

Renal oncocytoma - An incidental case and a diagnostic enigma: A case report

Asra Saeed, Jawaid Akhtar Mallick, Farrukh Ashraf, Khadija Mahar

Abstract

Renal oncocytoma (RO) is a benign parenchymal tumour of the kidney that arises from the distal renal tubules. Renal oncocytoma is usually small in size; however, giant lesions are uncommon. The tumour is generally asymptomatic, often diagnosed incidentally, and is considered renal cell carcinoma (RCC) pre-operatively. Diagnosis, however, is challenging on CT-imaging; nonetheless, biopsy can yield a promising diagnosis.

This report presents the case of a 35-year-old asymptomatic male, patient, who presented to the oncology out-patient department of Dr. Ziauddin Hospital, Karachi on 15th January 2025 with a right sided renal mass on his abdominal computed tomography that was discovered incidentally while he was undergoing diagnostic imaging for appendectomy. The patient underwent an elective right radical nephrectomy, and post-operative biopsy confirmed the diagnosis of renal oncocytoma. He presented for oncological consultation. Considering the disease course, tumour characteristics, clinical presentation, and prognosis in accordance with the current guidelines and literature, close follow-up was advised.

Keywords: Renal oncocytoma, Nephrectomy, Case report, Renal cell carcinoma.

DOI: <https://doi.org/10.47391/JPMA.31286>

Introduction

Renal oncocytoma, initially identified by Zippel in 1942 and later further characterised by Klein and Valensi in 1976, is a prevalent renal epithelial tumour. It constitutes 5–9% of all renal tumours and can present across a broad age spectrum, ranging from 24 to 91 years.¹ Renal oncocytomas are often detected incidentally and are associated with an excellent prognosis.² The classic symptom triad of renal cell carcinoma includes a palpable mass, haematuria, and flank pain. However, these symptoms are uncommon in renal oncocytoma.³ In addition to sharing a common cellular origin, renal oncocytoma (RO) and chromophobe renal cell

Department of Radiation Oncology, Dr. Ziauddin Hospital, Karachi, Pakistan.

Correspondence: Asra Saeed. e-mail: iasrasaeed@gmail.com

ORCID ID: 0000-0002-7391-0457

Submission completed: 23-07-2025 **1st Revision received:** 05-12-2025

Acceptance: 22-07-2026

Last Revision received: 21-07-2026

carcinoma (RCC) exhibit similar imaging features, such as a central scar.⁴ Although the tumour size is usually under 5 cm, larger tumours have been documented.⁵ Renal oncocytoma presents a growing challenge for urologists, oncologists, and nephrologists because of its difficult differentiation from renal cell carcinoma (RCC) and the high risk of overtreatment.⁶ Recent studies show that biopsy-proven ROs are suitable for active surveillance and suggest that it is safe to monitor.³

Given these diagnostic challenges and the potential implications for management, we report a case of renal oncocytoma that was detected incidentally and demonstrated radiological features suggestive of malignancy.

Case Report

A 35-year-old male with no known co-morbidities presented to the oncology outpatient department on 15th January, 2025 at Dr Ziauddin Hospital, Karachi, Pakistan, where he was diagnosed with right sided renal mass (noted incidentally on CT-Scan).

He was in usual state of health, when he underwent open appendectomy in Dr Ziauddin Hospital, Karachi, two months back. His surgery was performed on 1st January, 2025. During the work-up for his surgery, CT-Scan of the abdomen with contrast was performed, which showed 11 cm right renal mass, with no metastasis, and no prominent lymph nodes were identified. The patient had no symptomatic history related to the renal mass.

CT-Scan of the abdomen with contrast showed right-sided kidney, normal in size measuring 11 x 5.2 cm with a partially exophytic heterogenous soft tissue mass measuring 10.1 x 11.2 x 10.5 cm (AP x TR x CC) involving mid and lower lobes of the right kidney. No thrombus or prominent lymph nodes were noted. Renal arteries and veins were patent and followed a normal course. Anteromedially, the lesion was abutting adjacent to the gut loop and supero-laterally abutting liver adjacent to liver parenchyma; however, there was no evidence of direct invasion to these sites. The left kidney was in normal shape, size, and position, measuring 10.9 x 5 cm with normal renal parenchyma, renal pelvis, and calyces. The findings were likely suggestive of renal cell carcinoma.

The findings were compatible with RCC; hence, the patient

was admitted electively for right radical nephrectomy. Baseline workup and investigations were sent. The patient remained clinically stable throughout the course of surgery. Right-sided Radical Nephrectomy was performed and biopsy was sent by the surgeon. On macroscopic examination of the nephrectomy material, the right kidney measured 12×11×10 cm and the attached ureter measured 2.5 x 0.5 cm. Per operatively and post-operatively, the patient remained vitally and clinically stable, with GCS 15/15. No complications were observed. He was discharged on the third post-operative day, and was started on oral antibiotics and supportive care.

Surgical biopsy, gross examination of the right renal mass post nephrectomy revealed well-circumscribed, mahogany-brown tumour mass, microscopically consistent with central stellate scar measuring 11.5 x 8 x 6.5 cm. Laterality: right. Histological tumour type was Oncocytoma. Immunohistochemistry was performed in the pathology department using the Dako EnVision™ HRP polymer detection system. Tumour cells showed diffuse positivity for CD117.⁷ Tumour extent was limited to the kidney, involving renal parenchyma and was unifocal. Ureter and hilar vessels remained tumour free. Adrenal gland was not identified. Renal sinus and perinephric fat also remained tumour free.

The patient then presented to the oncology out-patient-department following the surgical histopathology report. He was asymptomatic and his clinical examination was unremarkable. Due to the nature and course of the disease, he was advised a close follow-up in OPD.

Discussion

Oncocytomas are one of the most common benign solid renal tumours and are often misdiagnosed as RCC before surgery, with a definitive diagnosis typically confirmed through histopathologic evaluation.⁸ Renal oncocytomas are typically small, with an average size ranging from 4–7 cm. Large oncocytomas exceeding 10 cm are uncommon, as in the current case. To our knowledge, the largest recorded oncocytoma, measuring 27 × 20 × 15 cm, was documented by Demos in 1988, which has been described by Kratiras et al. 2023.⁹ The unusually large size in the current patient adds to the limited literature describing giant renal oncocytomas.

From a radiological perspective, oncocytomas frequently mimic RCC, making pre-operative diagnosis challenging. Although certain imaging features such as a central stellate scar may suggest oncocytoma, these findings are neither sensitive nor specific. Consequently, most cases are treated surgically due to the inability to reliably exclude malignancy on imaging alone.⁸

Macroscopically, the mass is typically tan or mahogany in colour, well-circumscribed, and may present a central stellate scar in approximately one-third of the cases. Immunohistochemistry can assist in differentiating oncocytomas from other renal tumours. Oncocytomas test positive for CD117 and S100 calcium-binding protein A1 while being negative for CK7 and CD10. However, they share overlapping features with certain RCC subtypes, such as chromophobe RCC, making it challenging to distinguish. Consequently, these tumours are often managed with radical or partial nephrectomy.¹⁰

Additional pathological variations have also been described. Skenderi et al. have documented 24 cases of cystic renal oncocytoma. While a microscopic cystic architecture can be present in oncocytomas, macro-cystic renal oncocytoma remains a rare occurrence. Other atypical features reported in the literature include focal papillae, vascular invasion, and perinephric fat invasion. In a clinicopathological study by Omiyale et al., which analysed 159 cases of resected renal oncocytomas, 20 (12.6%) cases exhibited vascular and/or perinephric fat invasion.¹¹ These findings may raise concern for malignancy; however, the biological behaviour of oncocytomas remains overwhelmingly benign.

In the light of current literature, it is safe to keep a patient on close follow-up. In one study, the patient received annual follow-ups consisting of a physical examination, renal function evaluation, and imaging studies. After four years of monitoring, no major surgical complications were reported, and the abdominal CT scan showed no evidence of tumour recurrence.¹² Therefore, despite occasional atypical histological features, long-term outcomes remain excellent.

In conclusion, renal oncocytomas are asymptomatic parenchymal tumours with a benign clinical course and excellent long-term prognosis. Their large size, atypical features, and characteristics overlapping with RCC can create diagnostic uncertainty; however, histopathological evaluation remains definitive, and outcomes following surgical management are highly favourable.

Conclusion

This paper presents the case report of a patient diagnosed with one of the rare kidney tumours, often misdiagnosed on CT-imaging. Biopsy has been proven to aid in the diagnosis, however, there remains a need for more specific immunohistochemical markers, such as S100A1, CK7 and Hale's colloidal iron staining, or molecular/genetic profiling, to reliably differentiate renal oncocytoma from morphologically similar tumours, particularly chromophobe RCC. The patient was asymptomatic with no

evidence of nodal involvement and metastasis, hence was kept on follow-up.

Abbreviations: CT-Scan: Computed tomography, RO: Renal oncocytoma, RCC: Renal cell carcinoma, IHC: Immunohistochemistry, CD117: Cluster of differentiation, c-kit, CK7: Cytokeratin 7

Consent: Informed consent was taken for publishing this case report.

Disclaimer: None.

Conflict of interest: None.

Funding disclosure: None.

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Author Contribution:

AS: Concept, writing, literature review and formulation.

JAM: Supervision, permission to conduct the research in the hospital and review.

FA: Analysis of the research study and assisted in execution of the study.

KM: Writing and literature review.