International Surgery Journal
*Langalia PK et al. Int Surg J. 2025 Aug;12(8):1419-1422*
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20252304

**Case Report**

# Squamous cell carcinoma arising from immature teratoma of the kidney in a patient with chronic pyelonephritis

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**Received:** 19 June 2025
**Accepted:** 15 July 2025

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## ABSTRACT

Renal squamous cell carcinoma (SCC) is a rare malignancy often associated with chronic renal conditions like pyelonephritis and nephrolithiasis. Malignant transformation of a renal immature teratoma into SCC is exceedingly rare. We report a case of a 27-year-old male presenting with chronic pyelonephritis and left flank pain. Imaging revealed a renal mass, and subsequent nephrectomy with histopathology confirmed SCC arising from an immature teratoma, with regional lymph node metastasis. Chronic inflammation may have contributed to malignant transformation. This case highlights the potential for malignancy in renal teratomas and the need to consider SCC in patients with chronic renal pathology for timely diagnosis and management.

**Keywords:** Renal squamous cell carcinoma, Immature teratoma, Chronic pyelonephritis, Malignant transformation, Nephrectomy

## INTRODUCTION

Primary squamous cell carcinoma (SCC) of the kidney is an exceptionally rare malignancy, accounting for less than 1% of all renal tumors.[1] It is typically associated with chronic inflammatory conditions such as long-standing pyelonephritis, nephrolithiasis, and other causes of persistent urothelial irritation, which may induce squamous metaplasia and subsequent malignant transformation.[2]

Teratomas are germ cell tumors composed of tissues derived from all three embryonic germ layers. Although most commonly found in gonadal locations, extragonadal teratomas, including those arising in the kidney, are exceedingly rare.[3] Fewer than 30 cases of renal teratomas have been reported in the literature, and these tumors usually present during childhood.[4] Malignant transformation within teratomas—particularly into SCC—is a recognized, though infrequent, event, most commonly observed in ovarian teratomas.[5] However, such transformation within a renal teratoma is exceedingly uncommon.

Chronic inflammation, such as that caused by recurrent pyelonephritis, is believed to contribute to malignant transformation of epithelial components within teratomas, potentially via a pathway of sustained irritation, metaplasia, and oncogenic mutation.[6] In this context, the renal environment may facilitate squamous differentiation and eventual carcinoma.

Herein, we present a rare case of SCC arising from an immature renal teratoma in a 27-year-old male with clinical features of chronic pyelonephritis.

To our knowledge, this represents one of the few documented instances of such a transformation, highlighting the need for high clinical suspicion and comprehensive histopathological evaluation in atypical renal masses.

## CASE REPORT

A 27-year-old male presented with a one-month history of intermittent left flank pain. He had a history of exploratory laparotomy for intestinal obstruction and chronic pyelonephritis, for which a DJ stent was placed a year earlier. The patient was malnourished, with no other significant comorbidities. On examination, the abdomen was soft and non-tender, and the scar of a previous midline surgery was noted. Vital signs were stable.

**Table 1: Routine blood investigation.**

| Laboratory test results | Values |
|---|---|
| **Haemoglobin (gm/dl)** | 7.3 |
| **Total leucocyte count (/cumm)** | 10900 |
| **Platelet count (/cumm)** | 499000 |
| **Blood urea (mg/dl)** | 16 |
| **Serum creatinine (mg/dl)** | 0.7 |

### *USG and FNAC*

A hypoechoic lesion of size 3.6×3 $cm^2$ in left renal fossa.

### *CT report*

Approx 104×70×78 mm sized ill-defined left kidney shows multiple ill-defined heterogeneously enhancing collection with air foci within and specks of calcification completely destroyed and replace normal renal parenchyma and also involving renal hilum. There is peripherally wall enhancing collection with air foci noted involving pelvi-calyceal system extending in perinephric space and renal fascia predominantly along lower pole. Few of jejunal loop appear adherent with suspicious communication to above mention pelvicocalyceal collection Few subcentimetric size lymph node with significant fat standing noted along renal hilum and perinephric fat. No evidence of contrast excretion noted in left kidney Above feature suggestive of infective etiology "changes of emphysematous pyelonephretits".

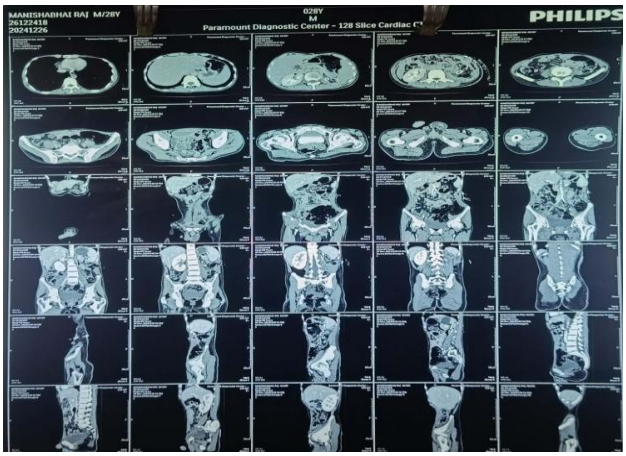


**Figure 1: CT scan slices from level of the diaphragm to the pubic symphysis with IV contrast.**

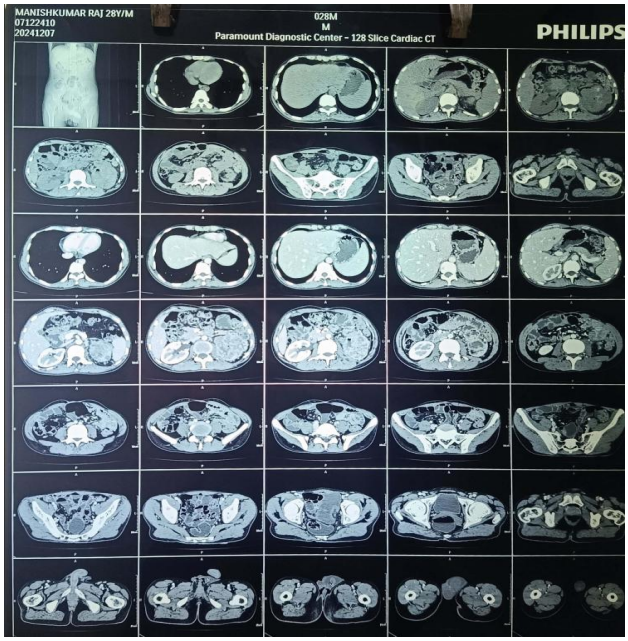


**Figure 2: CT scan slices from level of the diaphragm to the pubic symphysis with IV contrast.**

### *$Tc^{99}$ DTPA*

*Perfusion phase*

Right kidney shows adequate perfusion, left kidney shows significantly reduced perfusion.

*Cortical and excretion phase*

The right kidney appear normal in shape and size, shows uniform and adequate tracer extraction. Intrarenal transit time appears normal. The pelvicalyceal drainage appear normal.

The left kidney appears small in size. Its faintly visualized and shows significantly reduced tracer extraction. The drainage pattern cannot be commented due to impaired cortical function.

### *Renograms (time activity curves)*

The right kidney curve shows blunt cortical and normal excretory phase.

The left kidney curve shows reduced count with flate curve (parenchymal dysfunction pattern).

**Table 2: Quantitative parameter of DTPA scan.**

| Parameters | Left kidney | Right kidney | Total |
|---|---|---|---|
| **Differential function (%)** | 7.17 | 72.83 | 100 |
| **GFR (ml/min)** | 4.79 | 61.98 | 66.77 |

***Impression***

Right kidney appears normal in size, adequate cortical function unobstructed drainage.

Left kidney faintly visualized with significantly reduced cortical function drainage pattern cannot be commentated due to impaired cortical function.

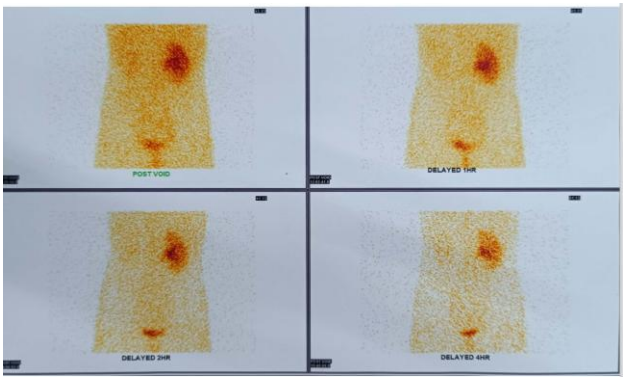


**Figure 3: DTPA scan.**

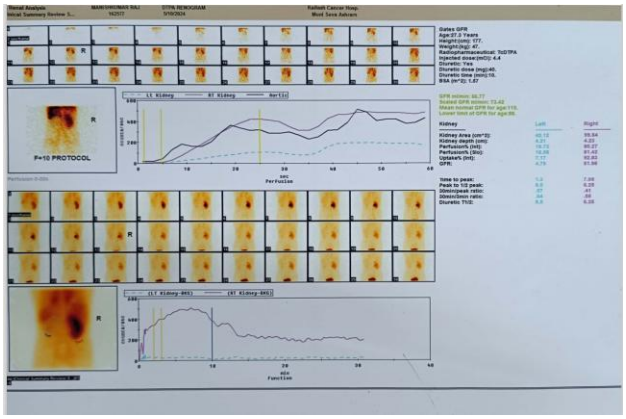

**Figure 4: DTPA scan.**

Following all pre-operative procedures investigation and informed and written concern the patient was undertaken for surgery under general anaesthesia under ASA-2.

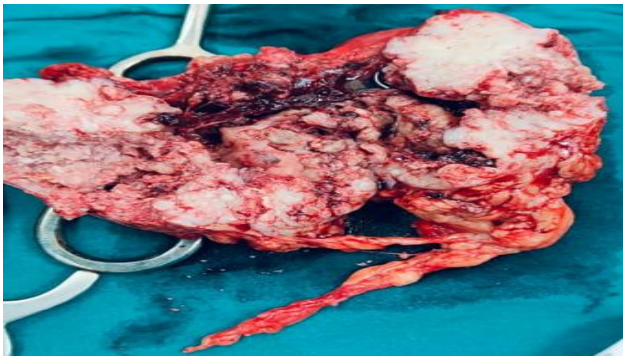

**Figure 5: Resected specimen showing a hard necrotic lesion with irregular margins, invading perirenal tissues.**

Patient was lying in right lateral position, loin incision was made, Abdominal layers opened along with line of skin incision, found grossly enlarged distorted left kidney separated from surrounding, after ligating renal artery, renal vein and pelvis left kidney excised and sent for histopathological examination.

***Histo-pathological report***

Feature suggestive of well to moderately differentiated squamous cell carcinoma replacing the renal parenchyma. Carcinoma has infiltrated the perinephric fat with regional metastasis is seen in two of the five lymph nodes. Foci of solid sheets and nests of large undifferentiated pleomorphic cell with vesicular nuclei containing prominent nucleoli with increase mitosis. Residual kidney shows changes of chronic pyelonephritis. The tumor's association with an immature teratoma was evident, as teratomatous elements were observed within the tumor.

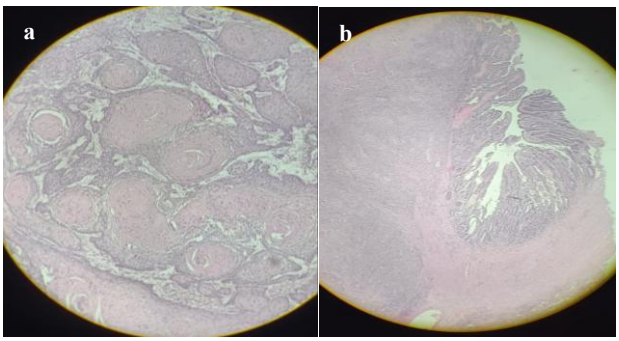


**Figure 6 (a and b): Microscopic appearance.**

## DISCUSSION

Teratomas are germ cell tumors composed of tissues from all three embryonic layers, most commonly arising in the gonads. However, extragonadal teratomas, particularly those arising in the kidney, are exceedingly rare. Renal teratomas represent a diagnostic and therapeutic challenge due to their atypical presentation and histological diversity. While mature cystic teratomas are typically benign, malignant transformation—especially into SCC—is a well-documented but rare phenomenon.

Most data regarding teratomas and their malignant transformation originate from ovarian tumor studies. Mature cystic teratomas (dermoid cysts) constitute 10–20% of all ovarian neoplasms and are the most common germ cell tumor of the ovary, typically occurring in women of reproductive age. A landmark study by Koonings et al analyzing 10 years of ovarian neoplasms revealed that mature cystic teratomas were among the most frequent benign ovarian tumors, accounting for a substantial proportion of germ cell neoplasms.[6]

Katsube et al further reinforced the predominance of mature teratomas among ovarian tumors, highlighting their benign nature, although their study also

acknowledged rare malignant transformations.[7] Westhoff and colleagues, in a population-based case-control study, examined the risk factors and demographic profiles associated with benign ovarian teratomas and underscored the importance of vigilant long-term follow-up due to potential for complications, including malignancy.[8]

The incidence of malignant transformation in mature cystic teratomas is estimated to be 1–2%, with squamous cell carcinoma being the most frequent histologic subtype. Comerci et al in a large clinicopathologic study of 517 cases of mature cystic teratomas, reported squamous cell carcinoma as the predominant malignancy arising within these tumors, occurring in 1.4% of cases. Their study emphasized the diagnostic difficulty in preoperatively identifying malignancy and recommended thorough histologic evaluation post-resection.[5]

Although the kidney is an uncommon site for teratomas, cases have been reported, typically in the pediatric population. Adult cases are extremely rare, and reports of immature renal teratomas undergoing malignant transformation are even more exceptional. Chronic inflammation, such as that seen in chronic pyelonephritis, may contribute to malignant transformation through sustained epithelial injury and metaplasia, creating a pro-oncogenic microenvironment that could favor squamous differentiation and malignancy.

To the best of our knowledge, this is one of the very rare cases of squamous cell carcinoma arising from an immature renal teratoma in the setting of chronic pyelonephritis. This case underscores the need for heightened clinical suspicion, especially in adults presenting with complex renal masses and a history of chronic renal inflammation. Complete surgical excision followed by histopathological analysis remains the cornerstone of diagnosis and management.

## CONCLUSION

This case report describes an unusual occurrence of squamous cell carcinoma arising from an immature teratoma in the kidney of a young male patient presenting with chronic pyelonephritis. While squamous cell carcinoma is an uncommon renal malignancy, it should be considered in patients with a history of chronic kidney disease, especially when there is evidence of chronic pyelonephritis. Furthermore, the possibility of malignant transformation in an immature teratoma, though rare, should be acknowledged. Early recognition, surgical resection, and oncological management are crucial for improving patient outcomes in such complex cases.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: Not required*

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**Cite this article as:** Langalia PK, Patel B, Thakkar V, Reddy N. Squamous cell carcinoma arising from immature teratoma of the kidney in a patient with chronic pyelonephritis. Int Surg J 2025;12:1419-22.