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Case report

A rare case of renal squamous cell carcinoma presenting with psoas sign

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ABSTRACT

Introduction: Renal cancer is a relatively common form of cancer; however, squamous cell carcinoma of the kidney is extremely rare and it carries poor prognosis.
Clinical presentation: We present a rare case of renal squamous cell carcinoma that was manifested with the psoas sign in a patient with a history of chronic staghorn calculus.
Discussion: Squamous cell carcinoma of kidney is rare and more invasive. Even though many risk factors have been identified, staghorn renal calculi with chronic infection have a higher incidence of renal squamous cell carcinoma (SCC). Squamous cell carcinoma (SCC) has a wider range of atypical presentations; the psoas sign is not commonly reported in other literature. Due to the lack of reporting and sufficient knowledge, there are currently no established management guidelines. Despite advancements in contemporary medicine, the survival rate of renal SCC remains remarkably low, necessitating further research to develop a standardized treatment protocol.
Conclusion: Primary renal SCCs are rare tumors and exhibit a strong association with renal stones, requiring prompt assessment and treatment of renal stones in affected patients. Despite their aggressiveness and poor prognosis, timely intervention is crucial.

1. Introduction

Renal cancer is a relatively common form of cancer, with >430,000 new cases diagnosed annually, and approximately 180,000 deaths worldwide [1]. More than 85 % of cancers originated from kidneys are renal cell carcinoma, which originates from renal epithelium [1,2]. Renal squamous cell carcinoma is a rare neoplasm, and it is associated with poor prognosis [2]. Adenocarcinoma of the renal cortex is the most common type of renal cancer, comprising over 85 % of diagnosed renal cancer cases. Remaining type of malignancies are transitional cell carcinoma, sarcoma, Wilms' tumor, squamous cell carcinoma and metastatic deposits [3,4]. Squamous cell carcinoma (SCC) of the renal pelvis is rare, accounting for only 0.5 % to 0.8 % of malignant renal tumors [4]. This report was drafted in line with the SCARE 2020 criteria [5].

2. Case presentation

72-year-old male who had left side open pyelolithotomy in 2018 for large staghorn calculus had an uneventful recovery. He had been an alcoholic and tobacco smoker for >50 years but had been abstinence for past 3 years. After 5 years in 2023, he presented with left side lower abdominal pain, mild intermittent fever, loss of appetitive and loss of weight over a one month period. Ultrasound kidney, ureter and bladder (KUB) revealed left side hydronephrosis, indicative of obstructed infected kidney. This was subsequently confirmed with the non-contrast computerized tomography (NCCT) KUB. No renal mass was detected at that time. Initially, the patient was managed with left side percutaneous nephrostomy. Despite having normal serum creatinine level, the patient exhibited elevated C-reactive protein (CRP) levels (>200) and an Erythrocyte sedimentation rate (ESR) of 90. After percutaneous nephrostomy (PCN) patient's condition improved. However, an attempt at anterograde ureteral stenting (JJ stenting) by interventional radiology team was unsuccessful. Subsequently, retrograde JJ stenting was performed due to difficulties with guide wire negotiation under fluoroscopy. During Rigid ureteroscopy (URS), an unhealthy proximal ureter was identified but the risk of ureteral injury prevented us from taking a biopsy. Following successful stenting, the patient was discharged. However, patient returned after 2 weeks with the worsening of the

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abdominal pain with positive psoas sign. A contrast enhanced computerized tomography (CECT) scan performed a month after the initial presentation revealed a mass at the lower part of the kidney. The mass had infiltrated into the pelvic ureteric junction, proximal ureter and left psoas muscle. Additionally, gross hydronephrosis and interval vertebral body erosions were observed (Fig. 1). These findings were discussed at the multidisciplinary team (MDT) meeting, and it was decided these features are more suggestive of malignant changes. An image guided biopsy reveled SCC (Figs. 2 & 3). Subequently MDT discussion concluded that palliative radiotherapy would be the most suitable approach, and the patient was transferred to a specialized center for further management.

3. Discussion

Renal cancer is a relatively common form of cancer. However, squamous cell carcinoma (SCC) of the kidney is extremely rare, accounting for only 0.5 % to 0.8 % of malignant renal tumors [3], whereas the renal cell carcinoma (RCC) accounts for about 85 % of renal tumors [2]. Furthermore, when compared to transitional cell carcinoma, squamous cell carcinoma tends to be more invasive.

Several risk factors have been identified, including long-standing nephrolithiasis, chronic pyelonephritis, exposure to exogenous and endogenous chemicals (e.g., arsenic), infections, hormonal imbalances, smoking, schistosomiasis, analgesic abuse, and radiotherapy or chronic rejection in transplant kidneys. Recent literature suggests that men with a history of renal stones, especially those with chronically infected staghorn renal calculi, exhibit a higher incidence of renal SCC [4,6–9,17,18].

The development of SCC in the kidney is believed to be associated with chronic irritation, inflammation, infection, and hydronephrosis. These factors may lead to squamous metaplasia, dysplasia, and carcinoma. However, it remains unclear whether squamous metaplasia is caused by the presence of stone or if stone formation is a consequence of SCC [10,11].

Renal cell carcinomas are known to present with a classic triad of symptoms, which include hematuria, renal angle pain, and a palpable mass. Other potential symptoms may include weight loss or fever [3,12]. In contrast, SCC has a wider range of atypical presentations, encompassing clinical features such as flank or abdominal masses, weight loss, hematuria, lumbago, and paraneoplastic syndromes. These syndromes may encompass hypercalcemia secondary to ectopic parathyroid-like hormone production, thrombocytosis, and leukocytosis. Patients with SCC often present with a combination of lumbago and gross hematuria [13,14]. In some cases, the presentation may be due to an obstructed infected system, as observed in our patient. Additionally, our patient displayed the psoas sign, a feature not commonly documented in other case studies.

While ultrasonography typically reveals hydronephrosis, contrast-enhanced CT is a crucial tool providing high-resolution imaging for assessing masses and staging renal malignancies. The literature suggests that both CT and Magnetic resonance imaging (MRI) offer similar diagnostic accuracy [14]. In cases of atypical hydronephrosis presentations, it is advisable to conduct a contrast-enhanced CT, especially in patients with a history of renal stones and a poorly functioning kidney on urogram, or those presenting with hematuria [15]. Periodic intravenous urography (IVU) is also recommended for patients with renal stones, particularly those with a long-standing history. The presence of filling defects in the collecting system, delayed appearance of pyelogram, or thickening of renal parenchymal should be considered as signs

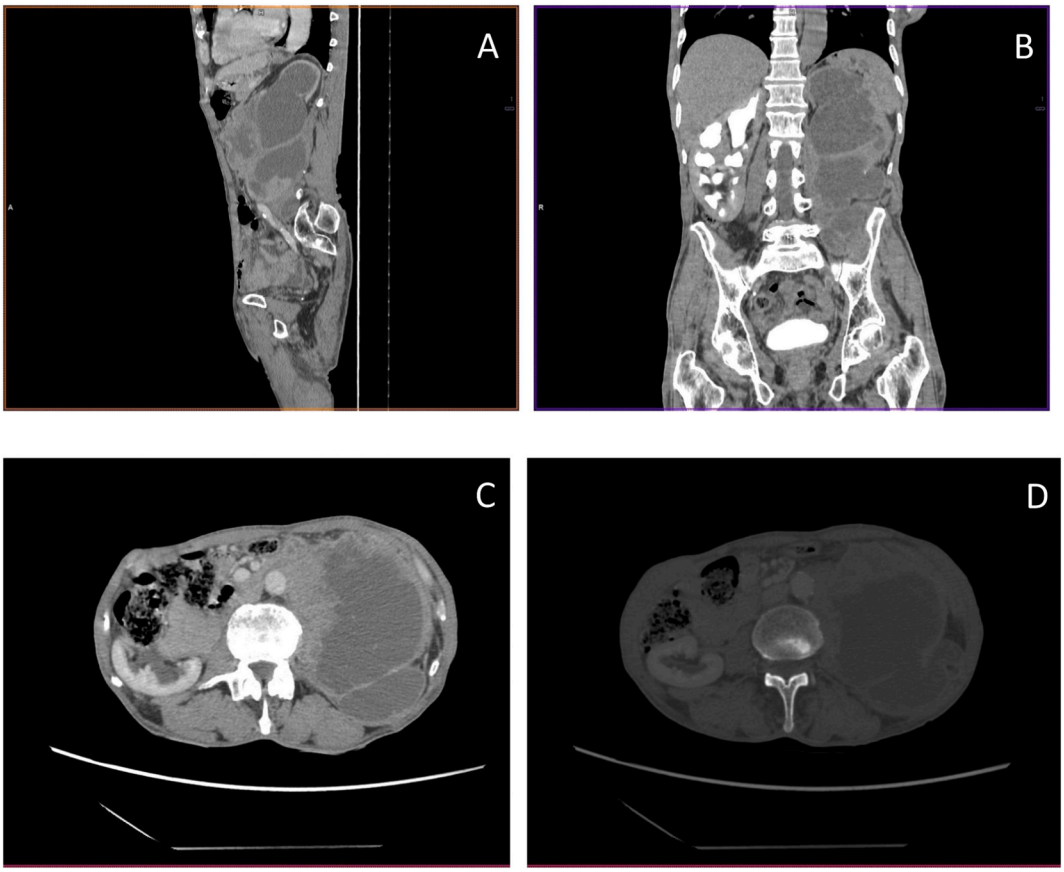

Fig. 1. CT images of the lesion. A – Sagittal section illustrating the lesion originating from the left lower pole of kidney. B – Excretory phase image revealing the nonfunctioning left kidney. C- Axial image displaying the lesion arising from the left lower pole of kidney. D – Bone window view highlighting the erosion of the vertebra.

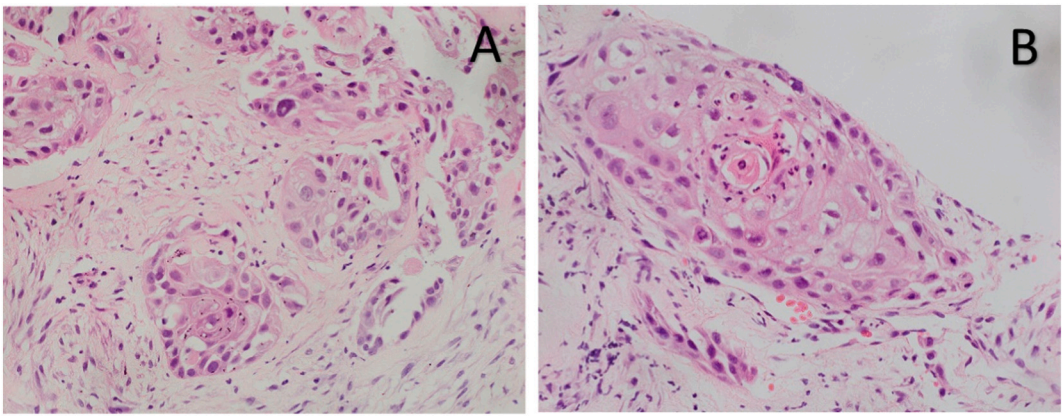

Fig. 2. A and B: H & E 400×: The cells exhibit moderately pleomorphic hyperchromatic nuclei. Single cell keratinization and keratin pearls are present.

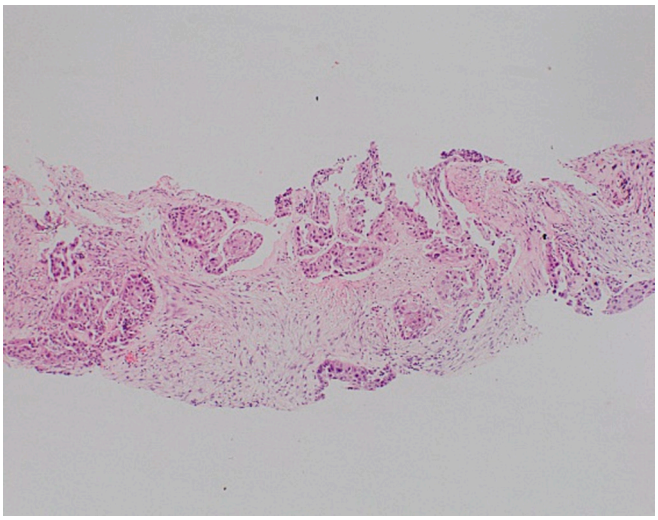

Fig. 3. H & E 100×: The core biopsy displays nests of malignant squamous cells in a desmoplastic stroma.

of renal tumors, even in the absence of mass effect and preservation of smooth renal contour. Therefore, performing a CECT is recommended for visualizing any mass [7,16,6,17].

In this case, the initial ultrasound and non-contrast CT suggested only an obstructed infected system. Nonetheless, owing to findings of rigid ureteroscopy (URS) and worsening of abdominal pain, a contrast-enhanced CT was performed, which unveiled the existence of a renal mass with extension into other regions. This remarkably aggressive progression of the tumor within such a short span of time is a noteworthy observation.

A multidisciplinary team (MDT) meeting was convened to deliberate on the diagnosis and subsequent management. To establish a management strategy, it was decided an image-guided core biopsy should be performed to obtain histological confirmation, a choice influenced by the patient's age and advanced stage of cancer. The histological examination confirmed the presence of SCC, revealing nests of malignant squamous cells in a desmoplastic stroma with pleomorphic hyperchromatic nuclei, along with single cell keratinization and keratin pearls.

Due to the lack of comprehensive reporting and adequate knowledge, there are currently no established management guidelines with a standardized protocol for renal SCC. The mainstay of treatment involves either radical nephrectomy or nephroureterectomy, although parenchyma-sparing surgeries have also been proposed for unifocal disease. Adjuvant chemotherapy and radiotherapy using cisplatin-based regimens are often administered to patients with advanced stages and poor prognoses. Nevertheless, these therapies have not exhibited survival advantages, emphasizing the critical need for early diagnosis [8,7,16,6].

Case series have reported that renal squamous cell carcinomas (SCC) are often diagnosed at advanced stages, a pattern that is consistent with our patient's diagnosis, which included malignant invasion of the psoas muscle resulting in hip flexion. Considering the patient's age, advanced cancer stage, and poor prognosis, the decision was made to manage the patient using palliative radiotherapy in the subsequent MDT meeting.

In conclusion, the rarity of renal SCC makes it challenging to gain extensive understanding of its characteristics and formulating a definitive treatment approach. Despite advancements in modern medicine, the survival rate of renal SCC remains remarkably poor, necessitating further research to develop a standardized treatment protocol.

4. Conclusion

Primary renal SCCs are indeed rare and aggressive tumors, displaying a strong association with renal stones. A wider range of presentations should be taken into account when suspicions of renal squamous cell carcinoma arise. This emphasizes the necessity of prompt treatment of renal stones and thorough evaluation for renal tumors in patients with long-standing staghorn calculi. Early detection of renal carcinoma and aggressive intervention remain vital, even though the prognosis associated with such cases remains unfavorable.

Statement of informed consent

Informed written consent was obtained from the patient in this case study for publication of this case report and relevant images.

Ethical approval

The ethics clearance was not necessary to this study because Institutional Review Board(IRB) of Teaching Hospital Jaffna does not require ethical approval for reporting individual cases or case series.

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Author contribution

Study concept – Balagobi B and Priyatharsan K

Data collection – Thulasi T, Priyanka A, Priyatharsan K, Heerthikan K and Sureska G

Data analysis – Heerthikan K and Priyatharsan K

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Conflict of interest statement

None.

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