

Contrast enhanced ultrasound as an alternative to CT urography in ureteric mass with raised creatinine

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Abstract

A case report of a patient with upper urinary tract lesion on grey scale USG with no significant vascularity on doppler study who underwent a contrast enhanced USG to delineate the mass lesion and reach a probable diagnosis, which was later confirmed on histopathology. Patient was un-fit for CECT and CE MRI due to high creatinine.

Extensive English literature search did not reveal any report of the use of contrast enhanced ultrasound in ureteric lesions.

Keywords

contrast enhanced USG; upper urinary tract neoplasm

Introduction

Upper Tract Urothelial carcinoma (UTUC) refers to malignant changes of the uroepithelial cells lining the urinary tract anywhere from the renal calyces to the ureteral orifice [1,2]. UTUCs are uncommon and account for only 5–10% of urothelial carcinomas. Urothelial carcinomas account for 90% of tumours of the renal pelvis. Pyelocalyceal tumours are about as twice as common as ureteral tumours [3].

UTUC has a peak incidence in patients in their 70s and 80s. Chemical carcinogens predispose the entire urothelium to the development of multifocal urothelial carcinoma by an effect sometimes referred to as field change of the urothelium. Smoking is the principal risk factor for UTUC [4,6].

For patients with suspected UTUC found by diagnostic imaging, ureteroscopic biopsy provides histopathological confirmation and information as to the histological grade of the UTUC, which is one of the best predictors of pathological stage, tumour recurrence and overall survival.

Diagnostic imaging plays a significant role in diagnosing and staging of UTUC. Previously, multiple imaging investigations were common with ultrasound, excretory urography and retrograde pyelography. Currently, CT urography is the most common imaging technique for imaging UTUC and MR urography is used only when CT urography is contraindicated [5]. Clinical presentation of UTUC is usually with haematuria and so the imaging techniques used must not only be highly accurate for diagnosing UTUC but also be able to detect other diseases responsible for haematuria.

In this case report, we demonstrate the use of contrast enhanced USG in cases where CT Urography/ MR urography is contraindicated.

Case Presentation

A 73-year-old male patient was referred to the Department of Radiodiagnosis for ultrasound KUB. Patient had history of hematuria and was a smoker for 30 years (12 pack years) which he quit 6 years back.

On grey scale ultrasound: Upper abdominal study showed a small right kidney measuring 63 x 34 mm with poor corticomedullary differentiation, irregular outline and increased renal parenchymal echogenicity with dilated pelvicalyceal system and ureter. Lower abdominal study revealed a hypoechoic lesion of 16 x 13 mm in right lower ureter with proximal ureter dilated (Figure 1). The fat plane was clear with surrounding structures and no enlarged lymph nodes were noted. Urinary bladder showed no clots or changed of cystitis.

The lesion did not show any signal on colour doppler study. Power doppler showed minimal signals in the lesion. The differentials for the lesion were sludge/mass lesion.

Urine microscopy was performed on centrifuged specimen which showed few atypical cells with hyperchromatic nuclei along with RBCs, few inflammatory cells and benign squamous cells.

CT Urography was advised according to protocol [7]. However, patient was declared un-fit for CT Urography due to raised serum creatinine (1.82). NCCT was done but was inconclusive (Figure 2,3).

The patient was deemed fit for contrast enhanced ultrasound which was done with 2ml microbubble contrast media. Study showed a 16 x 13 mm solid mass lesion in right lower ureter near uretero vesical junction as seen on grey scale ultrasound with vigorous uptake of contrast in arterial phase with rapid washout. Finding was suggestive of a significantly vascular mass lesion, likely malignant [9] (Figure 4,5). The findings were confirmed on cystoscopy guided biopsy of mass which revealed features of papillary transitional cell carcinoma.

Right nephroureterectomy with bladder cuff excision was done for the patient under general anaesthesia. No enlarged lymph nodes or peritoneal metastasis were detected intra operatively. Post operative biopsy confirmed papillary transitional cell carcinoma with no invasion of underlying muscle fragments, Histological grade II/III. Renal specimen on histopathology was positive for chronic pyelonephritis with hydronephrotic changes. The patient was discharged on Tamsulosin and antibiotics.

Discussion

CT Urography is the standard protocol for urinary tract neoplasms [7,8]. With the advent of contrast enhanced ultrasound, similar results can be obtained in patients un-fit for CT urography as was the case with this patient. Contrast enhanced ultrasound gives a quick and easy alternative to CT Urography/ MR urography and can be performed safely in patients with deranged RFT/LFT/PFT and in pregnancy.

Contrast material in ultrasound uses encapsulated microbubbles which oscillate within the membrane of the capsule. They resist compression more than expansion and send back echoes of higher frequencies which are detected on ultrasound. These microbubbles are small enough to cross pulmonary

capillaries and are excreted via lungs, thus making a patient with deranged RFT/LFT/PFT fit for this study.

As was the case in this patient, contrast enhanced ultrasound is a novel technique to differentiate highly vascular, possibly malignant masses from other benign masses. As it has no renal excretion, poorly functioning kidneys are not a contraindication for this study. Our patient had developed chronic pyelonephritis with hydroureteronephrosis secondary to distal ureteric obstruction resulting in poor renal function. Contrast enhanced ultrasound helped in diagnosing the cause of the distal obstruction with timely intervention and treatment in a setting where CT urography was contraindicated.

Thus, we emphasize upon the use of this novel technique in differentiating masses, not only ureteric, by a method which has no radiation exposure and is safe in a setting of renal/hepatic dysfunction.

Figures



Figure 1: Grey scale ultrasound image showing a solid hypoechoic lesion (*) in distal ureter with proximal hydroureter. The lesion showed no significant signal on colour doppler. D/D: sludge/ureteric mass.



Figure 2: NCCT KUB showing right hydroureteronephrosis.

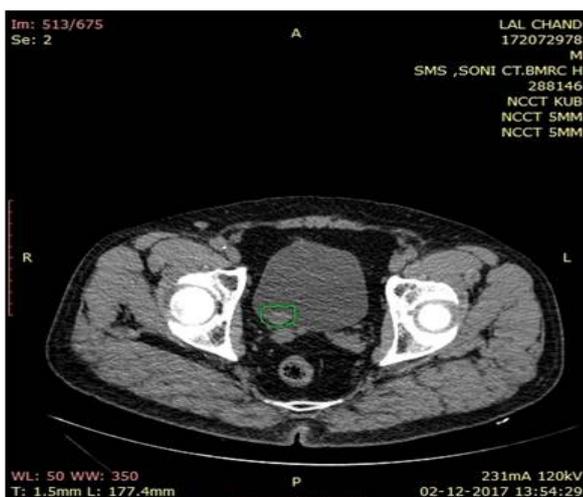


Figure 3: NCCT KUB showing lesion hyperdense to urine near right vesicoureteric junction.

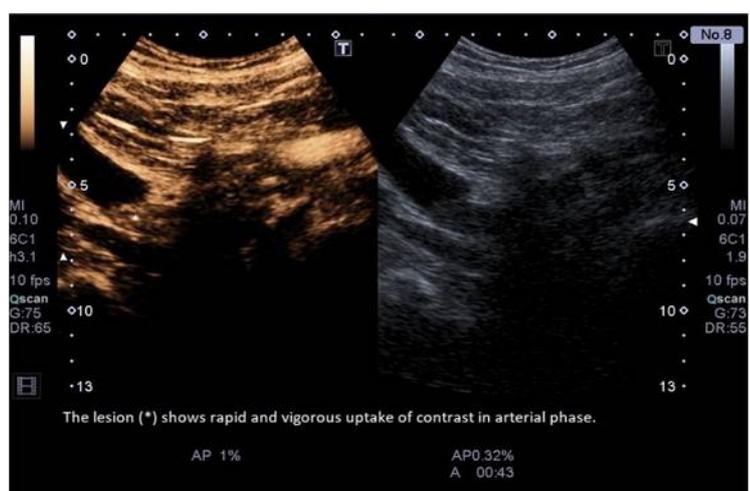


Figure 4: The lesion (*) shows rapid and vigorous uptake of contrast in arterial phase.



Figure 5: The lesion (*) shows rapid washout in the post arterial phase.

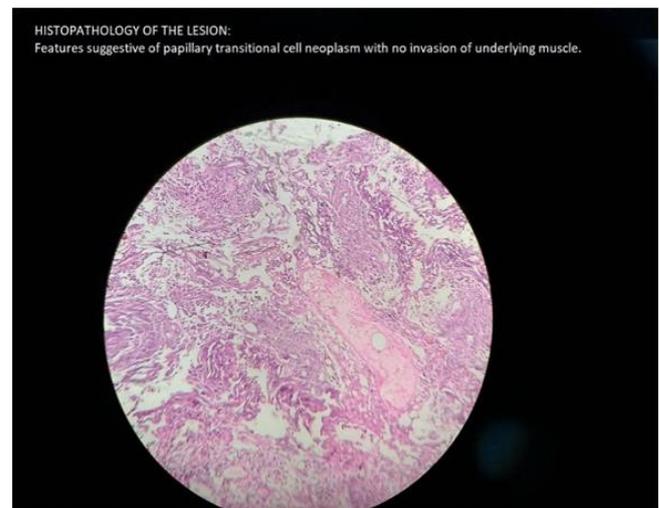


Figure 6: On histopathological examination, features suggestive of papillary transitional cell neoplasm with no invasion of underlying muscle is noted.

References

1. Cowan Nigel C, Cohan Richard H. Urothelial Cell Cancer, Upper Tract and Lower Tract. Andreas Adam, Adrian K. Dixon, Jonathan H. Gillard and Cornelia M. Schaefer-Prokop, editors. In: Grainger & Allison's Diagnostic Radiology, A Textbook Of Medical Imaging, 6th edn. Elsevier limited. 2015; 905-907.
2. Kim HJ, Lim JW, Lee DH, Ko YT, Oh JH, Kim YW. Transitional Cell Carcinoma Involving the Distal Ureter-Assessment With Transrectal and Color Doppler Ultrasonography. *J Ultrasound Med.* 2005; 24: 1625-33.
3. Jemal A, Siegel R, Xu J, Ward E. Cancer statistics. *CA Cancer J Clin.* 2010; 60: 277-300.
4. Azémar MD, Comperat E, Richard F, et al. Bladder recurrence after surgery for upper urinary tract urothelial cell carcinoma: Frequency, risk factors, and surveillance. *Urol Oncol.* 2011; 29: 130-6.
5. Wong-You-Cheong JJ, Wagner BJ, Davis CJ Jr. Transitional cell carcinoma of the urinary tract: radiologic-pathologic correlation. *Radio graphics.* 1998; 18: 123-42.
6. McLaughlin JK, Silverman DT, Hsing AW, et al. Cigarette smoking and cancers of the renal pelvis and ureter. *Cancer Res.* 1992; 52: 254-7.
7. Van Der Molen A, Cowan N, Mueller-Lisse U, et al. CT urography: definition, indications and techniques. A guideline for clinical practice. *Eur Radiol.* 2008; 18: 4-17
8. Silverman SG, Lyendecker JR, Amis ES. What is the current role of CT urography and MR urography in the evaluation of the urinary tract? *Radiology.* 2009; 250: 309-23.
9. Piscaglia F, Nolsøe C, Dietrich F, Cosgrove DO, Gilja OH, Bachmann Nielsen M, et al. The EFSUMB Guidelines and Recommendations on the Clinical Practice of Contrast Enhanced Ultrasound (CEUS): Update 2011 on non-hepatic applications, *Ultraschall in Med.* 2012; 33: 33-59.

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