

Bilateral Synchronous Renal Oncocytoma: A Case Report and Review

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Abstract

Introduction: Renal oncocytoma is a rare benign tumour. **Clinical Picture:** A 73-year-old man presented with bilateral renal tumours, suggestive of renal cell carcinoma (RCC). Nephron-sparing surgery (NSS) and radical nephrectomy were performed. Both specimens revealed renal oncocytoma on final histology. A review of nephrectomy specimens showed 4 other solitary oncocytomas out of 250 RCCs over the period 1991 to 2000. Diagnosis of oncocytoma could only be firmly established by careful histological evaluation to exclude RCC. **Treatment:** Renal oncocytoma carries a good prognosis. The use of NSS for synchronous bilateral renal masses is highlighted. **Conclusion:** NSS is recommended for renal oncocytoma wherever possible.

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Key words: Computed tomography, Diagnosis, Kidney neoplasm

Introduction

Oncocytomas are neoplasms characterised by large epithelial cells with finely granular eosinophilic cytoplasm called oncocytes. They were first described by Zippel¹ in 1942 and have subsequently been identified in the thyroid, parathyroid, salivary and adrenal glands. Renal oncocytomas were infrequently recognised and it was not until 1976 when Klein and Valensi² reported proximal tubular adenomas with oncocytic features that this neoplasm became recognised as a clinical entity.

Renal oncocytomas typically appear well encapsulated and may have central stellate scars on computed tomography (CT) and a spoke wheel vascular pattern on renal arteriography. However, these radiographic features can also be found in renal cell carcinoma (RCC). Thus, the diagnosis can only be made after complete resection and pathological evaluation. In fact, RCC remains the commonest pathology of all renal tumours, including those detected incidentally. Herein, we report a case of bilateral renal oncocytoma, where we initially suspected RCC.

Case Report

A 73-year-old man presented with non-specific gastrointestinal symptoms. An abdominal mass was detected in the right flank. Ultrasonography showed a

10.5-cm large solid lesion in the right kidney and a smaller 3.2-cm lesion in the mid-pole of the left kidney. CT revealed bilateral renal lesions with similar radiological features of diffuse contrast enhancement (Fig. 1). The right renal tumour occupied the entire central portion of the kidney, with only part of the lower pole identified; while the left renal tumour was located at the mid-pole of the kidney. Working diagnosis was that of bilateral RCC while metastatic evaluation was negative.

The patient underwent a left partial nephrectomy with the 3.2-cm left tumour resected with adequate margins of 0.5 cm. Both frozen and paraffin sections revealed oncocytoma. Postoperative recovery was unremarkable. Early post-partial nephrectomy, the serum creatinine rose to 132 $\mu\text{mol/L}$ but reverted to preoperative levels of 108 $\mu\text{mol/L}$ shortly afterwards. A radical nephrectomy was performed 6 weeks later for the 10.5-cm right renal lesion. After the right nephrectomy, the creatinine stabilised at 171 $\mu\text{mol/L}$ and remained at that level upon last follow-up (9 months). Macroscopic appearance of the right renal tumour was that of a mahogany brown, solid mass without necrosis. Histology confirmed oncocytoma, with characteristic features of solid nests and trabeculae of polygonal cells with abundant eosinophilic cytoplasm, round nuclei and occasional nucleoli (Fig. 2). No cells with clear cytoplasm,

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tubules with haemorrhage, necrosis or papillae to suggest RCC were observed. Ultrastructural study showed abundant mitochondria within the cytoplasm of these oncocytic cells (Fig. 3).

We also undertook a brief review of oncocytomas operated in our department. During the period 1991 to 2000, of the 250 histologically confirmed renal tumours (88% RCCs) that were resected, only 4 other cases of solitary renal oncocytoma were identified. Another case was initially diagnosed as oncocytoma but the histology was later revised to RCC and this was excluded. The age and sex distribution, symptoms at presentation, preoperative radiological investigations, surgical treatment, pathological findings and follow-up status are summarised in Table I.

Discussion

The incidence of renal oncocytoma at our institution was 2% out of all renal tumours detected from 1991 to 2000.

This is slightly lower than the incidence of 5% to 7% reported from some other tertiary referral centres.^{3,4} While the majority of renal oncocytomas are unilateral, about 4% to 5% of bilateral renal oncocytoma have been reported.³⁻⁵ Occasionally, the lesions are multi-focal.^{3,6}

The presentation of renal oncocytomas is varied.^{3,4,6} The age and sex distribution tend to overlap with that of patients with RCC. In one study,³ 58% of patients had their renal lesions detected incidentally, 15% presented with constitutional symptoms and 12% with gross haematuria. This may be related to their practice as tertiary oncology centres. As for our small series, majority of patients presented with specific urological symptoms, but we do expect to come across more incidentally detected renal

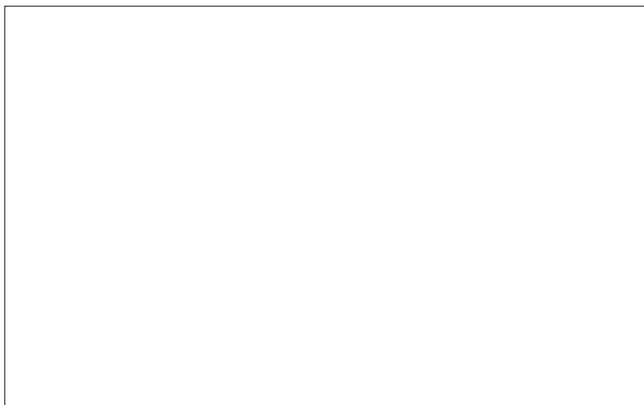


Fig. 1. Contrast enhanced CT showing bilateral renal lesions with similar features of diffuse contrast enhancement.

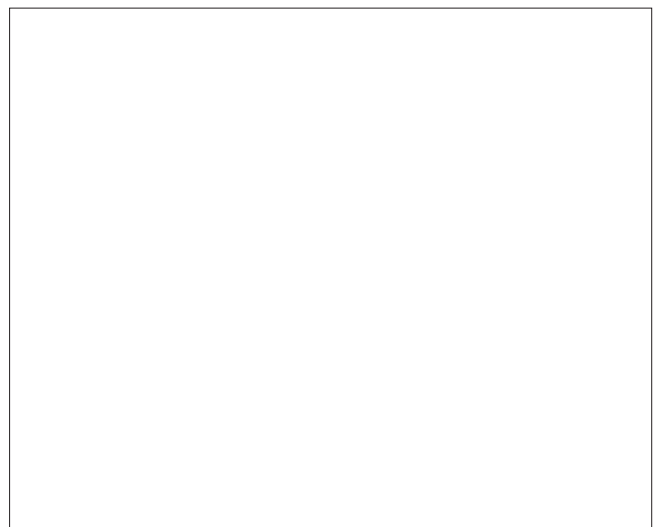


Fig. 2. Renal oncocytoma with solid sheets of polygonal cells with ample cytoplasm, vesicular nuclei and small nucleoli (Haematoxylin and eosin, original magnification $\times 200$).

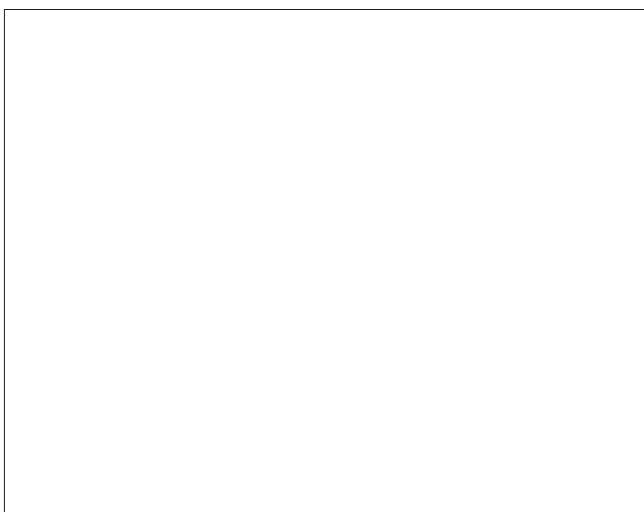


Fig. 3. Electron micrograph of cells of oncocytoma revealing numerous mitochondria packed within the cytoplasm (Uranyl acetate and lead citrate, original magnification $\times 12,400$).

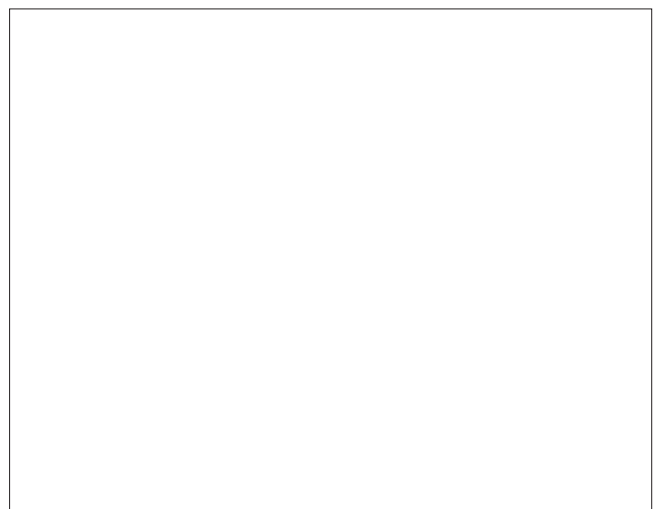


Fig. 4. Macroscopic appearance of a renal oncocytoma located at one pole of the kidney showing a central pale scar (arrow).

TABLE I: CLINICAL FEATURES OF 5 PATIENTS WITH ONCOCYTOMAS

Sex	Age (y)	Presentation	Computed tomography	Size (cm)	Operation	Follow-up (y)
F	20	Haematuria, renal colic	Calcification within mass	6	Radical	8
M	50	Epigastric pain	Central stellate low density scar	3.5	Partial	6
F	53	Loin mass	Mixed density mass	10.5	Radical	1.5
M	63	Haematuria	Mass with distension of renal pelvis and proximal ureter	8	Radical	1
M	73	Abdominal pain, loin mass	Bilateral renal mass	Right – 10.5 Left – 3.2	Right radical/ Left partial	9 months

oncocytoma, as we have observed an increased incidental detection of renal cancers in the past decade.⁷ Essentially, there were no distinguishing symptoms to differentiate from a malignant lesion.

Attempts have been made to establish the diagnosis of renal oncocytoma preoperatively with CT scan or angiography. CT scan features of renal oncocytomas include a distinct margin, smooth contour and a homogenous appearance.⁸ However, small RCCs can also show identical patterns. The central scar becomes more prominent with larger tumours but this feature is insufficient to differentiate an oncocytoma from RCC with central necrosis.⁹ An example of oncocytoma with a typical central scar is shown in Figure 4. The preoperative CT scans performed in our small series were all suggestive of carcinoma and no preoperative diagnosis of oncocytoma could be made confidently.

Angiographic features of oncocytomas include a well-encapsulated hypervascular mass, a spoke-wheel pattern of internal vessels and a homogenous parenchymal blush with no grossly irregular vessels, arterio-venous shunting or contrast medium puddling.¹⁰ However, any of these features could be present in RCC.

Preoperative aspiration biopsy and intraoperative frozen section have been attempted in other studies.^{11,12} It was noted that there is cytological overlap between oncocytoma and well-differentiated RCC. More importantly, some carcinomas have focal areas that closely resemble oncocytoma. Thus, definitive diagnosis based on aspiration biopsy or frozen section will require extensive sampling of the tumour. In general, the use of frozen section needle biopsy to guide surgical decision-making is not recommended.

The presence of bilateral renal lesions as in this patient presented a more difficult diagnostic and therapeutic challenge. Simple biopsy of either lesion without tumour excision is probably not advisable as there have been reported cases of renal oncocytomas coexisting with a synchronous RCC either in the ipsilateral or contralateral kidney.^{3,13} Thus, we recommend removal of both lesions to

establish the diagnosis as well as to provide the surgical cure.

Currently, oncocytomas are considered benign with good prognosis and long-term survival.^{3-5,13} This is in contrast to some reports in the 1980s which described oncocytomas that metastasised and caused patients' death.¹⁴⁻¹⁶ In retrospect, these oncocytomas that had an adverse outcome may have been inappropriately categorised and represent unrecognised RCC instead. It should be noted that the range of renal cell tumours with granular cytoplasm is broad and includes renal oncocytoma, chromophobe RCC, papillary RCC, and collecting duct carcinoma of the kidney. While the majority of these tumours are readily distinguished histologically from oncocytoma, others such as the eosinophilic variant of chromophobe RCC are close histologic mimics. Their differentiation may require further histochemical, immunohistochemical or ultrastructural investigations. For instance, Hale's colloidal iron staining is positive in chromophobe RCC in a microvacuolated pattern within the cytoplasm of tumour cells.¹⁷ Immunohistochemistry would reveal negative staining for vimentin in oncocytoma, as opposed to RCC which is reactive; while electron microscopy discloses mitochondria in oncocytomas but microvesicles in chromophobe RCC.¹⁸

In fact, we had to revise to RCC one case initially labelled as oncocytoma on histology. Microscopic examination revealed large, round to polygonal cells with abundant eosinophilic cytoplasm and fairly uniform nuclei with prominent nucleoli. These cells were arranged in tubules and sheets and the overall appearance resembled an oncocytoma. However, there were large areas of haemorrhage and there was gross renal vein invasion, which is not encountered in oncocytoma.¹⁸ The histological diagnosis was thus amended to RCC. Amin and associates⁵ detailed the approach to histopathological diagnosis of renal oncocytoma. Strictly and accurately defined, renal oncocytoma remains a benign renal tumour.^{5,13}

Conclusion

Renal oncocytoma is a rare benign tumour with a good prognosis. However, currently there are no reliable means

of diagnosing oncocytoma preoperatively and hence, this tumour should be treated as a potential RCC until pathological evaluation of the resected lesions proves otherwise. We would recommend surgical resection for these lesions with nephron-sparing surgery for smaller ones whenever possible.¹⁹

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