDS + MBBS
★★☆

The medial temporal lobe (uncus) is pushed through the tentorial opening by a supratentorial mass, compressing the oculomotor nerve and midbrain. It causes an ipsilateral dilated, unreactive pupil, contralateral hemiparesis, and falling conscious level.

Q6. How is head injury classified by severity?

BDS + MBBS
★☆☆

By GCS after resuscitation: mild 13–15, moderate 9–12, severe 8 or less.

Q7. What is an extradural haematoma?

BDS + MBBS
★☆☆

A collection of blood between the skull and dura, usually from a tear of the middle meningeal artery due to a temporal bone fracture. It classically presents with a lucid interval and appears on CT as a biconvex (lens-shaped) hyperdense collection that does not cross suture lines.

Q8. Differentiate acute and chronic subdural haematoma.

BDS + MBBS
★★☆

Acute: from tearing of bridging veins with high-energy injury and underlying brain damage, crescent-shaped hyperdense on CT, poor prognosis. Chronic: in elderly, alcoholics and anticoagulated patients after trivial injury, presenting weeks later with headache, confusion and fluctuating deficits, hypodense crescent on CT, treated by burr-hole drainage.

Q9. What is diffuse axonal injury?

MBBS
★★☆

Shearing injury of axons from rapid acceleration and deceleration, causing prolonged coma without a mass lesion. CT may be nearly normal or show small haemorrhages at the grey–white junction, corpus callosum and brainstem; MRI is more sensitive.

Q10. What types of skull fracture occur?

BDS + MBBS
★★☆

Linear, depressed, compound (open), comminuted and base of skull fractures. A linear temporal fracture crossing the groove of the middle meningeal artery increases the risk of extradural haematoma.

Assessment

Q11. Describe the Glasgow Coma Scale.

BDS + MBBS
★☆☆

- Eye opening (4): spontaneous 4, to voice 3, to pressure 2, none 1.
- Verbal response (5): oriented 5, confused 4, words 3, sounds 2, none 1.
- Motor response (6): obeys commands 6, localises 5, normal flexion 4, abnormal flexion 3, extension 2, none 1.

Total 3–15; record the components separately, e.g. E2 V3 M4.

Q12. What is the initial assessment of a head-injured patient?

BDS + MBBS
★☆☆

ATLS primary survey: airway with cervical spine protection, breathing, circulation with haemorrhage control, disability (GCS, pupils, blood glucose, lateralising signs) and exposure. Then a secondary survey for other injuries. Every unconscious head injury patient is assumed to have a cervical spine injury.

Q13. What are the signs of a base of skull fracture?

BDS + MBBS
★☆☆

Periorbital bruising (raccoon eyes), bruising behind the ear (Battle's sign), CSF rhinorrhoea or otorrhoea, haemotympanum, and subconjunctival haemorrhage with no posterior limit.

Q14. How can you tell whether nasal discharge is CSF?

BDS + MBBS ★★☆

The halo (target) sign on filter paper, glucose in the fluid, and most reliably beta-2 transferrin, which is found only in CSF.

Q15. What is the lucid interval?

BDS + MBBS ★☆☆

A period of consciousness between the initial concussion and later deterioration, as the haematoma (classically extradural) slowly expands and raises the intracranial pressure.

Q16. When should a head-injured patient be intubated?

BDS + MBBS ★★☆

GCS 8 or less, loss of protective airway reflexes, inadequate ventilation or hypoxia, hypercarbia, spontaneous hyperventilation, repeated seizures, significant facial injuries or bleeding into the airway, and before transfer if deteriorating.

Q17. What are the indications for an urgent CT head after injury?

BDS + MBBS ★★☆

GCS below 13 on initial assessment or below 15 two hours after injury, suspected open or depressed skull fracture, signs of base of skull fracture, post-traumatic seizure, focal neurological deficit, more than one episode of vomiting, and in patients on anticoagulants or with bleeding disorders.

Q18. Why are pupils so important in head injury assessment?

BDS + MBBS ★★☆

A unilateral dilated, unreactive pupil indicates compression of the oculomotor nerve by an expanding mass on that side (uncal herniation), which needs urgent surgery. Bilateral fixed dilated pupils indicate severe brainstem injury.

Q19. How will you record GCS in a patient with swollen eyes or an endotracheal tube?

BDS + MBBS ★★☆

Components that cannot be tested are recorded as not testable (e.g. eyes closed by swelling, verbal "T" for intubated), and the other components are documented. The motor score is the best predictor of outcome.

Investigations

Q20. What is the investigation of choice in acute head injury?

BDS + MBBS ★☆☆

Non-contrast CT scan of the head, which shows haematomas, contusions, skull fractures, midline shift, oedema and pneumocephalus.

Q21. Why will you image the cervical spine in a head injury?

BDS + MBBS ★☆☆

Cervical spine injuries are common with significant head injury, and clinical assessment is unreliable in unconscious or intoxicated patients. CT of the cervical spine is done with the CT head.

Q22. What blood tests will you send?

BDS + MBBS ★★☆

Full blood count, coagulation profile (especially on anticoagulants), blood glucose, urea and electrolytes, blood group and cross-match, alcohol level when relevant, and arterial blood gases in ventilated patients.

Q23. What is intracranial pressure monitoring?

MBBS
★★★

Measurement of ICP through an intraparenchymal sensor or intraventricular catheter in severe head injury, to guide treatment and maintain cerebral perfusion pressure. ICP above about 20–22 mmHg needs treatment.

Management

Q24. What are the principles of preventing secondary brain injury?

BDS + MBBS
★☆☆

Maintain the airway and oxygen saturation above 94%, normal carbon dioxide (PaCO2 about 4.5–5 kPa), systolic blood pressure of at least 100–110 mmHg, head elevation of 30 degrees with the neck straight and collar not too tight, normal blood glucose, normal temperature, control of seizures, and early evacuation of haematomas.

Q25. How will you reduce raised intracranial pressure?

BDS + MBBS
★★☆

Head elevation, sedation and analgesia, adequate oxygenation, osmotic therapy with mannitol (0.5–1 g/kg) or hypertonic saline, brief hyperventilation only as a bridge to surgery, CSF drainage, and decompressive craniectomy for refractory cases.

Q26. How will you treat an extradural haematoma?

BDS + MBBS
★☆☆

Urgent craniotomy and evacuation of the clot with control of the bleeding vessel. A significant haematoma with neurological deterioration is a surgical emergency, and results are excellent if treated early.

Q27. When will a general surgeon perform an emergency burr hole?

BDS + MBBS
★★★

Rarely, only when a patient with a rapidly expanding extradural haematoma is deteriorating and neurosurgical help or transfer is not available in time, guided by CT or by the side of the dilated pupil and fracture.

Q28. When should a depressed skull fracture be elevated?

BDS + MBBS
★★☆

When the depression is more than the thickness of the skull, there is an underlying haematoma or dural tear, it is compound and contaminated, or there is a cosmetic deformity. Compound fractures need debridement and antibiotics.

Q29. How will you manage a CSF leak after a base of skull fracture?

BDS + MBBS
★★☆

Most stop spontaneously within a week. Nurse with the head up, advise the patient not to blow the nose, observe for meningitis, and refer for surgical dural repair if the leak persists. Routine prophylactic antibiotics are not recommended.

Q30. How will you manage a scalp laceration?

BDS + MBBS
★☆☆

The scalp bleeds profusely because its vessels are held open in the dense connective tissue. Control bleeding with pressure, explore for fractures and foreign bodies, clean, and close in layers including the galea, which also stops bleeding.

Q31. When will you refer a head injury patient to a neurosurgeon?

BDS + MBBS ★☆☆

When CT shows a significant lesion, GCS is 8 or less after resuscitation, there is unexplained confusion over 4 hours, deterioration in GCS, progressive focal signs, seizures without full recovery, definite or suspected penetrating injury, or CSF leak.

Q32. What advice will you give to a patient discharged after a minor head injury?

BDS + MBBS ★☆☆

To be observed by a responsible adult for 24 hours and to return immediately if there is drowsiness, confusion, severe or worsening headache, repeated vomiting, seizures, weakness, visual problems or discharge from the ear or nose. Rest and avoid alcohol.

Q33. What is the role of tranexamic acid in head injury?

BDS + MBBS ★★☆

Given within 3 hours of injury (1 g over 10 minutes, then 1 g over 8 hours), it reduces head injury deaths in patients with mild to moderate injury.

Q34. How will you reverse anticoagulation in a patient with traumatic intracranial bleeding?

BDS + MBBS ★★☆

Warfarin: IV vitamin K and prothrombin complex concentrate. Direct oral anticoagulants: specific reversal agents (idarucizumab for dabigatran, andexanet alfa for factor Xa inhibitors) or prothrombin complex concentrate. Urgent CT and neurosurgical advice.

Complications

Q35. What are the complications of head injury?

BDS + MBBS ★☆☆

- Early: intracranial haematoma, cerebral oedema, raised ICP, seizures, CSF leak, meningitis.
- Late: post-traumatic epilepsy, hydrocephalus, chronic subdural haematoma, post-concussion syndrome, cognitive and behavioural changes, persistent vegetative state.

Q36. What is post-concussion syndrome?

BDS + MBBS ★★☆

Headache, dizziness, poor concentration, memory problems, irritability, fatigue and sleep disturbance that persist for weeks or months after a minor head injury.

Q37. Which endocrine and electrolyte disturbances follow head injury?

MBBS ★★☆

Diabetes insipidus (from pituitary stalk or hypothalamic injury, with polyuria and hypernatraemia), SIADH and cerebral salt wasting (both causing hyponatraemia), and hypopituitarism.

Q38. What is the risk of post-traumatic epilepsy?

BDS + MBBS ★★☆

Higher with early seizures, depressed fractures, penetrating injury, intracranial haematoma and dural tear. Short-term antiepileptic drugs reduce early seizures but do not prevent late epilepsy.

Recent Advances

Q39. What did the decompressive craniectomy trials show?

BDS + MBBS
★★★

In refractory raised ICP, decompressive craniectomy reduced mortality (RESCUEicp) but more survivors had severe disability, so the decision must consider likely outcome and family wishes.

Q40. What blood biomarkers are used in mild head injury?

BDS + MBBS
★★★

Glial fibrillary acidic protein (GFAP) and ubiquitin C-terminal hydrolase-L1 (UCH-L1); negative results help rule out intracranial lesions on CT and avoid unnecessary scans.

Q41. What is middle meningeal artery embolisation?

BDS + MBBS
★★★

Endovascular embolisation of the middle meningeal artery branches supplying the membranes of a chronic subdural haematoma; recent trials show it reduces recurrence when added to surgery.

Q42. What is brain tissue oxygen monitoring?

BDS + MBBS
★★★

A probe in brain tissue measures oxygen tension, aiming to detect and treat cerebral hypoxia in severe head injury in addition to ICP-guided therapy; its benefit is still being studied.

Q43. What is the Canadian CT Head Rule?

BDS + MBBS
★★☆

A validated decision rule for patients with minor head injury (GCS 13–15) that identifies those who need CT based on high-risk factors (GCS under 15 at 2 hours, suspected skull fracture, vomiting twice or more, age 65 or over) and medium-risk factors (amnesia, dangerous mechanism).

Examiner's Favourite (Hard Questions)

Q44. Why does the pupil dilate on the side of the haematoma?

BDS + MBBS
★★★

The oculomotor nerve is compressed against the tentorial edge by the herniating uncus. Its parasympathetic fibres lie superficially and are affected first, so the pupil dilates before eye movement is affected.

Q45. Why does an extradural haematoma cause a lucid interval?

BDS + MBBS
★★★

The initial impact causes brief concussion. Arterial bleeding then gradually strips the dura off the skull, and the haematoma takes time to grow large enough to raise the ICP, so the patient recovers temporarily before deteriorating.

Q46. Why is prolonged hyperventilation avoided in head injury?

BDS + MBBS
★★★

Low carbon dioxide causes cerebral vasoconstriction, which reduces ICP but also reduces cerebral blood flow and can cause ischaemia. It is used only briefly as a bridge to definitive treatment.

Q47. Why is hypotension in a head injury patient not usually due to the head injury?

BDS + MBBS
★★★

Intracranial bleeding cannot hold enough blood to cause shock in adults (except in infants or terminal brainstem failure). Hypotension indicates bleeding elsewhere (chest, abdomen, pelvis, long bones) or spinal shock, and must be looked for.

Quick Recall

- ✓ CPP = MAP − ICP; prevent secondary brain injury.
- ✓ GCS: eyes 4, verbal 5, motor 6; severe head injury = 8 or less: intubate.
- ✓ EDH: middle meningeal artery, lucid interval, biconvex on CT; urgent craniotomy.
- ✓ Chronic SDH: elderly, trivial injury, crescent; burr-hole drainage.
- ✓ Base of skull fracture: raccoon eyes, Battle's sign, CSF leak.
- ✓ Ipsilateral fixed dilated pupil = uncal herniation.
- ✓ Hypotension is not from the head injury; look for bleeding elsewhere.

SURGICAL VIVA VOCE

Long & Short Cases | General Surgery Viva Topics

This book brings together more than 1,350 viva questions with model answers on 28 common surgical long cases, short cases and general surgery topics, arranged the way examiners ask them: history and examination, anatomy, pathology, differential diagnosis, investigations, management, complications, recent advances and the hard questions that earn distinction. Each chapter opens with a sample case presentation and closes with a Quick Recall summary. Every question is tagged for BDS and MBBS and graded by difficulty, and all answers follow Bailey & Love's Short Practice of Surgery, 28th Edition.

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