has led the radiologists to consider IVU a less optimal choice for the initial imaging in acute abdominal or flank pain.
The radiation dose can be substantially reduced by decreasing milliamperes without decrease in diagnostic accuracy. Increase in pitch also lowers dose in CT examination[22].

DUAL SOURCE CT IN THE CHEMICAL COMPOSITION OF URINARY TRACT CALCULI

With dual source CT the two X-ray tubes can be set at different energies Kvp i.e. at 80 Kvp and 140 Kvp and dual energy scans can be acquired concurrently. Uric acid and non uric acid stones behave differently with respect to their attenuation values when scanned with CT at different energies. A special software is available with dual source CT scanners that takes advantage of these differences and uses a decomposition algorithm to differentiate between the various calculi. Accurate determination of the chemical composition of calculi can lead to a quicker and more accurate treatement e.g. uric acid stones can be treated with oral dissolution medication and hydration while non-uric acid stones require surgical treatment.

MR UROGRAPHY

MR urography constitutes the evaluation of the collecting system and urinary tract. It is based on the principle that simple fluids, such as urine have very long T2-relaxation time and heavily T2-weighted pulse sequence generate images with high signal intensity from static fluid in the collecting system whereas lower signal intensity from parenchymal tissue is suppressed. It is performed using heavily T2-weighted images such as rapid acquisition with relaxation enhancement (RARE) and half fourier acquisition single-shot turbo spin-echo (HASTE) sequences. These sequences are extremely fast and are performed in one breathhold. The fat in the background is suppressed. This is useful in patients where use of ionizing radiation or iodinated contrast material is to be avoided. A T1 weighted gadolinium enhanced 3D FLASH sequence is used after a contrast injection of 0.1mmol/kg and multiple thin sections are obtained. These are processed with maximum-intensity-projection to produce images similar to conventional contrast urography and provide quantitative functional as well as high resolution anatomical information. Low doses of a diuretic agent can be administered before the examination for better filling of the pelvicalcyceal system. Magnetic Resonance Urography (MRU) is an ideal technique in pregnancy, where there is contrast allergy, renal failure patients and if radiation dose is an issue(Fig 26 A & B). The level of obstruction is always identified, however, it is poor in the detection of urinary calculi specially those less than 4mm in size. Urothelial lesions, blood clots and debris can mimic calculi[23].
Decision on the appropriate radiological investigation is usually based on several factors which include the pretest probability of the disease, the prevalence of the disease the accuracy of the test, the potential risks of the test and the discomfort it causes to the patients & the cost the ideal test should improve the patients treatment by providing answers to the clinical questions.

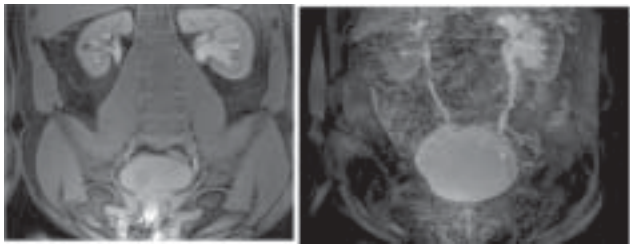

Fig. 26 A & B: T1 post gadolinium fat suppressed coronal (A) and MIP (B) MR urogram image showing a renal calculus on right side as a hypointense filling defect and left hydroureteronephrosis due to a stricture in the left ureter.

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