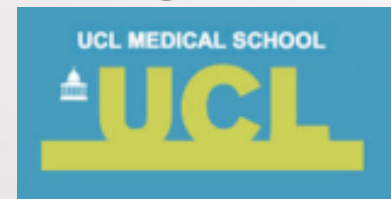


10 minutes on Investigating the Kidney

Dr Will Topping
Consultant Cardiothoracic Radiologist
East and North Herts NHS Trust
Honorary Clinical Lecturer (UCL)
Senior Clinical Tutor (University of Cambridge)



- Many causes

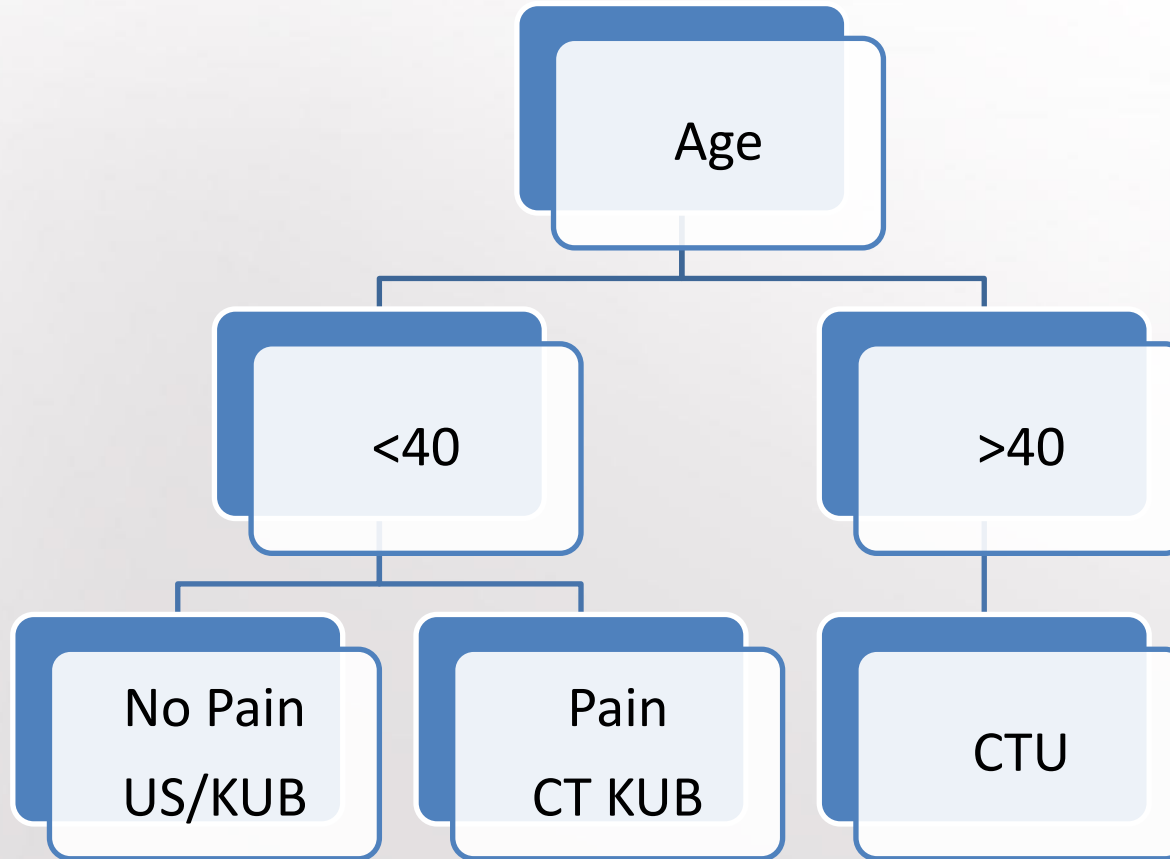
Haematuria

Category	Cause
Benign	<ul style="list-style-type: none"> • Renal masses (eg. angiomyolipoma, oncocytoma) • Benign prostatic hypertrophy • Strictures
Stones	<ul style="list-style-type: none"> • Staghorn calculi • Calcium stones • Uric acid stones
Infective	<ul style="list-style-type: none"> • Pyelonephritis • Cystitis • Urethritis
Trauma	<ul style="list-style-type: none"> • Pelvic trauma • Renal injuries • Foreign bodies
Renal	<ul style="list-style-type: none"> • IgA nephropathy • Thin basement membrane diseases • Hereditary nephritis • Medullary sponge kidney
Iatrogenic	<ul style="list-style-type: none"> • Recent endoscopic procedure (eg. transurethral resection of prostate [TURP]) • Transrectal ultrasound (TRUS) guided prostate biopsy • Traumatic catheterisation • Radiation • Indwelling ureteric stents • Renal biopsies • Extracorporeal shockwave lithotripsy
Malignant	<ul style="list-style-type: none"> • Renal cell carcinoma • Transitional cell carcinoma • Squamous cell carcinoma • Urothelial cell carcinoma • Prostate acinar adenocarcinoma

Risk factors in Haematuria

- Over 40
- Smoking History
- Gross haematuria
- Chronic Infection
- Pelvic Irradiation
- Chemicals and Dyes

Basic Algorithm



To be amongst the best...

Investigating asymptomatic gross haematuria

- CTU – 3 phase study looking for stones, renal masses and urothelial tumours. Highly sensitive and highly specific for urothelial tumours – (95% and 97%)
- However its a 3 phase radiation exam of the abdomen – non contrast for stones, 100s for renal tumours and a 15 minute delayed scan for uerters and bladder.

- Painless and under 40
- US and KUB

- Painless and over 40
- CTU

To be amongst the best...

Investigating asymptomatic dipstick haematuria

- Visible haematuria is associated with cancer in 8-25% of cases, but invisible haematuria in only 2.6%. Fewer than 0.5% of people investigated for asymptomatic invisible haematuria aged under 50 years have cancer.
- Current UK guidelines advocate urological referral to exclude cancer in smokers and people over 40 years of age, but patients should be made aware that fewer than 3% of investigated cases have cancer

To be amongst the best...

Investigating symptomatic invisible and gross haematuria

- Any haematuria with UTI treat UTI first before doing further investigation.
- Haematuria and classical loin to groin pain - go straight for a CT KUB.

Question 1

- Urine dipstick testing shows 1+ haematuria in a 42 year old man registering as a new patient with a general practice. No proteinuria is detected. He has never seen blood in his urine, has no LUTS, no symptoms to suggest kidney stones, and no systemic symptoms.
- He is an ex-smoker with no relevant medical, occupational, or family history. His blood pressure is 136/88 mm Hg. Physical examination is unremarkable. Serum creatinine is 95 $\mu\text{mol/L}$, giving an estimated glomerular filtration rate of 80 mL/min/1.73m².

- A – Ultrasound KUB
- B – Ultrasound KUB and KUB X-ray
- C – CTU
- D – MRU
- E – CT KUB

- A – Ultrasound KUB
 - B – Ultrasound KUB and KUB X-ray
 - **C – CTU**
 - D – MRU
 - E – CT KUB
-
- Ex-smoker over 40 with dipstick haematuria.

Question 2

- 29 year old female. Multiple infections. No symptoms currently. Urine MCS negative. Dipstick positive haematuria and White cells. Frequent flyer!
- A – Ultrasound KUB
- B – Ultrasound KUB and KUB X-ray
- C – CTU
- D – MRU
- E – CT KUB

Question 2

- 29 year old female. Multiple infections. No symptoms currently. Urine MCS negative. Dipstick positive haematuria and White cells. Frequent flyer!
- A – Ultrasound KUB
- **B – Ultrasound KUB and KUB X-ray**
- C – CTU
- D – MRU
- E – CT KUB

Question 2

- Low risk patient
- Low radiation exposure
- Both studies combined offer a good sensitivity and specificity.

Question 3

- 25 year old 1st trimester pregnant female with painful left loin to groin pain. Dipstick positive haematuria. MCS negative.
- A – Ultrasound KUB
- B – Ultrasound KUB and KUB X-ray
- C – CTU
- D – MRU
- E – CT KUB

Question 3

- 25 year old 1st trimester pregnant female with painful left loin to groin pain. Dipstick positive haematuria. MCS negative.
- **A – Ultrasound KUB**
- B – Ultrasound KUB and KUB X-ray
- C – CTU
- D – MRU
- E – CT KUB

Question 3

- MRI contraindicated in 1st and 2nd trimester due to theoretical risk of inducing deafness in the foetus.
- X-Rays of any modality of the abdomen contraindicated in pregnancy.
- US KUB best available test.

Basic Algorithm

