

## Original article

# A clinicopathological study of squamous cell carcinoma kidney

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## Abstract

**Background:** The upper urinary tract urothelial carcinoma specially squamous cell type is a rare entity. It is associated with chronic renal stone and infection which conceals the clinical diagnosis in the majority of the cases. We attempt to identify factors associated with this malignancy along with clinicopathological characteristics and prognosis.

**Material & methods :** The nephrectomy specimens resected for renal malignancy and diagnosed as squamous cell carcinoma (SCC) were reviewed retrospectively over a period of five years. Patient pertinent clinical , imaging , laboratory , and histopathological information were analyzed.

**Result :** Total 36 nephrectomy specimens with renal malignancies were received. The incidence of SCC was found to be 16.6% (6/36). In all the patients this carcinoma was associated with nephrolithiasis of long duration and pyelonephritis. The median survival time was 4.6 months. Imaging studies diagnosed only one case which underwent radical nephrectomy with median survival of 14 months. Poor response to surgery, radiotherapy, and chemotherapy resulted in a short survival.

**Conclusion:** The subtle presentation of this renal malignancy when associated with renal calculi and infection often delay the early diagnosis leading to poor prognosis. Therefore, high index of suspicion by clinician and early imaging and laboratory studies are required in patients with long duration of renal stone to detect associated renal malignancy.

**Key words :** Squamous cell carcinoma, kidney, nephrolithiasis, pyelonephritis.

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## Introduction

Squamous cell carcinoma of the kidney has been reported as a relatively rare malignancy arising mainly from the renal pelvis . Most of the literature mentions an incidence of 0.7-10%.<sup>[1,2]</sup> Renal calculi have known to be the major risk factor for squamous cell carcinoma. We found incidental squamous cell carcinoma in all our cases and these were found to have a poor prognosis, possibly due to late identification with features of infection. In this study all the cases were seen in a background of nephrolithiasis and pyelonephritis. The grave

prognosis patients prompted us to study the pathology and biological behavior, hoping that earlier diagnosis and better outcome can be achieved in the future.

## Material and Methods

The study was conducted at Command Hospital, a tertiary care hospital ,Department of Pathology , over a period of five years from January 2010 to August 2014 . All the nephrectomy specimens received in the department for renal malignancies were retrospectively analyzed. Case records were reviewed for presenting clinical features, imaging

characteristics and patient survival. Representative haematoxylin and eosin stained histopathology slides were reviewed for confirming the diagnosis, assessing capsular and vascular invasion along with lymph node metastasis if any. The specimen were further analyzed for tumor grading and differentiation of the tumor, presence of lymphovascular invasion, and the extent of tumor into renal parenchyma as well as in to renal sinus and peripelvic fat .

At the time of study, information regarding age, sex, presenting signs and symptoms, and duration of stone disease since the time of detection was recorded.. The presence of flank pain, pyuria, and fever were taken as signs of infectious disease. Urine analysis along with cytology for malignant cells was done in all cases. Imaging studies included plain X-Ray, intravenous urography, ultrasonography and computed tomography of kidneys and pelvis. Function of the kidney was assessed on intravenous urography. Type of surgery done, simple or radical nephrectomy were recorded along with survival time. The survival time was defined as the time interval between histological diagnosis and death of the patient.

All the data was analyzed by SPSS. The mean was calculated for quantitative variables and frequency and percentages were calculated for all qualitative variable .

**Result :**

There were thirty six patients with renal malignancies. Among these, six patients were diagnosed to have a squamous cell carcinoma (SCC) of the kidney. The mean age of the patients was 67.6 years, with a range of 62-87yrs . All the six patients were males. All patients had existing stone disease for mean duration of 6.8 years. The left side and right side were involved in four & two patients

respectively. Clinical features of infection and flank pain were the predominant presenting feature, occurring in all the patients. Two patients had hematuria and pyuria was present in 50% of cases. The urine culture was positive in three patients. The most common organism isolated was Escherichia coli in two cases followed by Proteus Mirabilis in one case . Four of the patients revealed a poorly functioning kidney on an intravenous urogram on the affected side. All patients had variable number of calculi and hydronephrotic changes on pre-operative ultrasonography. Preoperative computed tomogram picked up a 5cm renal tumor in one out of the six patients. The results of clinical data and investigative profile have been tabulated in **Table 1**.

Urine cytology was positive for the case diagnosed on imaging. All the nephrectomy specimens positive for this malignancy, on gross examination, were seen to contain multiple variable sized renal calculi ranging from 0.5-1.5 cm and a variable degree of pelvic dilatation and hydronephrotic changes. The calyces were blunted, dilated and deformed. The mean tumor size of all the cases was 8.2 cm. In 5 cases a relatively well circumscribed grey white solid tumor was seen in the deeper part of the medulla extending into the cortex. One case showed a more diffuse white tumor with extensive cystic change of the subcapsular space (**Figure1**). Friable areas of variable degree of necrosis could be discerned amongst the tumor mass in all the cases. The capsule was adherent to the renal parenchyma and obvious capsular invasion could be appreciated on gross examination in two cases. Microscopy revealed histological features of a moderate to well differentiated squamous cell carcinoma in all the cases (**Figure 2**). There were large areas of necrosis within the tumor. Mitosis was brisk (2-5/HPF in the

most mitotically active areas). The renal vein was provided only in the specimen which was clinically suspect before surgery. A diagnosis of angioinvasion / lymphatic invasion was given when invasion into the hilar lymphatic / blood vessels was discerned on microscopy.

Accompanying histological evidence of pyelonephritis was discerned in all the cases (**Figure 3**).

The glomerular capillaries exhibited a variable degree of patency. Cases with predominant fibrosis contained the maximum number of hyalinized and ischemic glomeruli. Variable degree of periglomerular fibrosis was seen in all cases. Another common feature was the significant degree of interstitial inflammation and fibrosis. Some degree of tubular damage in the form of atrophic and dilated tubules with attenuated lining epithelium filled with colloid casts was observed. Lymphocytes, histiocytes and plasma cells formed the bulk of the inflammatory infiltrate. The significant pathological features of all the cases are tabulated in (**Table 2**). Four of the patients had locally advanced tumor (T3). None of the six had developed lymph node metastasis at the time of diagnosis.

One patient with a pre-operative diagnosis of tumor and stone underwent a radical nephrectomy whereas five patients underwent simple nephrectomy. All the patients had uneventful postoperative recovery. Three patients underwent postoperative radiotherapy. Five patients received adjuvant chemotherapy. The median survival was found to be 4.6 months. Cases with capsular invasion on histopathology showed a lower survival time in spite of adjuvant therapy (mean 3.1 months). Case diagnosed preoperatively and followed by radical surgery showed the longest survival of 14 months.

## Discussion

Squamous cell carcinoma of the kidney is an uncommon tumor although it is the second most common tumor in the renal pelvis.<sup>[3]</sup> Only about 350 cases have been described in literature.<sup>[4]</sup> Most of these are isolated case reports, the largest series comprising of only a maximum of 20 cases.<sup>[4]</sup> The incidence of this malignancy has been reported to be a maximum of 10%, however we in our series of 36 renal malignancies, we have found a higher incidence of 16.6%.<sup>[2]</sup> SCC is often associated with renal calculi or infection and it usually presents at an advanced stage with pain or palpable mass.<sup>[5]</sup> The incidence of coexisting urinary stone disease varies from 18% in the United States to 100% in Hong Kong.<sup>[5,6,7]</sup> A relatively higher incidence of these tumors in the eastern countries could be related to dietary factors and associated with an increased incidence of calculus disease pathology seen in these countries. In our study the association of SCC with calculus was 100%, which is in consonance with the data from the other Asian Studies.<sup>[5]</sup> There have also been reports of association with congenital abnormalities (horse shoe kidney and pelvic location) of these lesions, however in our series of six cases, no such association was seen.<sup>[8,9]</sup> The common feature of nephrolithiasis has been reported in these cases too.

Amongst the clinical features, pain and fever were found to be the predominant feature in all the patients. Two patients presented with hematuria. One of these was the patient with a preoperative diagnosis on imaging and this case also provided a positive urine cytology report for malignancy. The other patient had episodic gross hematuria, however preoperative ultrasound could not pick up tumor. Hence, we suggest that the presence of hematuria in these patients should raise the suspicion of renal

tumor. The urine of all these patients should routinely be screened for malignant cells. Lymph node metastasis has rarely been reported in this malignancy although occasional reports of distant lymph nodes metastasis bypassing regional lymph nodes has been seen.<sup>[10]</sup>

As seen in this study, the presence of chronic renal infection and accompanying nephrolithiasis obfuscated the features of an underlying aggressive malignancy. CT scan is usually not done in all cases of calculus disease, hence these cases escape detection before surgery. The surgery in most cases consequently is not radical in nature. All cases had a long standing history of nephrolithiasis (mean - 6.8 yrs).

Hence, this study of relatively small number of clinically undetected cases with a fatal outcome highlights attention of clinicians and pathologists to carry out further detailed studies of a larger series to unravel preoperative diagnostic modalities and define the characteristics of this uncommon neoplasm better.

**Conclusion**

Squamous cell carcinoma has a strong association with nephrolithiasis and pyelonephritis. The insidious onset of renal calculus disease and renal infection obscures the presence of an underlying aggressive malignancy. We emphasize on a high degree of suspicion in such cases as the grave prognosis associated with this aggressive neoplasm makes early diagnosis and prompt definitive treatment imperative.

**Table 1 :** Clinical data and investigative profile

Characteristics	No of cases ( %) (n=6)
Cinical features of infectious disease	6(100)
Flank Pain	6(100)
Haematuria	2(33)
Pyuria	3(50)
Renal mass on imaging	1(16.6)
Urine cytology Positive for malignant cells	1(16.6)

**Table 2 :** Histological characteristics of all cases

Histological features	No of cases (%)
1. Histological feature of pyelonephritis	6 (100)
2. Moderate to well differentiated grade of tumour	6 (100)
3. Capsular invasion	4 (66)
4. Lymphatic / angioinvasion	3 (50)

Fig 1 Squamous cell carcinoma kidney in with extensive subcapsular cystic change.



Fig 2: Photomicrograph of a moderately differentiated squamous cell carcinoma of the kidney (H&E.x400).

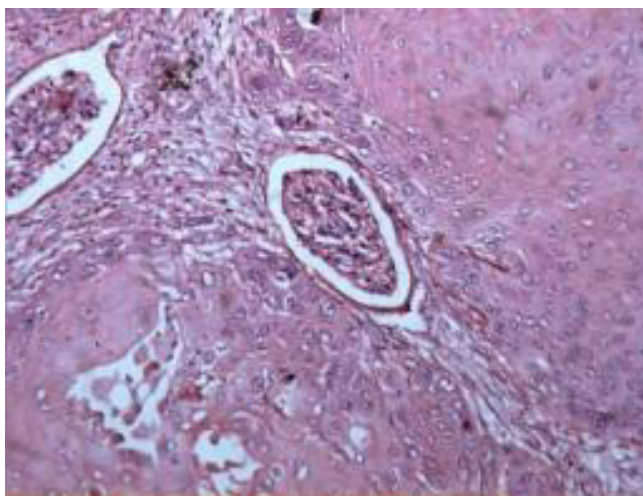
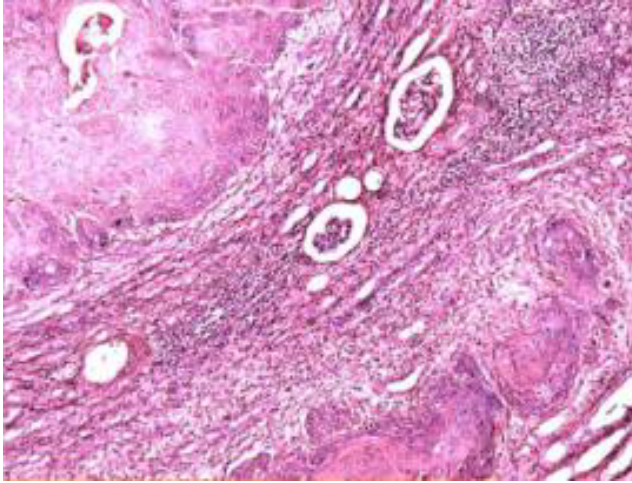


Fig 3: Photomicrograph showing squamous cell carcinoma in a background of dense chronic inflammatory infiltrate and fibrosis. (H &E x200)



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