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PRACTICAL NOTES

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# MBBS Practical Notes

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# Imaging Requests Modality and Radiation Safety

Practical 01 / Clinical or documentation case

## Aim

Choose an appropriate imaging modality and prepare a clear request and patient safety review.

## Principle

Diagnostic yield depends on the question and protocol. Justification and optimisation reduce unnecessary radiation. Contrast and MRI have separate screening considerations.

## Materials and Requirements

- Fictional clinical requests and imaging indication cards
- Contrast questionnaire, MRI checklist and transport form

## Procedure

1. State the clinical question, site, side, symptoms, relevant findings and urgency. Check prior imaging.
2. Review reliable identifiers, symptoms, onset, side and pertinent findings. Translate the clinical concern into a focused answerable imaging question and check prior imaging for duplication.
3. Compare radiography, ultrasound, CT, MRI, fluoroscopy and nuclear imaging for the scenario. Explain why the chosen modality addresses the question.
4. Match the chosen modality to target anatomy and what would change in care. Discuss urgency and potential exposure with the appropriate imaging professional if the request is uncertain.
5. Check relevant pregnancy history, renal function and prior contrast reactions. For MRI identify implants or other safety concerns and use formal screening.

Continue with step 6 on the next page.

# Procedure Continued

Imaging Requests Modality and Radiation Safety

6. Complete the relevant safety checklist, including implant verification for MRI and documented allergy or renal considerations for contrast when applicable. Flag uncertainty for the radiology team.
7. Explain preparation, the planned test and follow-up. Use the local pregnancy imaging practice and applicable prenatal diagnostic safeguards.
8. Explain the preparation, test and likely result pathway in plain language and check the person's understanding. Follow authorised pregnancy and other relevant safety requirements.
9. Plan safe escorted transfer for an unstable or oxygen-dependent simulated patient and confirm the receiving team.
10. Plan escort, oxygen, monitoring, equipment and transfer documentation for the simulated high-risk case. Confirm the receiving area and who is responsible during transfer.

## Precautions

- Apply radiation justification and the local optimisation policy. Use monitoring and shielding where indicated.
- Keep identifying data out of teaching files.

# Observations and Interpretation

Imaging Requests Modality and Radiation Safety

## Observations and Record

| Item | What to record | What it tells you |
|---|---|---|
| Request | Question, site, urgency and prior tests | Supports appropriate acquisition |
| Safety | Relevant pregnancy, contrast and implant checks | Prevents avoidable harm |
| Transport | Monitoring, escort, oxygen and handover | Maintains care during imaging |

### Worked Example

The case requires MRI and reports an implanted device of unknown type. The student holds routine transfer pending formal radiology safety verification.

## Result and Interpretation

Clarify the exact device and conditions and discuss urgency and alternatives with radiology. Document who will clear the scan.

## Viva Questions and Answers

### What does ALARA mean?

As low as reasonably achievable, balancing the indicated diagnostic purpose with exposure.

### Why mention the clinical question on a request?

It helps select the correct study, protocol and urgency.

# Chest Radiograph and ICU Device Position

Practical 02 / Report and data interpretation

## Aim

Read a chest radiograph systematically and recognise a device position or emergency finding requiring urgent communication.

## Principle

Projection, rotation and inspiration affect interpretation. A consistent review of lungs, pleura, mediastinum, bones and devices reduces omissions.

## Materials and Requirements

- Anonymised chest radiographs or schematic teaching views
- Device-position quiz and clinical details

## Procedure

1. Verify study, projection, side and date. Check rotation, inspiration and exposure. Compare previous images if available.
2. Confirm patient, view, side, date and comparison study. Check rotation using the clavicles and assess inspiration and exposure before commenting on heart size or lung markings.
3. Review trachea, mediastinum, cardiac silhouette, lungs, hila and pleural spaces. Inspect diaphragms, bones and soft tissues.
4. Use a fixed sequence through airway, mediastinum, hila, heart, lung fields, pleura, diaphragms, bones and soft tissues. Compare sides and mark the exact site of any abnormality.

Continue with step 5 on the next page.

# Procedure Continued

Chest Radiograph and ICU Device Position

5. Trace each visible line or tube and identify tip and relevant landmarks. Use the local confirmation policy for airway and enteric devices.
6. Follow the complete course of each visible device, verify its labelled endpoint and compare with the appropriate landmarks. Flag an uncertain or hazardous position for confirmation before use.
7. Describe patterns such as focal opacity, pulmonary oedema, effusion or a pneumothorax line when present. Consider image limitations.
8. Describe opacity or lucency by location, distribution and associated change. Compare a suspicious finding with earlier views and note what projection or technique may obscure.
9. Give a brief impression and record direct communication of urgent findings.
10. Report the main finding, clinical urgency and any device concern to the appropriate team. Document the time, recipient and whether further imaging or confirmation is needed.

## Precautions

- Keep all images de-identified. Never use a device based on student reading alone.
- Clinical deterioration requires immediate assessment.

# Observations and Interpretation

Chest Radiograph and ICU Device Position

## Observations and Record

| Item | What to record | What it tells you |
|---|---|---|
| Technique | AP or PA, rotation and inspiration | Explains apparent changes |
| Chest findings | Side, site and pattern | Supports focused interpretation |
| Devices | Course, tip and uncertainty | Identifies need for urgent confirmation |

### Worked Example

A portable AP chest film shows a pleural line with absent peripheral markings on the right. The patient scenario includes acute breathlessness.

## Result and Interpretation

The image supports right pneumothorax. Notify the team promptly and correlate with current stability. The clinical team assesses tension physiology.

## Viva Questions and Answers

### Why check for projection before commenting on heart size?

AP portable projection can magnify the apparent cardiac silhouette.

### Why trace the full course of visible devices?

An apparently well-placed tip may have an unexpected course or positioning issue.

# Abdominal Imaging and Focused Ultrasound Cases

Practical 03 / Report and data interpretation

## Aim

Identify common abdominal imaging patterns and choose a focused follow-up question.

## Principle

Plain radiographs can show selected gas patterns. Ultrasound can assess fluid, biliary and pregnancy-related structures. CT provides more detailed cross-sectional assessment when appropriate.

## Materials and Requirements

- Fictional or anonymised radiograph and ultrasound cases
- Modality selection and reporting worksheet

## Procedure

1. Confirm patient details, date, view and symptom context. Identify a pregnancy or other safety issue relevant to the choice of test.
2. State the main question and verify identifier, date, projection or protocol and whether positioning limits interpretation. Review symptoms, prior surgery and relevant pregnancy information.
3. Review gas distribution, bowel calibre, free air clues and relevant calcifications on the provided radiograph. Record technical limitations.
4. Trace gas in central and peripheral loops and note calibre, distribution or air-fluid levels where the view permits. Look for signs of free air and record the main technical limitation.

Continue with step 5 on the next page.

# Procedure Continued

Abdominal Imaging and Focused Ultrasound Cases

5. In each ultrasound case describe the organ, reported lesion or fluid and any limited visibility. Distinguish a descriptive finding from the diagnosis.
6. In the ultrasound report identify the organ and anatomical site, then record fluid, lesion or duct features with dimensions if supplied. Identify an incompletely examined region.
7. Relate findings to a scenario such as right upper quadrant pain, bowel obstruction or suspected ectopic pregnancy. Identify further imaging or urgent review when indicated.
8. Link the findings to the timing, symptoms and physical signs. Note which alternatives remain possible and what additional imaging or team assessment would answer the question.
9. Give a focused impression and most important action to the supervising team.
10. Present a one- or two-sentence impression, side or location and urgency. Identify incomplete results and verify who will act on a concerning finding.

## Precautions

- Treat instability and high-risk pregnancy symptoms as urgent even when imaging is uncertain.
- Use the supervising radiologist’s interpretation for care decisions.

# Observations and Interpretation

Abdominal Imaging and Focused Ultrasound Cases

## Observations and Record

| Item | What to record | What it tells you |
|---|---|---|
| Plain film | Gas distribution and relevant abnormal signs | Guides assessment of urgency and limitations |
| Ultrasound | Site, finding and technical limitation | Supports focused differential |
| Context | Symptoms, pregnancy status and next action | Links imaging to care |

### Worked Example

A case of vomiting and distension has dilated central small-bowel loops on the teaching film. The radiograph does not establish the cause.

## Result and Interpretation

The pattern raises concern for small-bowel obstruction. Request prompt clinical and surgical review and discuss further imaging with the team.

## Viva Questions and Answers

### Why include the body position with an abdominal radiograph report?

Position influences the distribution of gas and fluid levels.

### What does a technically limited ultrasound mean?

The target may not have been adequately evaluated, so review and further assessment depend on the clinical concern.

# Head CT Skeletal and Cross Specialty Imaging

Practical 04 / Report and data interpretation

## Aim

Recognise time-critical findings on provided head CT and skeletal studies and interpret selected specialty reports.

## Principle

Systematic review of image orientation, side, anatomy and technical limits helps identify urgent findings and choose the next question.

## Materials and Requirements

- Teaching CT head and skeletal examples, breast and ENT reports
- Age estimation reference supplied by faculty and interpretation form

## Procedure

1. Review CT identity, timing, indication and acquisition. Inspect brain symmetry, ventricles, midline, cisterns and extra-axial spaces.
2. Verify scan time, indication, contrast status when relevant and orientation. Use a consistent sequence through symmetry, midline, ventricles, cisterns and extra-axial spaces.
3. Record haemorrhage, mass effect or fracture signs when visible. State when the local stroke or head-injury pathway requires immediate discussion.
4. Describe suspected blood, mass effect or fracture by side and anatomical compartment. Compare with the clinical deterioration and communicate an urgent finding directly under the teaching pathway.

Continue with step 5 on the next page.

# Procedure Continued

Head CT Skeletal and Cross Specialty Imaging

5. For skeletal images use two views when available. Review alignment, cortex, joints and relevant growth plates. For age estimation use the provided references and record a range or uncertainty.
6. On skeletal views trace alignment and cortex in both planes where available. Identify adjacent joints and assess growth or age estimates only with the provided reference and limits.
7. In specialty reports identify the target finding, assessment category if reported and recommended next action.
8. Read the supplied specialty report for its clinical question, most important feature, comparison and recommended review. Check what cannot be determined from the image or report alone.
9. Document a concise impression and communicate urgent findings with the patient's clinical context.
10. Communicate a focused impression, urgency and limitation with relevant patient context. Confirm the receiver and document the next review or study.

## Precautions

- Do not delay emergency team review while refining imaging terminology.
- Use institutional reference standards and clearly communicate limits of age estimation.

# Observations and Interpretation

Head CT Skeletal and Cross Specialty Imaging

## Observations and Record

| Item | What to record | What it tells you |
|---|---|---|
| Head CT | Density, compartment, laterality and mass effect | Identifies urgent abnormalities |
| Skeletal study | Bone, side, alignment and reference if used | Structures interpretation |
| Specialty report | Clinical question, result and follow-up | Supports timely action |

### Worked Example

After a head injury, a teaching scan shows a hyperdense extra-axial collection and midline shift. The case notes falling consciousness.

## Result and Interpretation

Escalate urgently to the responsible emergency and specialist teams. Include current neurological status, time course and image findings.

## Viva Questions and Answers

### Why assess the midline on head CT?

Displacement can indicate significant mass effect.

### Does an early CT without clear infarction exclude acute stroke?

Early ischaemia can be subtle. Use the clinical pathway and further imaging as indicated.

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