RENAL ONCOCYTOMA: ULTRASOUND AND COMPUTED TOMOGRAPHY APPEARANCES

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INTRODUCTION

Renal oncocytoma is a relatively rare tumour that has an excellent prognosis and generally treated adequately by local resection or heminephrectomy. Pre-operative radiologic differentiation from renal cell carcinoma is important as renal cell carcinoma requires radical nephrectomy. A case of renal oncocytoma is presented with a review of the radiological features and current literatures.

CASE REPORT

A 73 years old woman presented with one week history of a constant dull ache in the right loin. There was no history of haematuria. She has a history of hypertension, glaucoma and a past history of hysterectomy and recurrent palpitation. On physical examination tenderness in the right flank to deep palpation was evident but no abnormal masses were felt. Blood urea and creatinine levels were normal. Urinalysis showed 10-40 wbc/dL and less than 10 rbc/dL. The haemoglobin was 13.1 gm/dL, haematocrit 0.41, platelet count $349x10^3$/L and the wbc count was $11.4x10^3$/L. Plain abdominal radiography was normal. Abdominal sonography revealed a 3cm well circumscribed hypoechoic mass with an irregular hyperechoic centre arising from the posterolateral surface of the lower pole of the right kidney and several sonolucent cysts within the liver.

Abdominal computed tomography (CT) confirmed the presence of a 3cm solid mass in the lower pole of the right kidney. The mass demonstrated an inhomogenous enhancement, an irregular contour and an indistinct interface with adjoining renal parenchyma. There was no evidence of tumour extension into the renal vein or perinephric space. There was no evidence of intratumoural calcification or retroperitoneal lymphadenopathy. No masses were seen in the left kidney and the liver demonstrated several low attenuation cysts and a diagnosis of renal cell carcinoma with liver secondaries was made. A right radical nephrectomy was performed. On sectioning a well encapsulated 3cm mass with homogenous tan tissue with cystic areas containing haemorrhage as well as yellow tissue in the centre was present. Microscopically the tumour consisted of sheets of cells with abundant eosinophilic cytoplasm, regular nuclei with pleomorphism but no mitotic activity was found. A central scar was present within the tumour. The histologic features were typical for renal oncocytoma. In retrospect the irregular hyperechoic centre within the mass on ultrasound examination represented the central scar within the tumour mass.

The patient made an uneventful post -operative recovery. At the time of surgery some bruising in the right abdominal muscle was noted and it was thought that this small haematoma may have actually been the cause of her initial pain.

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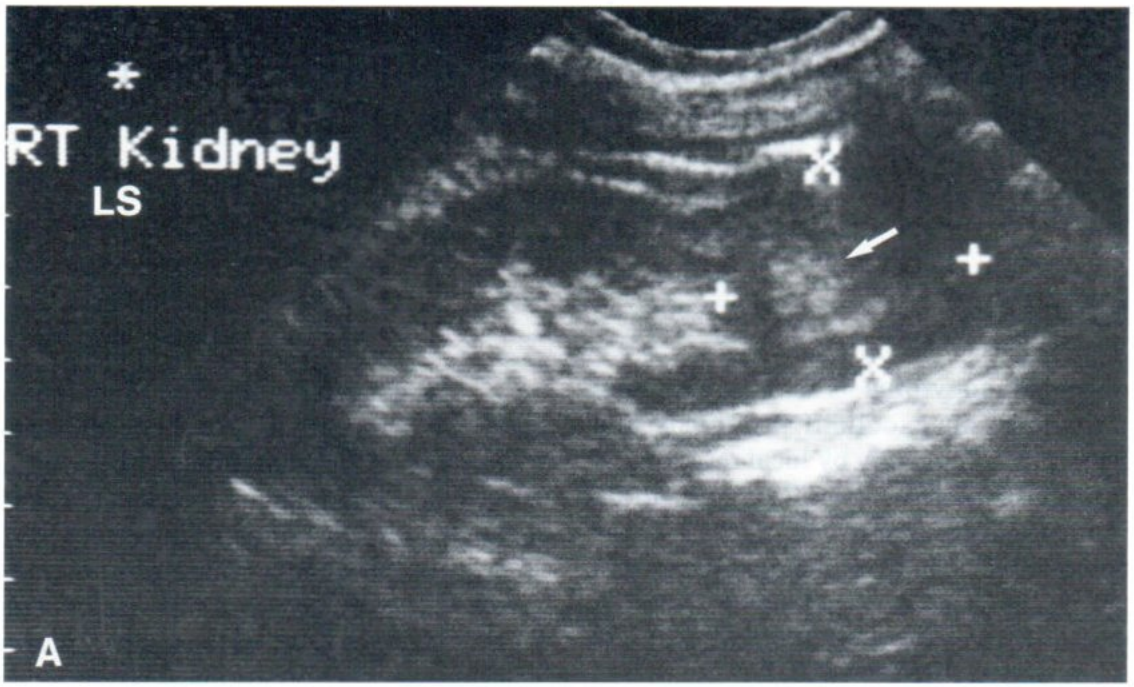

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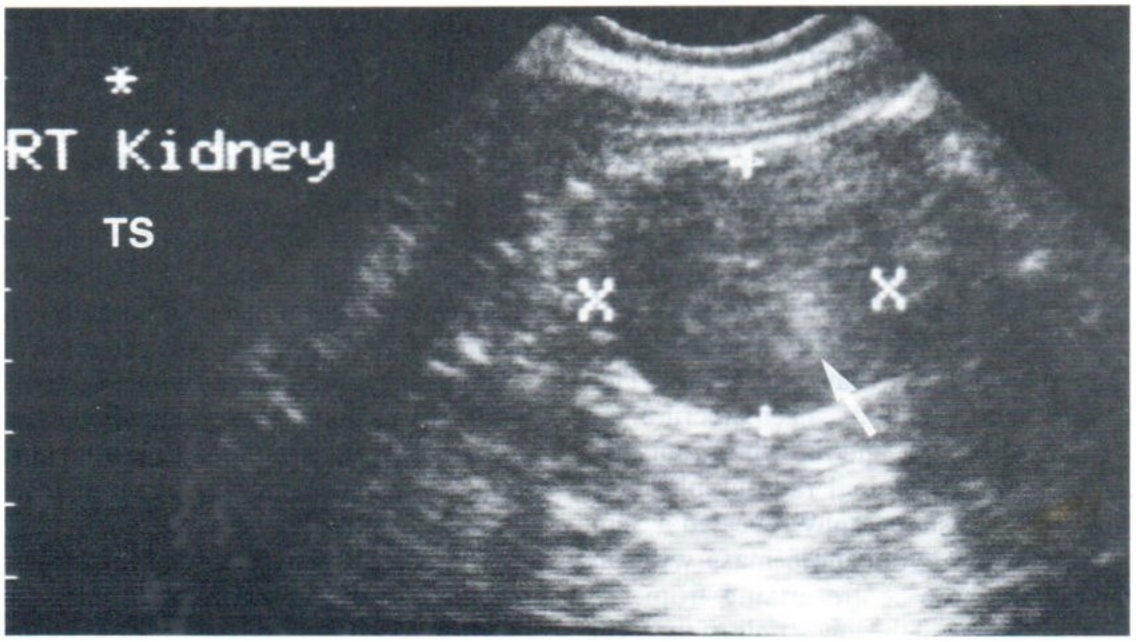
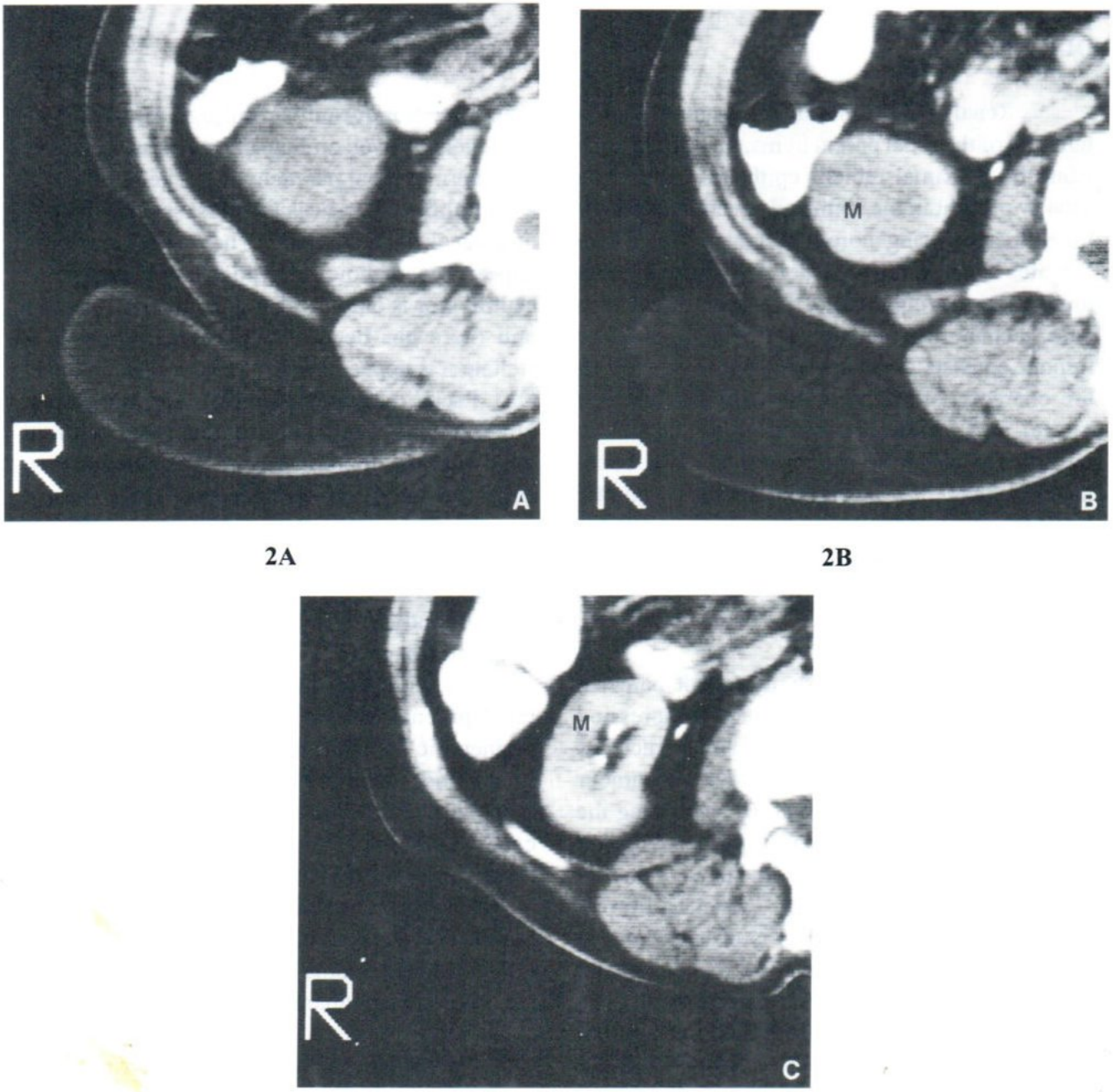


1A

Fig. 1 Longitudinal (A) and transverse (B) ultrasound of the right kidney. A 3cm well circumscribed hypoechoic mass with irregular hyperechoic central scar (arrow) arising from the posterolateral surface of the lower pole of the right kidney.



2A 2B

2C

Fig. 2 (A) Pre contrast scan. Tumour in the lower pole of right kidney is inhomogenous in appearance, (B&C) Post contrast scan. Tumour (M) demonstrates inhomogenous enhancement, irregular contour and indistinct interfaces with adjoining renal parenchyma.

DISCUSSION

Renal oncocytoma are uncommon, benign tumours of the renal parenchyma, thought to arise from the proximal tubular epithelial cells.[1] The usually present in the sixth and seventh decade of lift with males being more commonly affected than females with a ratio of 3:1.[2] Although most tumours are asymptomatic, they can present with pain, haematuria or palpable abdominal mass. The tumour consists exclusively of oncocytes which are characteristic large cells with small round nuclei and abundant granular eosinophilic cytoplasm on light microscopy. Mild focal pleomorphism may be present there is no mitotic activity on electron microscopy. The striking features are the large numbers of mitochondria with few other organelles and absence of fat vacuo les.

Oncocytomas are usually well demarcated lesions with a pseudocapsule due to compression by adjacent parenchyma. They have characteristic tan-brown to mahogany red colour[3] and tumour size varies from 1-14 cm with 6-7 cm being the average size at diagnosis.[2] Central necrosis and haemorrhage are typically absent but were present in the larger tumour (> 8 cm).[4] A central fibrotic scar may be present and this is possibly due to previous haemorrhage, necrosis and infarction with subsequent organization and healing. The scar is usually stellate in appearance but occasionally circular scars have been encountered.[5] Calcification occurs rarely.[6] Oncocytomas may occur in other organs such as salivary glands, thyroid, parathyroid, pituitary gland and adrenal. Renal oncocytomas are usually single. But can be multicentric, bilateral or associated with renal cell carcinoma.[4,7] The main differential, diagnosis is renal cell carcinoma but unlike renal carcinoma, oncocytomas are not associated with vascular invasion, local recurrence or distant metastasis. Excretary urography can confirm the presence of a discrete non-invasive solid mass but is non -specific. Sonographic findings are that of a homogenous, well circumscribed mass, isoechoic with normal renal parenchyma.[4] The presence of a central fibrotic scar is the most specific feature of a renal oncocytoma.[4,5] The central scar may appear hyperechoic or hypoechoic however the central scar is only present in a minority of cases and there has been a single case report of a stellate scar appearance in a renal cell carcinoma.[9] On CT scan, oncocyoma typically appear as a solid homogenous, well-marginated mass without calcification and have homogenous contrast enhancement. A low density central scar if present may be demonstrated with fine sections.[9,10] In contradistinction, renal cell carcinoma often have calcification, generally demonstrate inhomogenous contrast enhancement due to the presence of haemorrhage and necrosis and have lobulated contours with indistinct interfaces with normal renal parenchyma. Invasion of the renal vein, perinephric invasion of the fat and metastasis to lymph nodes tend to occur. However no pathognomonic features are present as small renal cell carcinoma may demonstrate homogenous enhancement, differentiating it from oncocytoma by CT findings alone is impossible. As haemorrhage may occur in large oncocytoma, on CT scans oncocytoma may demonstrate inhomogenous contrast enhancement.

On scintigraphy both renal cell carcinoma and oncocytoma are photon-deficient on static scans and therefore indistinguishable from each other. Typical angiographic features of oncocytomas include "spoke wheel" configuration of vassels and a homogenous nephrographic blush, sharp, marginated and absence of vascular pooling or venous shunting. Renal cell carcinoma however have displayed the "spoke wheel" pattern and homogenous blush.[11] However the majority of oncocytoma have hypovascular or avascular appearance on angiography.

Percutaneous biopsy of renal masses is not particularly useful in differentiating from renal cell carcinoma since oncocytes may be present focally within renal cell carcinoma.[11] However if oncocytoma is suspected pre-operatively, a local resection should be performed. If the tumour have the typical tan-brown appearance and well circumscribed on macroscopy, a frozen section should be performed. If this confirms an oncocytoma, no further surgery is required. However, if on subsequent electron microscopy renal cell carcinoma is diagnosed a secondary nephrectomy can be performed.

SUMMARY

In summary there appears to be no pathognomonic findings of oncocytoma. Typical sonography, CT and angiographic findings may suggest the diagnosis pre-operatively. If at surgery, a uniform tan-brown, well encapsulated tumour is present, and a frozen section confirms oncocytoma, a local resection or partial nephrectomy should be performed. If subsequent histology reveals renal cell carcinoma a secondary nephrectomy is performed.

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