Case study

A Rare Case of Renal Squamous Cell Carcinoma with Underlying Staghorn Calculus as Confounding Factor

ABSTRACT

Renal cell carcinoma is one of the most common kidney pathologies in adults, responsible for approximately 90-95% of cases. Clear cell variant is the most common variant accounting for 60-70% of cases, papillary accounting for 10-15% of the cases.

Diagnosis of carcinoma in the presence of staghorn calculus is seen in less than 1% of patients in recorded data. However, squamous cell carcinoma of the kidney is a rare condition usually associated with chronic irritation by a foreign body, most likely due to staghorn calculus. Hence, presenting a case report of a 65-year male who presented with a complaint of pain in the abdomen for two months associated with malaise, weight loss, and fever.

CTKUB was suggestive of a large staghorn calculus on the left kidney with hydronephrosis was suggestive of revealed non-excreting enlarged left kidney with multiple calculi and abnormal cortical and periureteric lesions encasement of adjacent vessels. Initially, He was managed conservatively. Later underwent nephrectomy for the same.

Pathological report revealed a rare case of primary squamous cell carcinoma, most probably originating from the pelvis and secondarily infiltrating the renal parenchyma and associated with nephrolithiasis and hydronephrosis.

Keywords
Squamous cell carcinoma;Nephrolithiasis;Hydronephrosis;Abdominal pain;Pyelonephritis

Introduction

Staghorn calculi are radio-opaque stones that tend to occupy the renal pelvis. Inadequate management of staghorn calculi can cause severe complications such as renal dysfunction or pyelonephritis leading to urosepsis. However, rare cases have shown squamous metaplasia of the renal pelvis to squamous cell carcinoma.[1]

In the upper urinary tract system, urothelial carcinoma is the most common type of malignancy. Conversely, squamous cell carcinoma (SCC) is rare and has a prevalence of <1% among urinary tract neoplasms. [2]

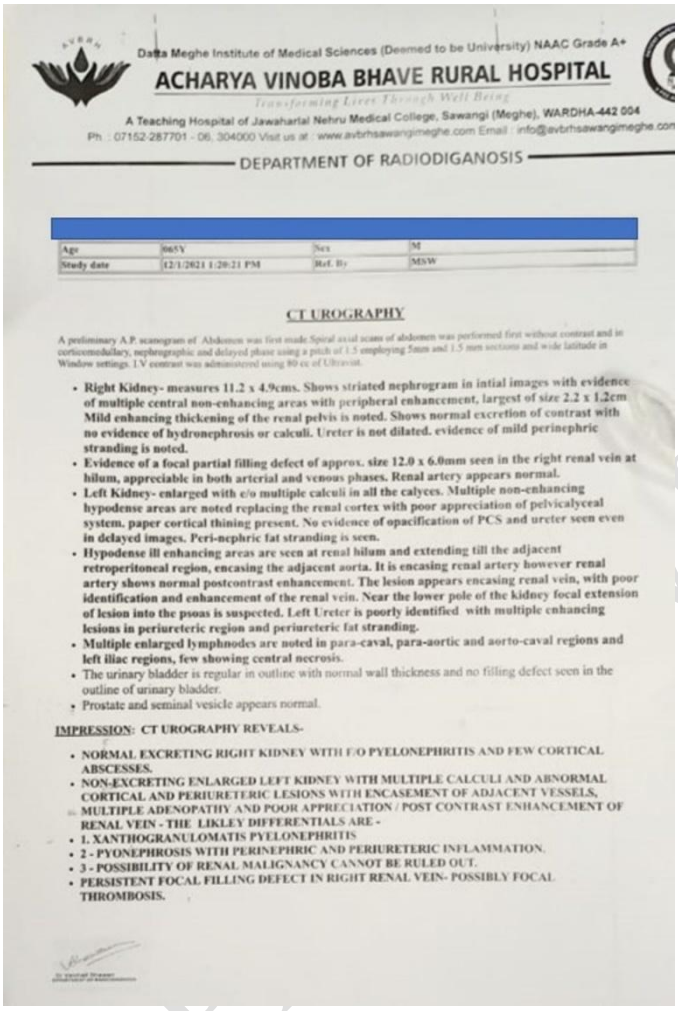
Case Report

A 65-year-old male came to a casualty with c/o pain over the left side of the abdomen for two months. It was insidious in onset, gradually progressive with pain radiating to the back associated with multiple episodes of fever in the past. He had similar complaints in the past, dating back to 15 years.

Systemic examination revealed tenderness in the left lumbar region associated with a nodular, nonmobile lump of size 7x6 cm with diffuse margins palpable in the left lumbar region on deep palpation.

WBC count was 47400 on admission.

USG abdomen and pelvis s/o multiple calculi in the renal pelvis largest of size approximately 4x3.8cm noted at pelviureteric junction causing mild dilatation of pelvicalycealsystemsuggestive of mild hydronephrosis and impression was nephrolithiasis of the left kidney with moderate left-sided hydronephrosis.



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DEPARTMENT OF RADIODIGANOSIS

Age	065Y	Sex	M
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CT UROGRAPHY

A preliminary A.P. scanogram of Abdomen was first made.Spiral axial scans of abdomen was performed first without contrast and in corticomedullary, nephrographic and delayed phase using a pitch of 1.5 employing 5mm and 1.5 mm sections and wide latitude in Window settings. I.V contrast was administered using 80 cc of Ultravist.

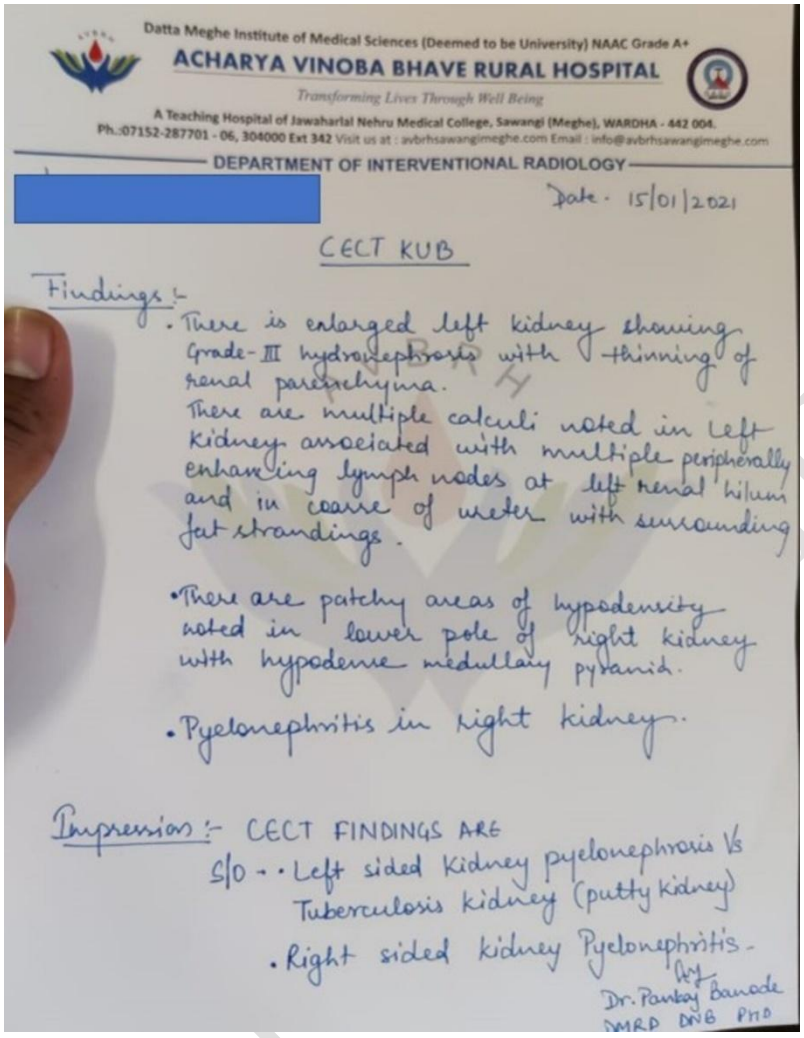
- **Right Kidney- measures 11.2 x 4.9cms. Shows striated nephrogram in intial images with evidence of multiple central non-enhancing areas with peripheral enhancement, largest of size 2.2 x 1.2cm Mild enhancing thickening of the renal pelvis is noted. Shows normal excretion of contrast with no evidence of hydronephrosis or calculi. Ureter is not dilated. evidence of mild perinephric stranding is noted.**
- **Evidence of a focal partial filling defect of approx. size 12.0 x 6.0mm seen in the right renal vein at hilum, appreciable in both arterial and venous phases. Renal artery appears normal.**
- **Left Kidney- enlarged with c/o multiple calculi in all the calyces. Multiple non-enhancing hypodense areas are noted replacing the renal cortex with poor appreciation of pelvicalyceal system. paper cortical thining present. No evidence of opacification of PCS and ureter seen even in delayed images. Peri-nephric fat stranding is seen.**
- **Hypodense ill enhancing areas are seen at renal hilum and extending till the adjacent retroperitoneal region, encasing the adjacent aorta. It is encasing renal artery however renal artery shows normal postcontrast enhancement. The lesion appears encasing renal vein, with poor identification and enhancement of the renal vein. Near the lower pole of the kidney focal extension of lesion into the psoas is suspected. Left Ureter is poorly identified with multiple enhancing lesions in periureteric region and periureteric fat stranding.**
- **Multiple enlarged lymphnodes are noted in para-caval, para-aortic and aorto-caval regions and left iliac regions, few showing central necrosis.**
- The urinary bladder is regular in outline with normal wall thickness and no filling defect seen in the outline of urinary bladder.
- Prostate and seminal vesicle appears normal.

IMPRESSION: CT UROGRAPHY REVEALS-

- **NORMAL EXCRETING RIGHT KIDNEY WITH F/O PYELONEPHRITIS AND FEW CORTICAL ABSCESSES.**
- **NON-EXCRETING ENLARGED LEFT KIDNEY WITH MULTIPLE CALCULI AND ABNORMAL CORTICAL AND PERIURETERIC LESIONS WITH ENCASEMENT OF ADJACENT VESSELS, MULTIPLE ADENOPATHY AND POOR APPRECIATION / POST CONTRAST ENHANCEMENT OF RENAL VEIN - THE LIKLEY DIFFERENTIALS ARE -**
- **1. XANTHOGRANULOMATIS PYELONEPHRITIS**
- **2 - PYONEPHROSIS WITH PERINEPHRIC AND PERIURETERIC INFLAMMATION.**
- **3 - POSSIBILITY OF RENAL MALIGNANCY CANNOT BE RULED OUT.**
- **PERSISTENT FOCAL FILLING DEFECT IN RIGHT RENAL VEIN- POSSIBLY FOCAL THROMBOSIS.**

Figure 1: CT Urography Report

It was again reviewed by a senior radiologist who gave an impression.



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DEPARTMENT OF INTERVENTIONAL RADIOLOGY

[redacted] Date. 15/01/2021

CECT KUB

Findings :-

- There is enlarged left kidney showing Grade-III hydronephrosis with thinning of renal parenchyma. There are multiple calculi noted in Left kidney associated with multiple peripherally enhancing lymph nodes at left renal hilum and in coarse of ureter with surrounding fat strandings.
- There are patchy areas of hypodensity noted in lower pole of right kidney with hypodense medullary pyramid.
- Pyelonephritis in right kidney.

Impression :- CECT FINDINGS ARE

S/O - - Left sided Kidney pyelonephrosis Vs Tuberculosis kidney (putty kidney)

- Right sided kidney Pyelonephritis.

Dr. Pankaj Bansode DMRD DNB PhD

Figure 2: Review report CT KUB

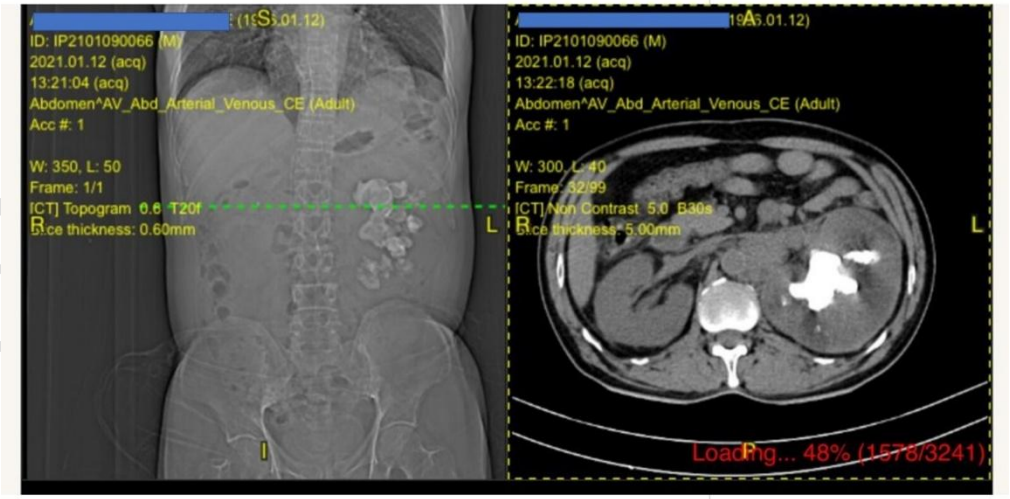


Figure 3: CT film; Sagittal view and topogram showing staghorn calculi in left kidney

In view of deteriorating condition of the patient decision was taken to operate. The patient underwent nephrectomy for the same, and the retrieved specimen was sent for histopathological review.

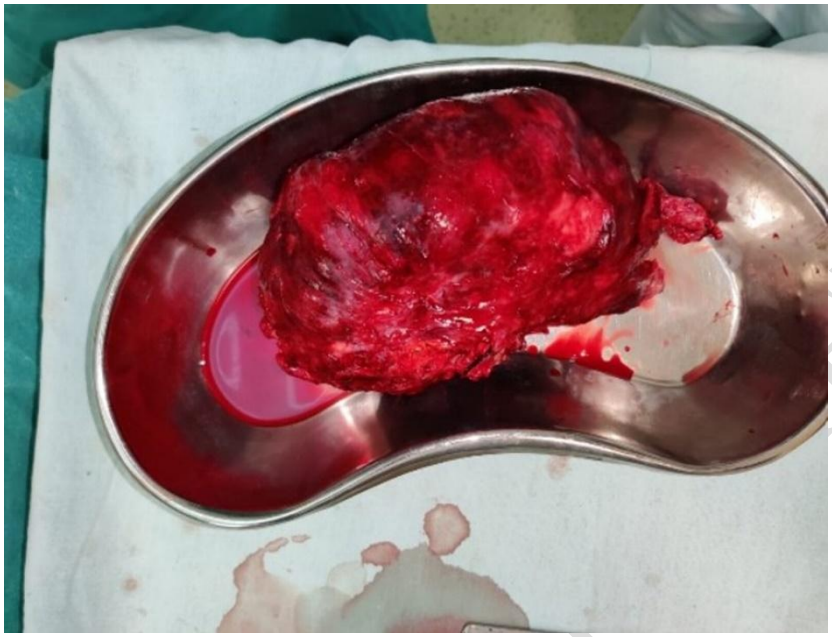


Figure 4: Showing gross specimen of retrieved kidney

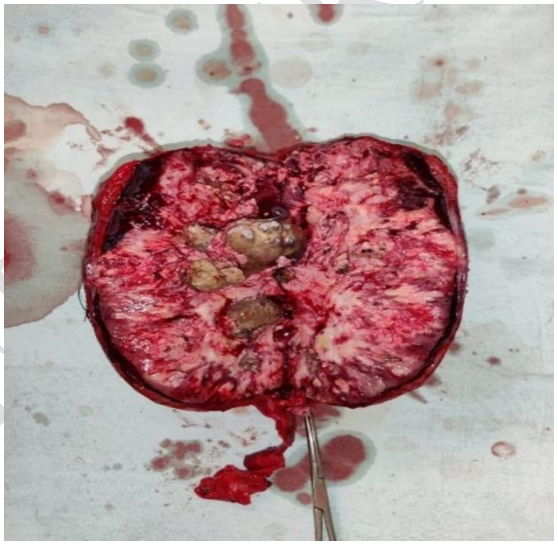
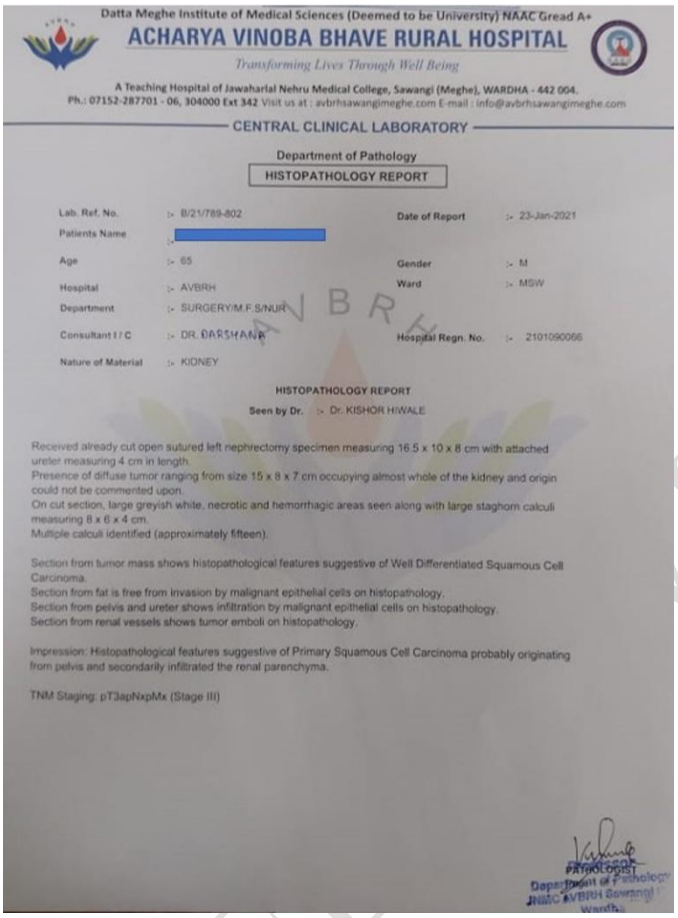


Figure 5: Showing cut section of a retrieved kidney with multiple calculi

Histopathology findings: The histopathological report suggested primary squamous cell carcinoma probably originating from the pelvis and secondarily infiltrated the renal parenchyma.



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CENTRAL CLINICAL LABORATORY

Department of Pathology

HISTOPATHOLOGY REPORT

Lab. Ref. No.	:- B/21/789-802	Date of Report	:- 23-Jan-2021
Patients Name	:- [redacted]		
Age	:- 65	Gender	:- M
Hospital	:- AVBRH	Ward	:- MSW
Department	:- SURGERY/M.F.S/NUR		
Consultant I / C	:- DR. DARSHANA	Hospital Regn. No.	:- 2101090066
Nature of Material	:- KIDNEY		

HISTOPATHOLOGY REPORT

Seen by Dr. :- Dr. KISHOR HIWALE

Received already cut open sutured left nephrectomy specimen measuring 16.5 x 10 x 8 cm with attached ureter measuring 4 cm in length.
Presence of diffuse tumor ranging from size 15 x 8 x 7 cm occupying almost whole of the kidney and origin could not be commented upon.
On cut section, large greyish white, necrotic and hemorrhagic areas seen along with large staghorn calculi measuring 8 x 6 x 4 cm.
Multiple calculi identified (approximately fifteen).

Section from tumor mass shows histopathological features suggestive of Well Differentiated Squamous Cell Carcinoma.
Section from fat is free from invasion by malignant epithelial cells on histopathology.
Section from pelvis and ureter shows infiltration by malignant epithelial cells on histopathology.
Section from renal vessels shows tumor emboli on histopathology.

Impression: Histopathological features suggestive of Primary Squamous Cell Carcinoma probably originating from pelvis and secondarily infiltrated the renal parenchyma.

TNM Staging: pT3apNxpMx (Stage III)

PATHOLOGIST
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JNMC AVBRH Sawangi (M)
Wardha

Figure 6: Histopathology report

TNM Staging: pT3apNxpMx (Stage III)

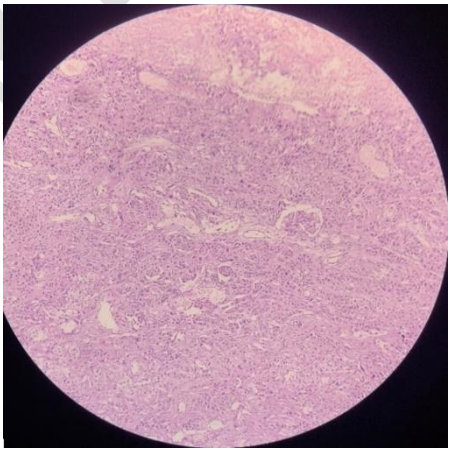

Figure 7:Histopathology slides showing keratin pearl formation

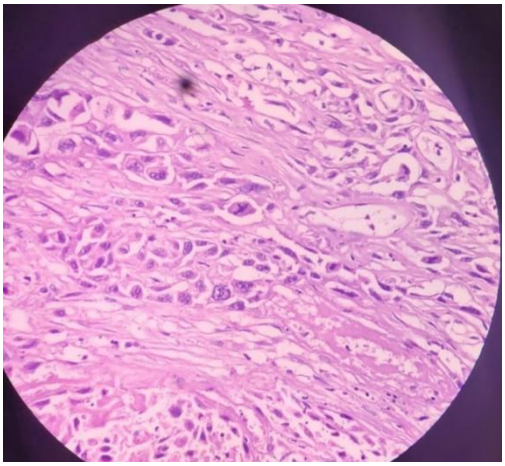

Figure 8: Histopathology slides showing irregular squamous nests under 40X magnification

Management: The patient underwent a leftsided nephrectomy under general anaesthesia.

Discussions

The most frequent neoplasms within the urinary tract are urothelial carcinomas; SCC in the renal pelvis is rare and only accounts for 0.5% of malignant renal tumours [2]. Renal SCCs are reported to be aggressive tumours with a worse prognosis than other urinary tract carcinomas because they tend to be detected in an advanced stage (pT3 or more significant) [3,4]. The prognosis for renal SCC is abysmal, and less than 10% of patients survive for five years [4,5]. Whether or not renal calculi cause SCC is unclear. Some studies have reported that urothelial epithelium may lead to squamous metaplasia with chronic irritation or inflammation, which progresses to dedifferentiation, dysplasia, and, ultimately, carcinogenesis [4]. The coexistence of calculi has been reported in many (approximately 90%) cases of renal SCC [2,6,7]. Some previous studies have mentioned that patients with renal SCC had chronic episodes of pyelonephritis or nephrolithiasis [8,9].

Conclusion

Primary renal SCC is a rare entity and strongly related to renal stones, which might confound diagnosis. They may not be radiologically detectable, and the first indication of malignancy might come accidentally on histological review of nephrectomy for the non-excreting enlarged calculous kidney. This highlights the need for prompt treatment of renal stones and assessment for renal tumors in patients with long-standing staghorn calculi. The high incidence of SCCs in hydronephrotic kidneys also highlights the need for the meticulous sampling of the renal pelvis by the pathologist in such specimens.Patient workup to rule out tubercular pathology may also be

done. The patient's CBC profile should be assessed at regular intervalssince it was found that the WBC trend was increasing in this patient. On the basis of these findings, we speculate that the renal calculus might have initially provoked the metaplasia with the squamous metaplasia subsequently exacerbating the calculus leading to a vicious cycle and conclusive squamous carcinogenesis.

Limitations and Future Studies

There are multiple types of renal cancers such as clear cell, papillary, chromophobe, clear cell papillary, collecting duct, and medullary type. However, SCCSs associated with staghorn calculus is a rare condition found in less than 1% of patients. Whenever there is any evidence of renal stones associated with multiple episodes of fever, weight loss, abdominal pain, hematuria, oliguria, malignancy should be suspected. Currently, there are no diagnostic modalities for early detection of renal cancer other than incidental radiologic discovery. There is also no existing biomarker for kidney cancer diagnosis. The currently available biomarkers appear to have the most utility as mere diagnostic adjuncts.

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