

Role of Imaging and Percutaneous Biopsy in a Rare Case of Squamous Cell Carcinoma of Mid Ureter

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Abstract: *Squamous cell carcinoma of the ureter is very rare, constituting only 1-1.6% of all urothelial tumours. It is an aggressive tumor, spreading to bone, liver and lung. The median post diagnosis survival is short and estimated to be five months. Definitive diagnosis is exclusively by histopathological evaluation, which is used for stratifying the tumors into different prognostic groups to aid in the evaluation of treatment results and to optimize the management of patients. Therapeutic options may include radical surgery, radiotherapy, chemotherapy, or a combination of these treatments. We present a case of locally advanced squamous cell carcinoma of the ureter and its different methods of biopsy. Ureteroscopic biopsy is an integral part of diagnosis of neoplastic lesion of the upper urinary tract, but it is technical challenging. Although image-guided percutaneous biopsy of the urinary tract is a relatively uncommon procedure, it can be considered a good option in selected cases or when traditional methods, such as the ureteroscopic technique, are not possible.*

Keywords: Percutaneous access; Urinary tract; SCC

1. Introduction

The vast majority of the upper urinary tract carcinomas, including the renal pelvis and ureter are urothelial in origin. Although rare, squamous cell carcinoma (SCC) of the upper urinary tracts does exist and constitutes only 1-1.6% of all urothelial carcinomas. Adding to its rarity, the occurrence of the SCC in the renal pelvis is approximately six times higher, compared to the ureter. Patients usually present in their sixth and seven decades. Numerous risk factors have been previously postulated to play major role in the development of the SCC of the ureter such as chronic irritation, urolithiasis, chronic hydronephrosis, heavy misuse of analgesics especially Phenacetin and external beam irradiation. In addition to the abovementioned risk factors, horse-shoe kidneys have a higher tendency to develop SCC of the ureter than normal kidney.

The ureteric mucosa is transitional in origin and normally lacks squamous architecture. Hence the tumorigenesis of the SCC of the ureter can be partly explained by the chronic irritation leading to de-differentiation, dysplasia and ultimately SCC.

Biopsy is an integral component for the evaluation of potentially malignant lesions of the ureter and other malignancies of the upper urinary tract. When indicated, biopsy is usually performed via ureteroscopy. However, ureteroscopic biopsy may not be possible in patients with high-risk comorbidities, as it is invasive and requires general anaesthesia and the insertion of ureteral catheters. Thus, although ureteroscopy remains the gold standard, it can be technically challenging and is associated with significant rates of false-negative results, depending on the morphological characteristics of the lesion. Percutaneous biopsy can be performed in selected cases when the target

segment of the ureter or renal pelvis cannot be accessed via ureteroscopy, is predominantly exophytic and non-endoluminal, or showed inconclusive results in previous samples.

Therapeutic options may include radical surgery, radiotherapy, chemotherapy, or a combination of these treatments. We present a case of locally advanced SCC of the ureter and comment on its management and subsequent disease related complication.

2. Materials and Methods

Methodology:

Study Design

This is a case study of elderly female, who presented with ureteric mass for which radiological imaging and percutaneous biopsy done under radiological guidance.

Case Summary

A 70-years-old female presented to the new civil hospital, surat with pain in right lumbar region associated with dribbling and haematuria for three-month duration. Previous past medical history of left side invasive mammary carcinoma (ER+, PR-, HER2 neu+) for that MRM done 2 year back followed by 2 cycle of letrozole taken. Patient is k/c/o hypertension on medication.

Clinical examination was unremarkable.

Haematological and biochemical profile was within normal ranges. Haemoglobin level was 10.80g/L (normal range 12-15 g/dL), creatinine was 1.04mg/dL (normal range 0.6-1.1 mg/dL) and serum amylase was 58 mg/dL (28-100 mg/dL).

Urinalysis and urine cytology were normal and negative for the presence of malignant urothelial cells.

On contrast Computerized Tomography (CT) of the abdomen and pelvis done 2yr back showed urothelial thickening with significant luminal narrowing in right mid ureter at L4 level with resultant moderate hydroureteronephrosis

Recent follow-up CT scan (Fig 1) shows approx. (66x46x40) mm (S1xAPxML) sized ill-defined enhancing lesion involving right mid ureter extending from level the vertebral level L3 to L5 with surrounding extensive fat stranding. Anteriorly the lesion is closely abutting ileal bowel loops with loss of fat plane. Posteriorly lesion is abutting right psoas muscle with loss of fat plane. Poster inferiorly the lesion is in contact with right external iliac artery and shows loss of fat plane with it. Which resultant in gross hydroureteronephrosis.

Multiple subcentimeter to centimetres sized metastatic lymphnodes noted in adjacent region

MRI Study of abdomen showed (Fig 1) a well-defined lobulated heterogeneous lesion with restricted diffusion in right mid ureter, involving the entire wall thickness as well as occluding the entire lumen causing significant proximal ureteric dilatation and gross hydroureter with thinning of renal parenchyma. Heterogeneous enlarged metastatic lymphnodes noted in paraaortic region

3. Ultrasound guided percutaneous biopsy

Ultrasound appears to have several advantages as a guidance method. It is commonly available and does not involve ionizing radiation, and the device is portable and radially available.

Biopsy technique

The patient is positioned supine, with the hands comfortably resting behind the head

A preliminary US scan is performed to identify the target and mark the skin and also ensure there is no major vessel or bowel in path of the biopsy needle.

Before the procedure is started, breathing instructions are practiced with the patient performed with the breath hold. This minimizes risk of injury to the bowel or surrounding vessels.

Equipment needed

A coaxial needle with semiautomatic or automatic biopsy gun. Generally, a 3.5 – 5 Mhz transducer is used for biopsy, however a linear/superficial probe is useful in superficial lesions

- 1%/2% lidocaine without epinephrine
- Betadine and spirit swabs
- 1 normal saline container and 1 formalin container

Probe Sterilization

The transducer must be sterilized before its use by betadine and spirit swabbing. Ideally a layer of disposable plastic/condom should be placed over it to achieve true sterilization

Techniques include:

- Local anaesthesia with 2% buffered lidocaine
- Must keep needle in plane of beam
- We follow shortest distance and safest pathway, so needle trajectory planned away from major vessel (aorta).(Fig 2)
- Advancing the coaxial needle under imaging guidance until the tip is in the intended area of biopsy
- Removal of the stylet and insert biopsy gun and take samples.

4. Discussion

Our research basically studied a rare case of squamous cell carcinoma of the ureter. It is an aggressive tumor, spreading to bone, liver and lung. Definitive diagnosis is exclusively by histopathological evaluation, which is used for stratifying the tumors into different prognostic groups to aid in the evaluation of treatment results and to optimize the management of patients.

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5. Conclusion

Image-guided percutaneous biopsy of the mid urinary tract appears to be a safe and effective alternative in selected patients who underwent unsuccessful ureteroscopy or who are inadequate candidates for this procedure.

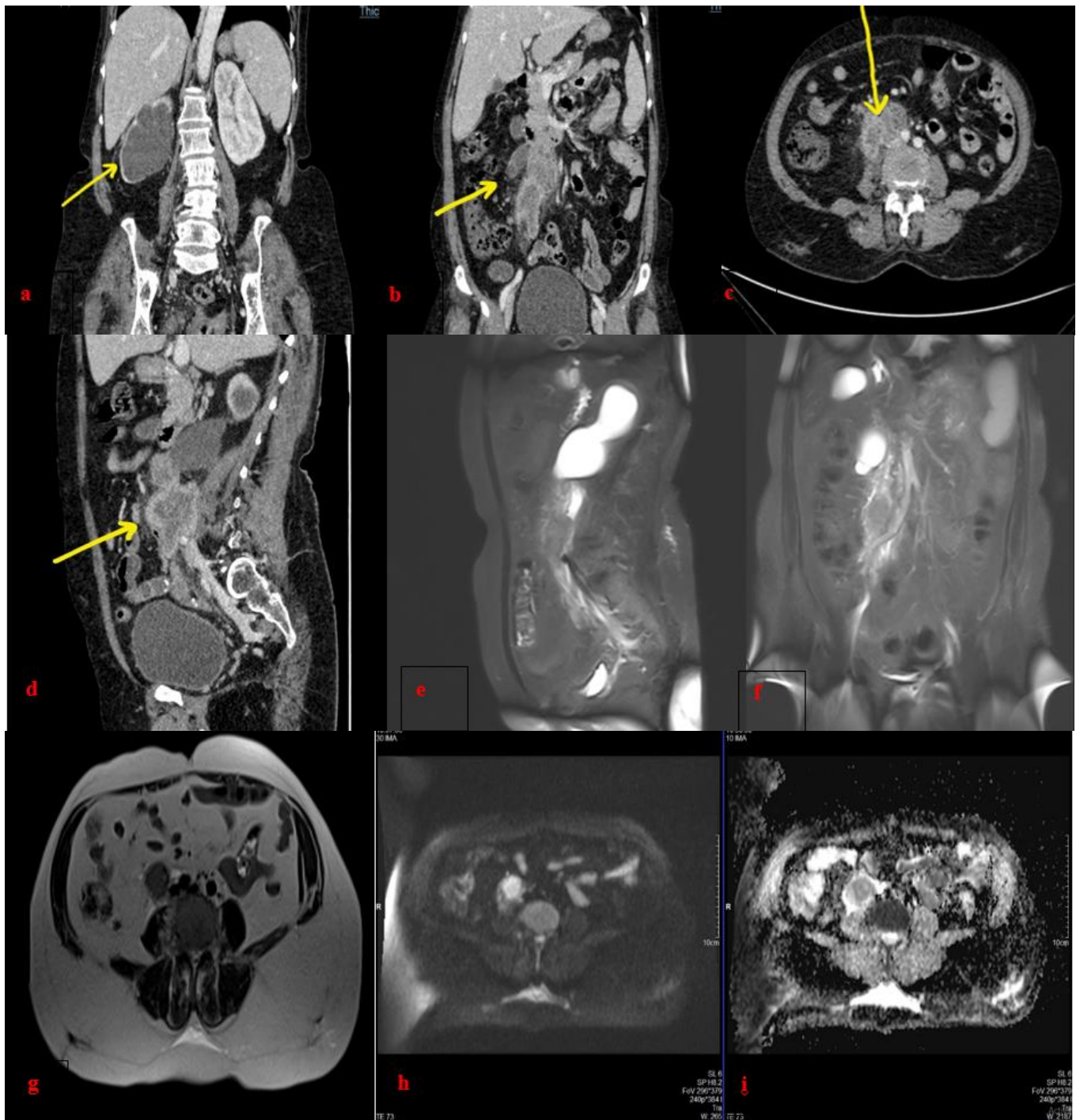


Figure 1: shows radiological imaging of 70 years old female presented with complain of abdomen pain and haematuria. (a) coronal section of CT image shows gross hydronephrosis in right kidney. (b) coronal section, (c) axial section and (d) sagittal section of CT images show ill-defined enhancing lesion involving right mid ureter. (e) sagittal section and (f) coronal section of STIR-MR images shows a well defined lobulated altered signal lesion in right mid ureter resultant in gross hydronephrosis in right kidney. (g) axial section of T2-wighted image shows heterogenous hyperintense signal. (h & i) shows that lesion shows diffusion restriction.



Figure 2: Show percutaneous biopsy under USG guidance of mass of right mid ureter. (a) convex probe and (b) linear probe image show lesion of right mid ureter and its close relation with aorta. (c) show biopsy needle inserted percutaneously in lesion

References

- [1] Mehdi Salehipour, Niloofar Dastgheib, Masood Hosseinzadeh, Alireza Makarem, Alireza Rezvani, Alireza Sanati, Sona Tayebi. Primary renal pelvis and ureter squamous cell carcinoma (SCC): a rare case report and review of literature.
- [2] Nachiappan M, Litake MM, Paravatraj VG, Sharma N, Narasimhan A. Squamous cell carcinoma of the renal pelvis, a rare site for a commonly known malignancy.
- [3] Palmer CJ, Atty C, Sekosan M, Hollowell CMP, Wille MA. Squamous cell carcinoma of the renal pelvis. Urology.
- [4] Paonessa J, Beck H, Cook S. Squamous cell carcinoma of the renal pelvis associated with kidney stones: a case report.
- [5] Hippargi SB, Nerune SM, Kumar M. Urothelial and squamous cell carcinoma of renal pelvis – a rare case report
- [6] Shangqing Ren, Hualin Feng, Yige Bao, Yi Wei, Yong Ou, Yaoqian Wang, Qian Lv, Shan Zhong, Fang Zhou, Shida Fan, Qiang Wang, Cheng Luo, Zhengjun Chen, Yu Nie & Dong Wang. Ureteral urothelial carcinoma with squamous cell carcinoma and sarcomatoid carcinoma differentiation: a case report