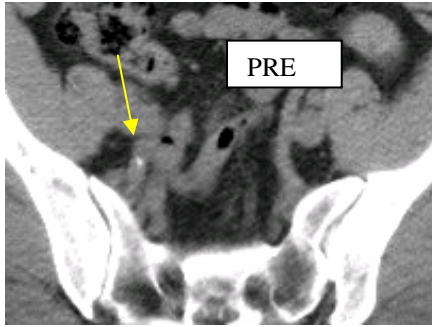
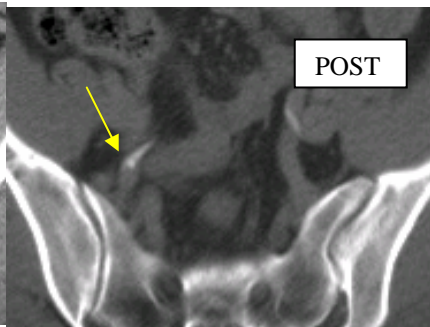


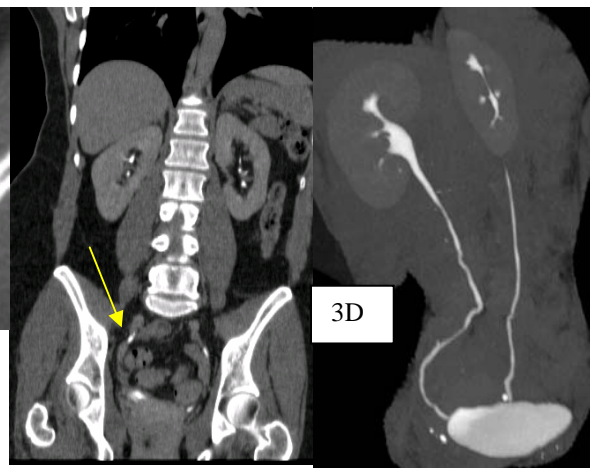
**CT UROGRAM: VALUE OF IV CONTRAST FOR  
DIAGNOSIS OF URETERAL STONES**



**Fig. 1**



**Fig. 2**



**Fig. 3**

**Fig. 4**

**Clinical Presentation:** This is a 55-year-old female who was referred by **Dr. Ted Brown** to AIC with right flank pain. A CT urogram (with/without contrast) was performed on our 16-slice CT to rule out a kidney or ureteral stone.

**Imaging Findings:** **Fig. 1** is an axial **precontrast** image through the pelvis showing a tiny calcification on the right side. It is almost impossible to determine whether or not it lies within the ureter since the ureter is difficult to distinguish from adjacent vessels and bowel (even when the serial images were viewed using a cine mode and a 3D workstation). **Fig. 2** is a delayed **post-contrast** image at about the same level. It shows an opacified ureter with the calcification within it. **Fig. 3** is a coronal reformation, also showing the same calcification. **Fig. 4** is a true **3D CT urogram** image, similar to an IVP.

**Diagnosis:** A small right distal ureteral stone, diagnosed best on delayed post-contrast CT urogram. There is minimal proximal dilatation.

**Discussion:** CT urogram generally refers to a multislice CT of the kidneys, ureters, and bladder (abdomen/pelvis) without and with IV contrast material. 3D IVP-like images can be produced on a 3D workstation. Diagnosis of only **KIDNEY STONES** does NOT require IV contrast. However, diagnosis of **KIDNEY CYSTS/MASSES** or **URETERAL STONES** is often difficult, if not impossible, without the use of IV contrast material, the latter due to the presence of adjacent vessels and bowel, calcifications in calcified phleboliths or in iliac arteries, or other benign extra-ureteral calcifications. The only way to make the diagnosis in some cases is by opacifying the ureters with IV contrast and then determining whether or not a calcification lies within or outside of the ureter. There are also other secondary signs of a ureteral stone, namely edema in the adjacent ureteral wall, proximal dilatation, etc. These secondary signs may not always be present, as in this case where there is no or minimal proximal obstruction.

**CONCLUSION:** CT UROGRAM without the use of IV contrast (referred to by some clinicians as plain CT KUB, but technically not a true "urogram") is adequate for diagnosis of kidney stones, but is limited for diagnosis of ureteral stones and full characterization of renal cysts or other renal masses.

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**REFERENCE:** M Noroozian, MD, R H Cohan, MD<sup>1</sup>, et. al. Multislice CT urography: state of the art. British Journal of Radiology (2004) 77, S74-S86.10.  
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