AUCKLAND RADIOLOGY GROUP

SCAN
OFFICIAL NEWSLETTER

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HAEMATURIA

Common causes of haematuria include both malignant and non-malignant conditions. The most common malignant tumors of the urinary tract are renal cell carcinoma and transitional cell carcinoma. There are numerous non-malignant causes, including urinary tract infection, prostatic hypertrophy, trauma, drug toxicity, coagulopathy and exercise-induced haematuria.

Macroscopic haematuria... *20% of adults have a urinary tract malignancy*

Microscopic haematuria... *2-3% of adults have a urinary tract malignancy*

Assessment for urologic malignancy is the most important reason for evaluating these patients

The **intravenous urogram** (**IVU**) has long been the backbone of radiological investigation of urinary tract pathology, including haematuria, and is based on multiple radiographic exposures of the urinary tract before and after the administration of intravenous contrast, which is subsequently excreted by the kidneys. As well providing physiological information, it allows excellent visualisation of the urinary collecting system.

The limited detail of the renal parenchyma and ability to detect parenchymal masses is a major limitation of the IVU. An IVU is thus often supplemented by **ultrasound** to evaluate the renal parenchyma. Other limitations of the IVU are its reduced efficacy in the setting of renal impairment, as well as segments of the ureters which are not opacificed at the time of film exposure. Bladder detail is also limited on the IVU, particularly with regard to detection of small or sessile lesions. Cystoscopy remains the investigation of choice for bladder malignancy.

The advent of modern CT scanners has revolutionised the radiological evaluation of the urinary tract. A **noncontrast CT scan**, or "**renal colic scan**" is excellent for detection of urinary tract calculi, having replaced the abdominal radiograph and ultrasound in the evaluation of renal colic.

Fig 1. Normal CT urogram. The split bolus technique displays the renal parenchyma as well as the pelvicalyceal systems, ureters and bladder.

A **contrast-enhanced CT scan** or "**CT Urogram**" is now the radiological investigation of choice for painless haematuria, characterisation of urinary tract masses and detection/exclusion of upper urinary tract urothelial lesions (95% sensitivity [1]). The rapid scanning ability of multidetector CT scanners means that timed administration of the contrast bolus allows excellent opacification of the kidneys, renal collecting systems and ureters. The latest evolution of this technique

reduces the number of scan phases, hence reducing radiation dose, and is known as "**dual- or split- bolus CT".** This is performed by administering an initial bolus of contrast ten minutes before the scan to opacify the ureters, followed by a second contrast bolus at the time of the scan to opacify the kidneys and other abdominal viscera.

Other imaging options still include the **plain abdominal radiograph (KUB)** in the setting of "stone follow-up", and **ultrasound** is sometimes used for detection of stones and complications of stones (hydro-nephrosis), detection of renal and bladder masses and can be helpful in characterizing cystic renal masses that are indeterminate at **CT. Ultrasound is not usually the primary examination in patients with hematuria**.

Urinary tract CT scans (both non-contrast and dual/split bolus contrast) can be performed at ARG branches at 101 Remuera Rd and the Northern Clinic. Costs are approximately IVU $387 (+ ultrasound $195), non-contrast CT $485 and CT with contrast $826. Thus the cost of CT compares favourably with the combined cost of IVU and ultrasound, as well as offering several advantages.

Our radiologists are always happy to offer advice on the most appropriate imaging modality for investigation of the urinary tract, and can be contacted at any of our branches.

Stephen Wood

1. Caoili EM, et al. MD**CT**U of upper tra**ct** uroepithelial malignancy (abstr). AJR 2003; 180(suppl):71)

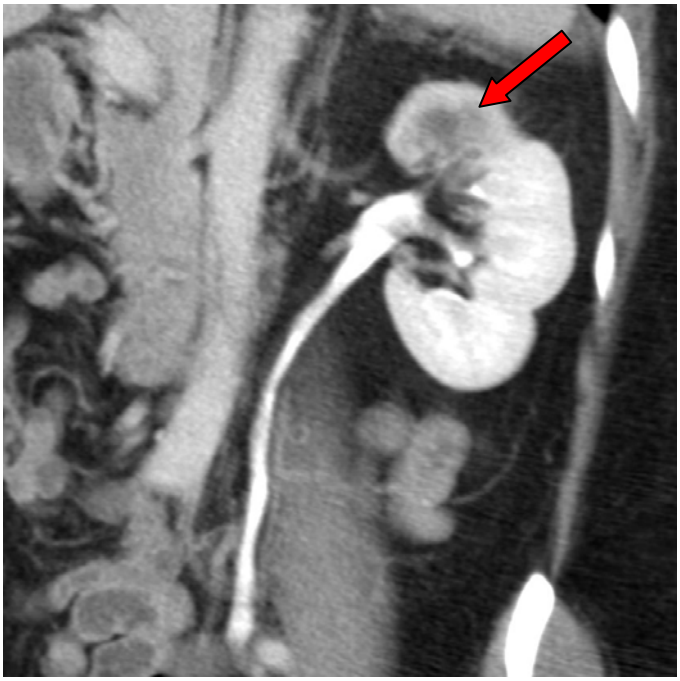

Fig 2. CT urogram showing a mass in the parenchyma of the upper pole of the left kidney (arrow).

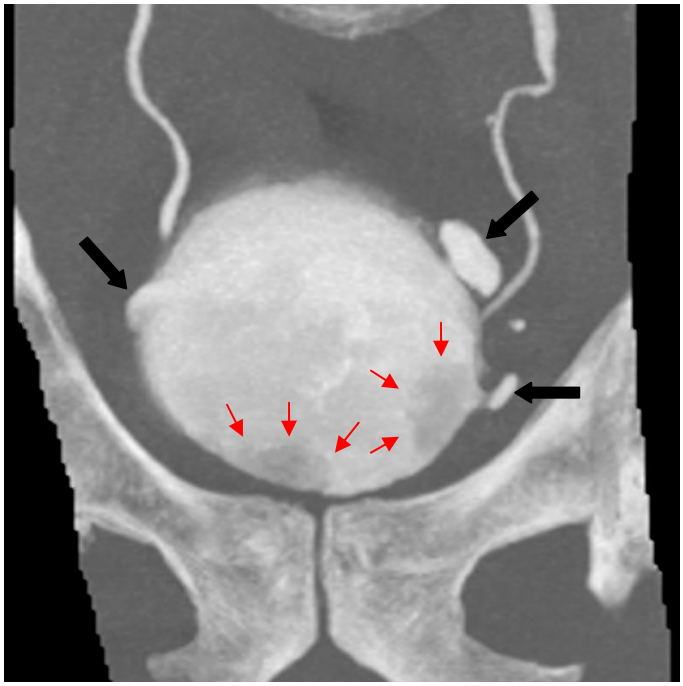

Fig 3. CT urogram showing two bladder tumours (red arrows). Bladder diverticula are noted (black arrows).

Andrew Smith now an ARG Partner

Neuroradiologist Andrew Smith has become a partner in the Auckland Radiology Group.

Andrew graduated from the University of Auckland (1997) and trained in radiology in the Auckland training scheme. He was an ARG/Auckland City Hospital fellow in neuroradiology in 2006 and was appointed as a consultant neuroradiologist before his departure for Vancouver, where he spent a year as a fellow in neuroradiology at the Vancouver General Hospital.