CASE REPORT

Leaving No Stone Unturned: A Case Report of Squamous Cell Carcinoma of the Kidney Associated with a Staghorn Calculus

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Squamous cell carcinoma (SCC) of the kidney is a rare malignancy and has a poor prognosis because it is usually detected and presents at an advanced stage of the disease. Due to lack of studies regarding its clinical course and its radiologic features, it is usually not detected and presents as an incidental finding in histopathologic results. This type of malignancy more often is related to Renal stones secondary to chronic infection, inflammation, and irritation. A 52-year-old Filipino woman was referred to this institution due to flank pain and constant weight loss. The authors administered antibiotics then performed simple nephrectomy on her. A pathologic examination revealed Squamous Cell Carcinoma with Sarcomatoid differentiation. Four months after the operation, patient was readmitted due to lowback pain and generalized weakness which led to a suspicion of a possibility of Bone Metastasis. Patient was offered further workups such as whole abdominal CT scan with contrast and other palliative treatments however she refused and opted to be discharged despite medical advice. Patient then died 2 weeks after being home against medical advice.

Key words: squamous cell carcinoma, staghorn calculus

Introduction

Literature provides that Renal cell carcinomas, especially arising from the renal cortex, accounts for about 80% to 85% of all primary renal neoplasms.[1] The most frequent type of renal cell carcinoma is the transitional cell carcinoma, which constitutes approximately 8% of the total incidence. Less frequently, there are parenchymal epithelial tumors, which include pathologies such as oncocytomas, collecting duct tumors, angiomyolipomas, and renal sarcomas.[2]

Renal cell carcinomas are predominantly seen in men aged 50 to 70. On a global scale, they exhibit varying degrees of incidence. In the United States alone, there are approximately 63,000 fresh diagnoses annually, leading to nearly 14,000 fatalities. It was noted that most of the increases in cases in the US observed since the 1980s have been diagnosed at an early stage of the disease.[1,3] In the Philippines, a total of 2,384 new cases of kidney cancer were recorded in 2020 alone and amassing 1,229 cancer deaths. Accordingly, it was concluded that renal cell carcinoma is the most common type of renal malignancy in the country.[4]

The screening of renal cell carcinoma typically includes the following: 1) urine test with possibility of hematuria; 2) hematological parameters indicative of anemia or high serum calcium levels; and 3) a renal and bladder ultrasound showing a solid mass or a complex cyst, which can have septations and nodules.[2,5] As to imaging, a plain and contrast enhanced CT scan of the kidneys, ureters,

and bladder are staples in its diagnosis. Through these imaging modalities, renal cell carcinoma will demonstrate significant enhancements, which can even reach greater than 20 Hounsfield units (HU) after contrast. The imaging modalities can also detect lymphadenopathy and invasion to the renal vein or inferior vena cava or invasion to the adjacent organs, greatly assisting in the approach to management. Moreover, the aforementioned use of the CT scan allows for the detection of metastases, including the extent of involvement among the bones of the abdomen and pelvic regions. Accordingly, if distant metastases are suspected, a whole-body CT scan is still warranted.

Rare cases of renal cell carcinoma also include squamous cell carcinoma of the kidney. Even as it is rare, it is still vital to explore this as a potential differential diagnosis, especially when a renal mass coincides with persistent renal calculi. Chronic irritation, inflammation, and infections that facilitate squamous metaplasia of the renal pelvis epithelium, are known factors that can contribute to the said diagnosis. Thus, cases of chronic pyelonephritis, which is a state of chronic inflammation and chronic irritation of the renal parenchyma through stones are significant considerations needed to be explored when considering a diagnosis of squamous cell carcinoma.[6]

This case report presents a Filipino patient who was diagnosed with stage IV (T1bN0M1) squamous cell carcinoma of the kidney associated with a single staghorn calculus. The paper focuses on the perspective of the patient's management, as well as the comparison of the unique features of this case contrasted against similar cases reported in peer-reviewed literature.

The Case

The patient is a 52-year-old female who came to the hospital with a chief complaint of flank pain and constant weight loss, which started and persisted about three months prior to her hospital consultation. It was also noted that the patient did not present with symptoms of hematuria. Upon being given the requisite ancillaries and laboratory evaluations, the patient was diagnosed to have a non-functioning kidney, secondary to Obstructive Nephropathy, which was also secondary to a left staghorn calculus, hence the patient was subsequently scheduled for a simple nephrectomy of the left kidney.

The operation was conducted without any intraoperative complications.

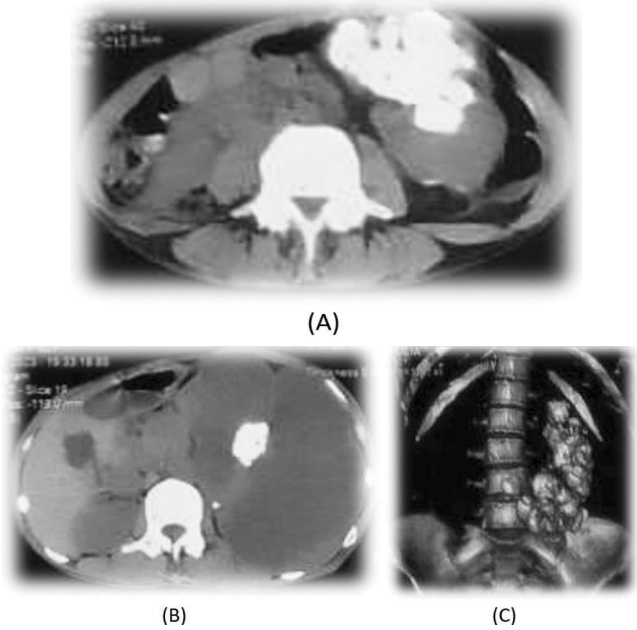

Figure 1. (A-C) Non-contrast enhanced CT scan of the KUB of the patient showing the presence of the staghorn calculus of the left kidney.

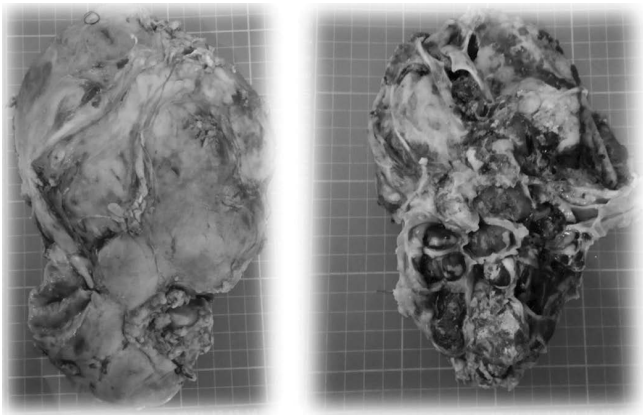

Figure 2. Gross and Opened-cut section of the kidney specimen of the patient status post open simple nephrectomy.

Patient was then transfused with 3 units of PRBC postoperatively, as the rest of the hospital stay was unremarkable. However, it turned out that

the surgical pathology report of the left kidney indicated that the patient had stage 1 (T1BNO) Squamous cell carcinoma. Patient was lost to follow up however three months post-surgery patient presented with low back pain and generalized body weakness.

Patient was then readmitted at this institution with the planned workup for the patient which included a whole abdominal CT scan with contrast. Unfortunately, the patient was discharged against the physician's advice.

Outcome and Follow-up

Upon further investigation, it was found out that the patient had developed bone metastasis presenting as low backpain and had expired at about 4 months post nephrectomy.

Discussion

A primary squamous cell carcinoma arising in the urinary tract is relatively uncommon, as SCCs usually arise from the urinary bladder and male urethra rather than the kidney.[5] Inversely, the patient reported in this case appears to have an incidentally acquired primary renal squamous cell carcinoma associated with calculi and severe hydronephrosis. Nevertheless, the connection between renal cancer and a kidney stone, particularly a staghorn calculus in this instance, appears to be an emerging trend of increasing significance in recent cases involving renal cell carcinoma diagnoses.

A similar study of a 54-year-old female complaining of left flank pain and an abdominal mass of six months presented with squamous cell carcinoma of the kidney, which was associated with a ureteral stone. Despite the patient being successfully treated after radical nephrectomy, as well as four cycles of tirelizumab as antibiotic therapy, the patient had developed adrenal, lymph, and uterine appendage metastases. The proponents mentioned that squamous cell carcinoma of the kidney has a poor prognosis and should be a consideration in patients with a renal mass, long-standing urinary calculi, or massive hydronephrosis.[2]

In another rare case, a 61-year-old male complains of right flank pain for five months. A CT scan then revealed multiple renal stones, as well as a necrotic mass in the right kidney lower pole, which was suspected as an ascending colon invasion. Radical nephrectomy, coupled with a right hemicolectomy and lymph node dissection was done. After which, an examination of the kidneys, along with a PET/CT led to the diagnosis of primary squamous cell carcinoma of the kidney. Adjuvant therapy was not administered to the patient, who remained alive throughout the 6-month follow-up period post-surgery. Notable features of this case were the presence of adjacent organ invasion, and the proponents remarked on how the mechanism of SCC pathology remains unclear, with its prognosis appearing to assimilate that of urothelial carcinoma when compared through differing stages.[5]

As to the presence of staghorn calculi in squamous cell carcinoma, a 59-year-old female presenting with a long-standing history of flank pain and hematuria was studied, in which the imaging modalities revealed the enlargement of the right kidney accompanied by the presence of multiple staghorn calculi. Subsequently, the patient underwent a radical nephrectomy right, and the histopathological analysis of the mass confirmed the presence of well-differentiated keratinized squamous cell carcinoma. Notably, as to the previous case, no primary source for this squamous cell carcinoma was identified.[3]

From the three cases previously discussed, common features arising from patients with SCC are: 1) the age range of the patients, which seem to be in the ranges of early 50s to early 60s; 2) a long-standing history of flank pain which may or may not include hematuria; and 3) the occurrence of staghorn calculus, which is present in one of the three case reports reviewed.[2,3,5,6]

In a broader case series consisting of 14 patients with SCC of the kidney[6], most were male (71.4%) and had a mean age of 56 years. Among the patients studied, flank pain emerged as the predominant presenting symptom, observed in 11 cases (78.6%), followed by fever, noted in 6 cases (42.9%). Interestingly, only 4 out of the 14 patients (28.5%) had received a preoperative diagnosis of squamous cell carcinoma (SCC), while the remaining 10 patients (71.4%) had an incidental finding of SCC upon examination of their histopathology specimens. The mean overall

survival duration stood at 5 months, with a standard deviation of 4.5 months. In a deeper look of the cases in the series, various modes of presentation were documented, encompassing flank pain, hematuria, fever, loss of appetite, and weight loss, with the addition of painful urination and wound discharge. These symptoms frequently overlap with those associated with the more prevalent forms of renal cancer, making primary renal SCC hard to diagnose. Six individuals, whose nonfunctional kidneys were surgically removed, were discovered to have remaining disease upon post-operative radiological assessment. These patients underwent excision of the residual disease.

Furthermore, among the ten patients who incidentally exhibited squamous cell carcinoma upon histopathological examination, two were identified to possess metastatic nodules within their lungs. Unfortunately, none of the patients provided consent for chemotherapy, while six of them did receive radiation therapy as a component of their pain management for secondary bony metastases. Unfortunately, all fourteen (14) died secondary to the extensive metastasis and disease progression.[6]

The cases reviewed emphasize the difficulties the recognition of squamous cell carcinoma in the affected cases, most especially, that a correct preoperative diagnosis cannot be made only based on the patient's symptomatology and radiological findings. Unfortunately, the confirmation of squamous cell carcinoma can only be done through differentiation of cells in pathological studies. It would be difficult to rely upon symptomatology and radiological studies, as they are not too dissimilar from those of other upper urinary tract neoplasms and chronic inflammatory diseases.

In terms of management, it was noted that nephrectomy became a necessary intervention in cases of metastatic squamous cell carcinoma, primarily for symptom management and, on occasion, to confirm the pathological diagnosis. In addition to the surgical management, the use of adjuvant cisplatin-based chemotherapy and palliative radiotherapy has been proposed to alleviate symptoms in cases of metastatic disease. However, their impact on overall survival remains uncertain, while the establishment of suitable treatment protocols for patients in this category warrants further extensive research through large-scale studies.[6]

Conclusion

Primary squamous cell carcinoma of the kidney is a rare malignancy involving the urinary tract system. While renal squamous cell carcinoma with sarcomatoid differentiation is extremely rare, and the prognosis is very poor. In dealing with patients that have long-standing staghorn calculus within the renal pelvis on top of the presence of massive hydronephrosis, the physician should always consider a differential diagnosis of a possible renal squamous cell carcinoma, even with its rare occurrence, as progression and metastasis have proven to be fatal. The clinical picture of the disease is also important as the gradual onset of vague symptoms, lack of pathognomonic signs, and inconclusive radiological features make the squamous cell carcinoma of the kidney unsuspected in most cases, therefore delaying diagnosis and treatment.

Conventional imaging methods may not reliably detect this type of malignancy, and in most instances, the use of non-contrast and contrast enhanced CT scan in conjunction with MRI imaging plays a vital role in nailing down the diagnosis. It is also prudent for specialized physicians to be tactical in offering prompt surgical interventions combined with immunotherapy if suspicion is high likely, as it may improve survival rates of these patients.

Squamous cell carcinoma of the kidney usually presents at an advanced stage, with often poor prognosis. Therefore, not only should a high index of suspicion be warranted in patients with chronic kidney stone disease, but more studies should be conducted to discern the common features of patients with squamous cell carcinoma of the kidney associated with renal calculi. This would enable the identification and perspective evaluation of risk factors which would greatly help in the treatment and management of this condition in the susceptible patient population.

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