Inner Spaces
Vol. 4 No.1, January 2006

Points

1. CTU is a synergistic combination of IVU and CT at the same cost as a CT abdomen with much more information
2. It is indicated wherever an IVU or a CT is indicated
3. 64-slice CT scanners make isotropic coronal plane imaging possible, which is why regular CTU is now a reality
4. CTU is the gold standard for the evaluation of calculus disease and useful in a variety of other conditions, e.g. neoplasms, trauma, cystic renal disease, etc.

CT Urography (CTU) is a "one-stop shop" procedure for the evaluation of disorders of the kidneys, ureters and bladder. It combines the advantages of an IVU and a CT scan without compromising on any of their advantages.

CTU's general use has been hampered by the lack of high-quality coronal images, the "natural" plane used in IVUs. With 64-slice CT scanners, and an isotropic (equal in all directions) resolution of 0.4mm, the coronal (frontal), sagittal and oblique reconstruction images have the same resolution as the axial images (Fig. 1).

Fig. 1A

Fig. 1B

Fig. 1C

Fig. 1 (A-C): Renal cyst. The axial post-contrast image (A) shows a well-defined mid-polar right renal cyst (arrow), which is as well seen on the coronal (frontal) image (B), with the same resolution (isotropic). The frontal MIP CTU image (C) shows the collection system well as well as the impression of the cyst (arrow).

A CTU is performed as follows:

- Plain scan
- Intravenous injection of non-ionic contrast medium
- Arterial phase (Fig. 4A)
- Venous phase (Fig. 1B, 5A)
- Delayed phase
- Ultra-delayed phase (more than 2 hours), if the patient has delayed function (Fig. 2A)

(Compression is not necessary)

- With this protocol, in a single study we can achieve the following.
- Angiograms (Figs. 4B, 5B)
- Venograms
- Parenchymal evaluation
- Excretory system evaluation (Figs. 1C, 2C, 3, 4C, 5C, 6B)
- Evaluation of the adjacent organs

Indications

1. Cystic renal disease for characterization (Fig. 1)
2. Calculus disease for evaluation of the number and size of the calculi and function (Figs. 2, 3).
3. Neoplasms for identification and staging (Fig. 4)
4. Trauma - for detection and staging (Fig. 5)
5. Infection, vascular lesions, congenital anomalies (Fig. 6), etc

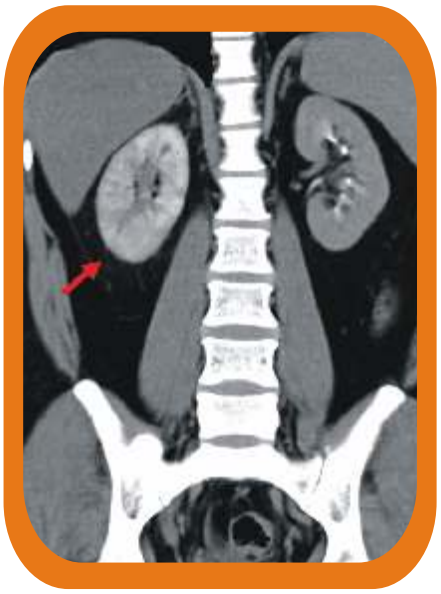

Fig. 2A

Fig. 2B

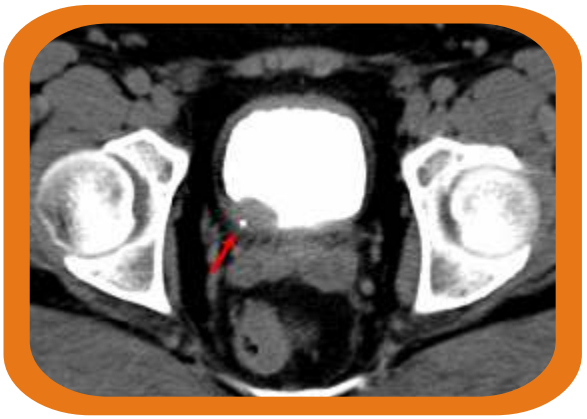

Fig. 2C

Fig. 2 (A-C): UV junction calculus. A delayed image (A) shows progressive delayed nephrogram on the right (arrow), with no opacification of the collecting system. This is due to a right UV junction calculus (arrow) as seen on the oblique MIP CTU image (B) and the axial image (C).

Fig. 3

Fig. 3: Pelvic calculus. A MIP CTU frontal image shows how well the right renal pelvic calculus (arrow) is visualized along with the non-dilated collecting system.

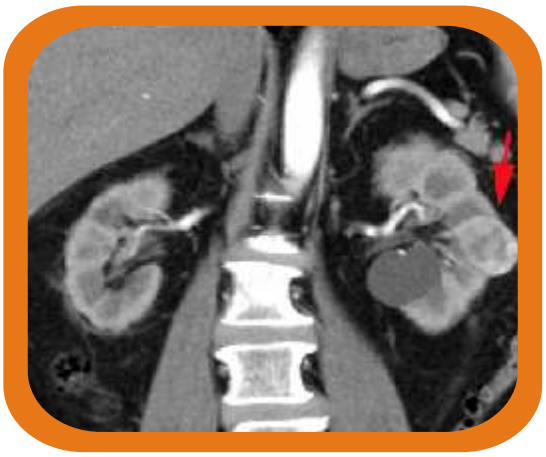

Fig. 4A

Fig. 4B

Fig. 4C

Fig. 4 (A-C): Renal cell carcinoma (RCC). An incidental RCC is seen arising from the mid-pole of the left kidney (arrow), hypervascular on the arterial phase study (A), with well-maintained fat planes. The angiogram (B) shows the left renal artery well with a single supply to the kidney. The MIP CTU image (C) shows the collecting system which is not involved.

Fig. 5A

Fig. 5C

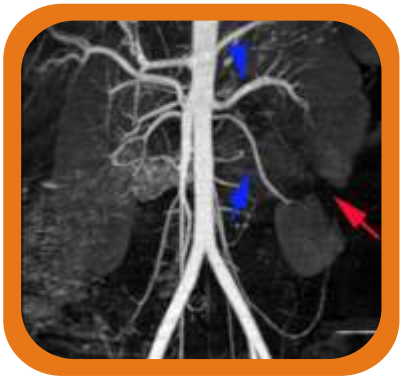

Fig. 5B

Fig. 5 (A-C): Trauma. This 8-years old girl had a left lower polar fracture (arrow) seen on the coronal venous phase image (A).
The upper and lower poles had separate supplies (blue arrows), seen on the angiogram image (B) with no vascular injury. The MIP CTU image (C) shows extravasation of contrast (arrow) from the lower pole calyces.

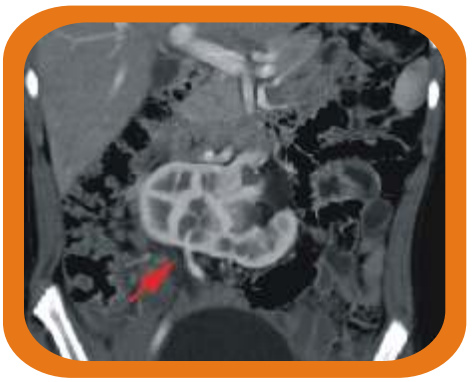

Fig. 6A

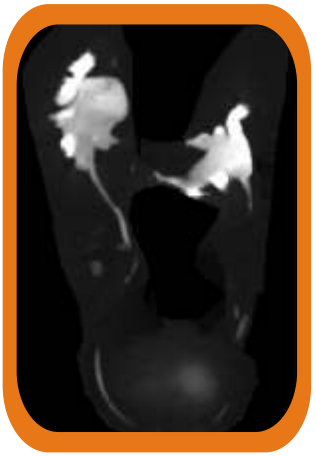

Fig. 6B

Fig. 6 (A, B). Horseshoe kidney. The isthmus of the horseshoe (arrow) is seen well on this venous phase study (A) with a Classic appearance on the MIP CTU image (B).

Advantages

1. Functional and anatomic information in one study
2. Coronal (frontal plane) imaging at the same resolution as the axial plane
3. The same cost as a standard CT abdomen and pelvis and about 30-40% more than an IVU, but with much more information

Contra-indications (as with CT and IVU)

1. Raised serum creatinine levels
2. High-risk for contrast reactions

Over the last few years, enough data has accumulated to suggest that CT is the gold standard in the evaluation of calculus disease. It is already the main modality used for the staging and characterization of cystic renal disease and neoplasms of the kidneys, ureters and bladder as well for trauma. CTU also helps in the study of PU junction obstructions and other bizarre masses and pathologies identified on ultrasound or x-rays.

Designed and published by

Forthcoming Newsletters

- Breast MRI
- Plaque Imaging

Main Clinic

Bhaveshwar Vihar,
383, Sardar V. P. Road,
Mumbai - 400 004
Tel : 022-2388-4015
Email : info@jankharia.com

Cardiac & Ultra fast CT scan

Nishant Business Center,
Arya Bhavan, 461, S. V. P. Road,
Mumbai - 400 004
Tel : 022-2389-3551
Fax : 022-2382-9595

Subscribe

Provide your name and address at
subscribe@jankharia.com
Tel : 022-2388-4015
(Benny or Shamina)