Radiographic Techniques 2

lecture 12

Abdomen and pelvic cavity

By

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Most common referral criteria

Q/ Radiographic examination of the abdomen and pelvic cavity is performed for a variety of reasons. These include:

1. Obstruction of the bowel.
2. Perforation.
3. Renal pathology.
4. Foreign body localization
5. Toxic mega colon.
6. Aortic aneurysm.
7. Prior to the introduction of a contrast medium, e.g. intravenous urography (IVU) to demonstrate the presence of radiopaque renal or gall stones and to assess the adequacy of bowel preparation, if used (**plain film**).
8. To detect calcification or abnormal gas collections, e.g. abscess.

Antero-posterior – supine abdomen = (Urinary tract KUB)

Position of patient and image receptor

1. The patient lies supine on the imaging table with the median sagittal plane at right-angles and coincident with the midline of the table.
2. **No rotation** the pelvis is adjusted so that the anterior superior iliac spines are equidistant from the tabletop.
3. **35 × 43 cm CR cassette**
4. The patient's hands may be placed high on the chest or the arms away from the spine.
5. Using a short exposure time, the exposure is made on arrested expiration. Ideally respiration should be arrested on full

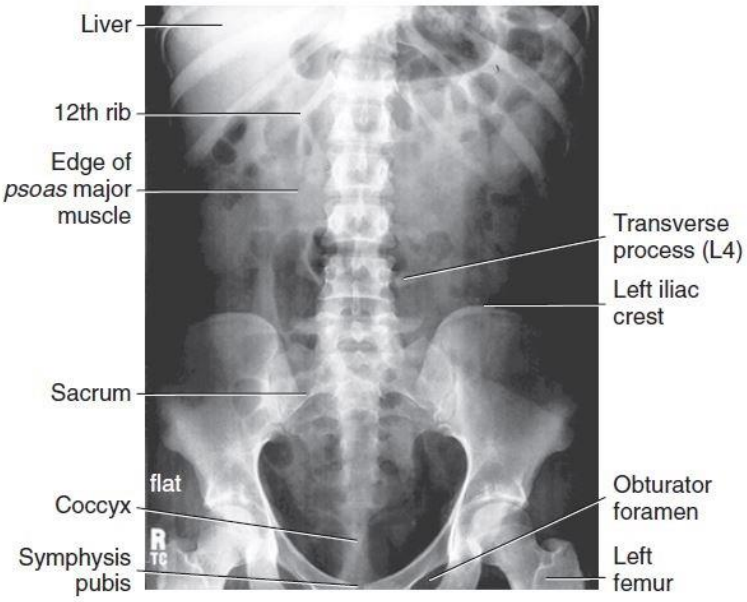
expiration to allow the abdominal contents to lie in their natural position.

6. The centre of the image receptor at the level of iliac crests (region the symphysis pubis is included on the image).

Direction and location of the X-ray beam

a. **Direction: Collimated vertical beam** (lateral margins of the abdomen include in the film).

b. **Location: center at the level of iliac crests** (region the symphysis pubis is included on the image).



Essential image characteristics

• The bowel pattern should be demonstrated clearly.

Common faults and solutions

1. Failure to include the region of the symphysis pubis and the diaphragm on the same image. This may be due to patient size, in which case two images are acquired, i.e. if using CR the cassettes are placed transversely (landscape) across the abdomen to include upper and lower abdominal regions.
2. Failure to visualise the lateral extent of the abdominal cavity including the lateral peritoneal fat stripe may be due to patient size or poor positioning.
3. Respiratory movement unsharpness may be reduced by practice of the arrested breathing technique prior to exposure.
4. Rotation may be evident when the patient is in pain.
5. Presence of artefacts such as buttons or contents of pockets.

Left lateral decubitus (AP)

*This projection is used if the patient cannot be positioned erect to **confirm** the **presence** of **subdiaphragmatic gas**.

*It may also be used for confirming a **bowel obstruction**.

*It should only be undertaken as a specific request when other modalities such as ultrasound/CT cannot be used.

*With the patient lying on the left side, free gas will rise to be located between the lateral margin of the liver and the right lateral abdominal wall.

*To allow time for the gas to collect the patient should remain lying on the left side for a short while (**e.g. 10 minutes**) before the exposure is made.

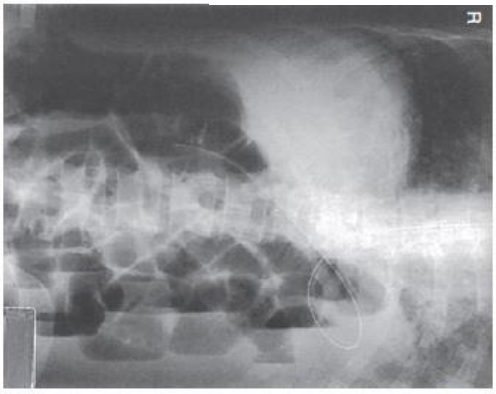
Position of patient and image receptor

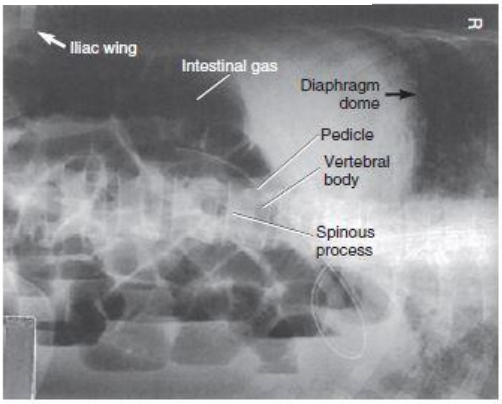
1. The patient lies on their left side, on a trolley, with the elbows and arms flexed so that the hands can rest near the patient's head.
2. The patient's position is adjusted to bring the median sagittal plane at right-angles to the image receptor.
3. The patient is positioned with the posterior aspect of the trunk against a vertical Bucky DDR system with the upper border of the image receptor high enough to project above the right lateral abdominal and thoracic walls.
4. Alternatively, a 35 × 43 cm CR grid cassette is supported vertically against the patients back.

Direction and location of X-ray beam

a. **Direction: Collimated horizontal x-ray beam**

b. **Location: center (5 cm) above level of iliac crest**





Urinary tract – kidneys–ureters–bladder

Q/Plain radiography of the abdominal and pelvic cavity is undertaken to visualise:

1. The outline of the kidneys surrounded by their perirenal fat.
2. The lateral border of the psoas muscles.
3. Opaque stones **in** the kidney area, in the line of the ureters and in the region of the bladder.
4. Calcifications within the kidney or within the bladder.
5. The presence of gas within the urinary tract.
6. Any other acute abdominal pathology.

Preparation of the patient

1. The patient should micturate to empty the bladder prior to the examination.
2. If possible, the patient should have a low residue diet during the 48 hours prior to the examination to clear the bowel of gas and faecal matter that might overlie the renal tract. In the case of emergency radiography no bowel preparation is possible.
3. The patient is undressed and wears a gown.

Antero-posterior – supine of KUB as Antero-posterior – supine of the abdomen.

Urinary bladder

Antero-posterior 15° caudal

Position of patient and image receptor

• The patient lies supine on the Bucky table with the median sagittal plane at right-angles to, and in the midline of the table.

• **A 24 × 30** cm CR **cassette** is commonly used; this is placed transversely in the tray with **its *lower border*** 5 cm below the symphysis pubis. If using DDR then adequate collimation to demonstrate this area is required

Direction and location of the X-ray beam

a. **Direction: collimated central ray is directed 15° caudally**
b. **Location: center at the midline 5 cm above the upper border of the symphysis pubis.**

Anteroposterior 15° caudal angulated image of the urinary bladder region demonstrating a bladder calculus (large arrowhead) and small pelvic phleboliths, with lucent centres (arrows).

Right or left posterior oblique

Position of patient and image receptor

1. From the supine position one side is raised so that the median sagittal plane is rotated through **35°.**

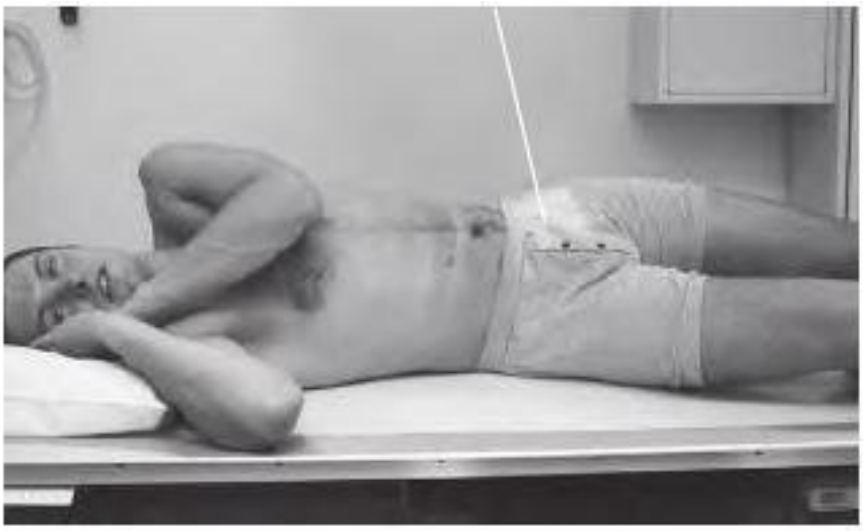
2. To help stability, the knee in contact with the table is flexed and the raised side supported using a non-opaque pad.
3. The patient's position is adjusted so that the midpoint between the symphysis pubis and the anterior superior iliac spine on the raised side is over the midline of the table/receptor.
4. **A 24 × 30 cm CR cassette** is placed longitudinally in the tray with its upper border at the level of the anterior superior iliac spines. If using DDR then adequate collimation to demonstrate this area is required.

Direction and location of the X-ray beam

a. **Direction: collimated vertical central beam**

b. **Location: center at the midline 2.5 cm above the symphysis pubis.**

*Alternatively a **caudal** angulation of **15**° can be used with a higher centring point and the receptor displaced downwards to accommodate the angulation and allow for **better demonstration** of the **apex of the bladder**.



Right posterior oblique image of the bladder area showing large urinary calculi.