

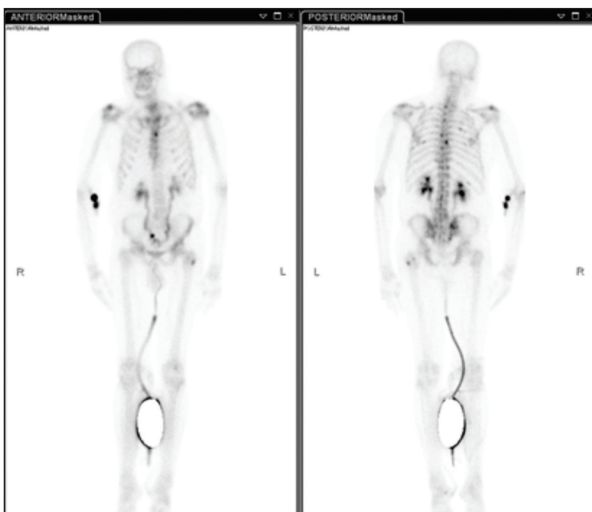
Imaging and radiology

Case 1



1. What radiological test is this and what does it show?
2. What is the typical radio-nucleotide used for this study, what is its half-life and how is it excreted?
3. Approximately how long does this study take to perform?
4. What is the normal background radiation in the UK?
5. What is the radiation exposure for this procedure?

Case 3



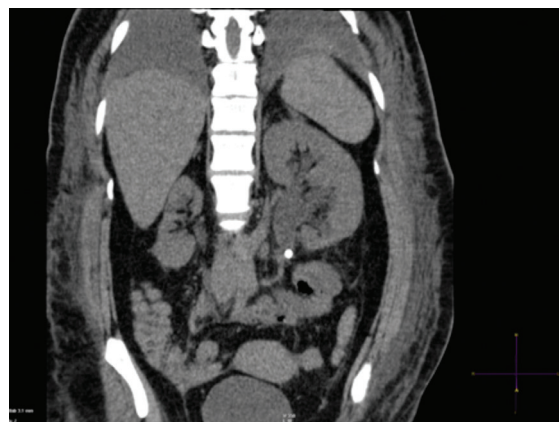
1. What is this study?
2. What radio-isotope is used and how is it detected?
3. What is the radiation dose for this study?
4. How long does it take to perform this scan?

Case 2



1. What x-ray film is this and why is it different from an abdominal x-ray?
2. What does the x-ray show?
3. What percentage of urinary tract stones are radio-opaque and what are their likely compositions?
4. What x-ray images are normally required for an IVU?
5. What contrast media is required for an intravenous urogram (IVU) and what is the radiation dose of an IVU?

Case 4



1. What imaging modality is this, what is the diagnosis?
2. What is the radiation exposure for this study?
3. What advantages does this study have over an IVU?
4. What is the sensitivity and specificity for CT in diagnosing renal tract stones?

Radiology and imaging – answers

Case 1

1. MAG-3 renogram, obstructed left kidney likely secondary to (pelvi-ureteric junction obstruction) PUJO.
2. MAG-3: mercaptoacetyltriglycine attached to technetium 99m, half-life six hours. 90% tubular excretion, 10% filtered at the glomerulus.
3. 20-30 minutes.
4. 2.5-3mSv (Higher in Aberdeen / Cornwall, approximately 8mSv).
5. Approximately 0.5-0.7mSv.

Case 2

1. KUB x-ray (kidney / ureter / bladder). Film is taken at oblique angle so the patient's pelvis is easily demonstrated / imaged, whereas an AXR is taken horizontally.
2. Left ureteric stent in-situ with calcified lower end, left mid ureteric stone and a large left upper pole stone.
3. 75-85% are radio-opaque, calcium

containing stones eg Calcium oxalate or calcium phosphate.

4. Plain KUB, immediate nephrogram, five minute film, 10 minutes, 20 minutes and a post-micturition study +/- delayed films if required.
5. Non-ionic, low-osmolality contrast agent (e.g. Omnipaque 1ml/Kg), 2.5mSv.

Case 3

1. Radionuclide bone scan.
2. Technetium 99m, Gamma camera.
3. 6.5mSv.
4. 2-4 hours

Case 4

1. Plain CT KUB, coronal reconstruction demonstrating left PUJ stone with associated hydronephrosis.
2. 4.5mSv
3. Quick scan (20-30 seconds), easy to interpret, no IV contrast needed, can establish differential diagnosis.
4. Sensitivity >95%, specificity >96%.

AUTHOR



Nick Rukin,
Consultant Urological Surgeon,
Royal Wolverhampton
Hospital NHS Trust, UK.
E: nickrukina@nhs.net
Twitter: @nickrukina