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A master of disguise: A rare case of renal solitary fibrous tumour

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A B S T R A C T

Solitary fibrous tumour (SFT) of the kidney is extremely rare, with fewer than 100 reported cases. We describe a 58-year-old male with a left renal mass, initially suspected as transitional cell carcinoma on CT urography. He underwent radical nephroureterectomy with bladder cuff excision. Histology revealed spindle cells in a collagenous stroma, and immunohistochemistry showed strong nuclear STAT6 positivity, confirming SFT. Postoperative recovery was uneventful, and the patient remains disease-free at six months. Renal SFT diagnosis relies on histopathology and immunohistochemistry, with complete surgical excision as the mainstay and long-term surveillance recommended due to recurrence risk.

1. Introduction

Solitary fibrous tumours (SFTs) are fibroblastic mesenchymal neoplasms accounting for less than 2 % of all soft tissue tumours. Initially identified in the pleura, they are now recognized at extrapleural sites such as the retroperitoneum, orbit, pelvis, and kidneys.[1,2] They are mostly benign, however approximately 10–15 % can show aggressive or malignant features.[3,4] Renal SFTs are extremely rare, representing <0.1 % of renal tumours.[5–7]

Preoperative diagnosis is challenging because imaging findings overlap with Renal Cell Carcinoma (RCC) or Upper Tract Urothelial Carcinoma (UTUC).[8] Histologically, SFTs are composed of spindle-shaped cells arranged in a "patternless" architecture with alternating cellularity and hemangiopericytoma-like vessels. Immunohistochemistry (IHC) plays a pivotal role, especially the presence of nuclear STAT6 expression, which is considered diagnostic due to the NAB2–STAT6 fusion gene.[9]

We report a rare case of renal SFT with an atypical presentation and review the diagnostic, therapeutic, and prognostic aspects of this entity.

2. Case presentation

A 58-year-old male daily wage worker presented with bilateral pedal edema of four months duration. He reported no urinary symptoms such as hematuria, dysuria, flank pain, or Lower Urinary Tract Symptoms (LUTS). His past medical history included long-standing hypertension for which he was on amlodipine, type 2 diabetes mellitus, and coronary artery disease, all of which were under regular medical management. He denied any history of smoking, alcohol use, or occupational exposure to urothelial carcinogens. On clinical examination, the patient was afebrile, with stable vital signs. Bilateral pitting pedal edema was noted. Cardiovascular and respiratory examinations were unremarkable. Abdominal examination revealed no tenderness, palpable masses, organomegaly, and renal angle examination was negative for lump or tenderness.

Initial investigations included ultrasonography of the abdomen, which showed a hypoechoic mass in the interpolar region of the left kidney, associated with mild pelvicalyceal system dilatation. Contrast-enhanced CT urography demonstrated a 6 × 5 × 4 cm heterogeneously enhancing lesion arising from and involving the renal pelvis, associated with mild hydronephrosis and para-aortic lymphadenopathy (Fig. 1). Based on imaging features, the lesion was provisionally suspected to be transitional cell carcinoma (TCC) of the renal pelvis. Urine cytology was performed on three consecutive samples, all of which were negative for malignant cells.

Given the radiological suspicion of UTUC and the absence of bladder lesions on preoperative evaluation, the patient was planned for left radical nephroureterectomy with bladder cuff excision via an open approach. Intraoperative cystoscopy confirmed the absence of any bladder tumour or mucosal abnormality. Left kidney showed a 5 × 5 cm hard mass in the midpole extending into the renal hilum (Fig. 2). No significantly enlarged lymph nodes were noted. There were no intraoperative adverse events, and the patient's postoperative course was uneventful, with early mobilization and satisfactory wound healing. The patient's bilateral pedal edema was still present postoperatively. He was discharged in stable condition.

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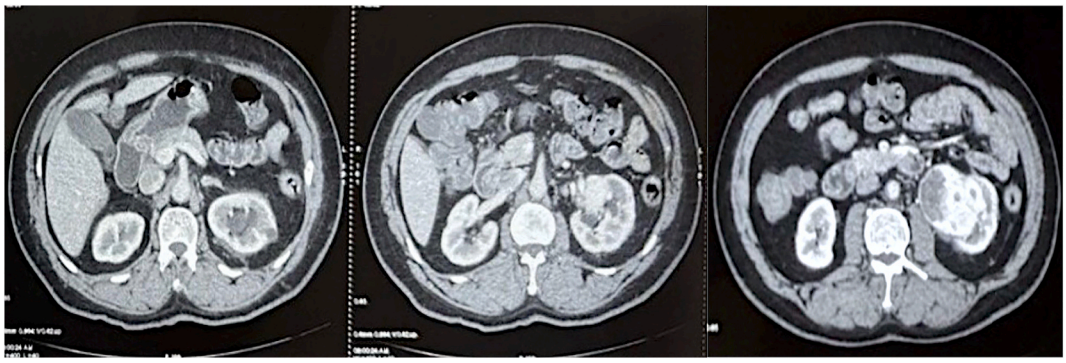

Fig. 1. Contrast-enhanced CT urography showing a 6 × 5 × 4 cm heterogeneously enhancing lesion arising from and involving the renal pelvis, associated with mild hydronephrosis.

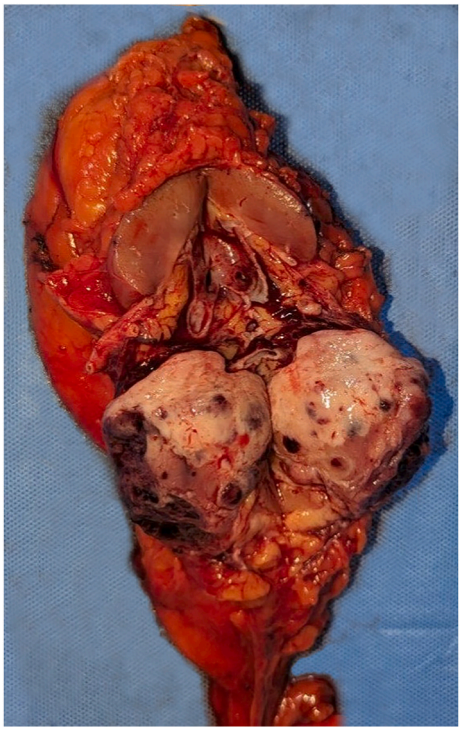

Fig. 2. Left radical nephroureterectomy specimen showing a 5 × 5 cm hard mass in the midpole extending into the renal hilum.

Histopathological examination revealed a well-circumscribed, firm, tan-white tumour measuring 5 × 4.5 × 4.5 cm, localized to the lower pole of the left kidney and abutting but not invading the renal pelvis. Microscopic evaluation demonstrated alternating hypercellular and hypocellular areas composed of spindle-shaped cells with oval nuclei and indistinct nucleoli, embedded in a dense collagenous matrix (Fig. 3). Mitotic activity was <2 per 10 high-power fields, with no evidence of necrosis, cytologic atypia, or lymphovascular invasion. IHC showed diffuse nuclear positivity for STAT6, and positivity for CD34, Bcl-2, and vimentin, while being negative for cytokeratin, EMA, S-100, and desmin (Fig. 4). All lymph nodes were free of neoplasm. Based on these histological and IHC features, a diagnosis of renal solitary fibrous tumour was established.

The patient was advised for regular oncological follow-up, including 6 monthly abdominal imaging for the first 2 years, followed by annual scans for 5 years to detect recurrence or metastasis. He remains disease free at 6 months of follow up.

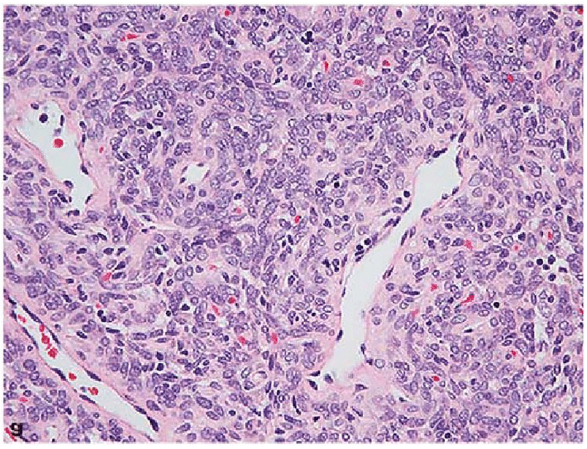

Fig. 3. Histopathology showing hypercellular and hypocellular areas composed of spindle-shaped cells with oval nuclei and indistinct nucleoli, embedded in a dense collagenous matrix.

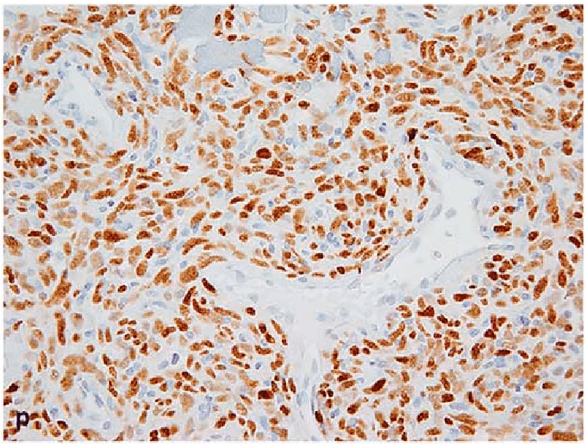

Fig. 4. Immunohistochemistry revealing diffuse nuclear positivity for STAT6.

3. Discussion

Renal SFTs are rare, with fewer than 100 cases documented in English literature.[5–7] It was first described by Gelb et al., in 1996.[10] Since then, only case reports and small case series have been published, with most patients presenting in the fifth to seventh decades of life, and with no significant sex predilection.[5,6] Most are detected incidentally, but when symptomatic, patients present with hematuria, flank pain, or a

Table 1
Review of 7 reported cases of solitary fibrous tumour of kidney along with our case. Abbreviation: NED – No evidence of disease.

Author & Year	Age (years)/Sex	Size (cm)	Presentation	Management	Follow-up
Usuba et al., 2016[1]	50/M	13 × 9 × 8 cm	Left flank pain	Radical nephrectomy	Local recurrence at 8 months - excision done; NED at 1year post-recurrence
Cheung F et al., 2015[2]	63/M	10 cm	Hematuria	Radical nephrectomy	Contralateral recurrence at 10 y; treated with partial nephrectomy; NED at 18 months
Samaratunga et al., 2023[4]	52/M	9.5 cm	Flank pain	Radical nephrectomy	Contralateral recurrence after 17 years - treated with partial nephrectomy; NED at 2 years
Mearini et al., 2014[7]	52/M	14 × 9 × 8 cm	Hematuria	Radical nephrectomy + lymph node dissection	NED at 30 months
Zaghbib et al., 2019[11]	55/M	4 × 4 × 3 cm	LUTS	Partial nephrectomy	NED at 9 months
Wang et al., 2014[12]	66/F	23 × 18 × 12 cm	Right flank mass	Radical nephrectomy	NED at 9 months
Yang et al., 2017[16]	50/M	15 × 11 cm	Hematuria, flank pain	Radical nephrectomy, adrenalectomy, RPLND, and left hepatic lobectomy	Recurrence at 2 years
Present case (2025)	58/M	5 × 4.5 × 4.5	Pedal edema	Radical nephroureterectomy	NED at 6 months

palpable mass.[11] Table 1 summarises selected published cases, including our present case. In our patient, the renal SFT was diagnosed incidentally during evaluation for bilateral pedal edema, which was subsequently attributed to antihypertensive therapy. This highlights the tumour's potential to remain clinically silent until advanced size or associated systemic effects develop.

Radiologically, renal SFTs typically appear on CT or MRI as well-defined, enhancing soft-tissue masses, often mimicking RCC or UTUC.[8,12] Some studies have noted progressive, delayed enhancement on contrast imaging due to the tumour's collagen-rich stroma; however, this finding is not specific and cannot reliably distinguish SFT from other renal neoplasms.[13]

Histologically, SFTs are composed of spindle-shaped cells in a "patternless" architecture with alternating hypercellular and hypocellular areas. The defining IHC hallmark is nuclear STAT6 expression, which correlates with the NAB2–STAT6 gene fusion present in over 95 % of SFTs.[9] Additional supportive markers include CD34 and Bcl-2, though they lack diagnostic exclusivity.[14]

The majority of renal SFTs follow an indolent course, but approximately 10–15 % may behave aggressively.[2,14] Although there is no strict correlation between morphology and behaviour, histopathology remains the best indicator of prognosis.[15] Histologic predictors of malignancy include size >10 cm, mitotic activity >4 per 10 high-power fields, presence of necrosis, nuclear pleomorphism, and positive tumour margins.[14] Our patient's tumour measured 5 cm, had low mitotic activity, and lacked necrosis or atypia, placing it in a low-risk category with favourable prognosis.

Complete surgical excision remains the mainstay of treatment. Radical nephrectomy is commonly performed, but nephron-sparing surgery may be considered for small, well-circumscribed lesions.[6,11] There is no established role for adjuvant chemotherapy or radiotherapy in localized disease, though targeted agents such as pazopanib have shown efficacy in metastatic or unresectable cases.[16]

Given the potential for late recurrence—even more than a decade after surgery—long-term follow-up is essential.[14,17] Current recommendations include cross-sectional imaging every 6–12 months for the first five years, followed by annual surveillance thereafter.

4. Conclusion

Renal solitary fibrous tumour is an exceptionally rare entity with non-specific clinical and radiological features, often mimicking more common renal malignancies. Diagnosis relies on histopathology and immunohistochemistry, with nuclear STAT6 expression serving as a key marker. This case highlights an unusual scenario in which the tumour was incidentally detected during evaluation of pedal edema, reinforcing the need for clinicians to maintain a broad differential diagnosis when evaluating renal masses. Radical surgical excision remains the mainstay of treatment and is curative in most cases. However, given the tumour's unpredictable malignant potential and the possibility of aggressive behaviour in a subset of patients, vigilant long-term follow-up is essential.

CRediT authorship contribution statement

P.R. Saju: Writing – review & editing, Supervision, Conceptualization. **M. Sharoo Shaneej:** Writing – original draft, Formal analysis, Conceptualization. **Ritu Raj:** Writing – review & editing, Formal analysis. **Suman De:** Writing – review & editing, Supervision. **Ramkumar Aiyappan:** Writing – review & editing, Data curation. **S.J. Aquil Faris:** Writing – review & editing. **Maradana Prudhvi Vasanth:** Writing – review & editing.

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