

Oncology

Don't be fooled by the fat: A rare case of renal cell carcinoma with intratumoural fat

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ABSTRACT

Angiomyolipoma (AML) is a benign renal tumour composed of fat, smooth muscle and blood vessels. Radiologic evidence of macroscopic fat within a solid renal lesion on computed tomography was historically thought to be pathognomonic for this condition. Herein, we report a case of an incidental solid renal cell mass with multiple foci of intra-tumoural fat, which was shown to be a clear cell renal cell carcinoma (RCC) at nephrectomy. Macroscopic fat within solid renal lesions does not exclude malignancy, evaluation of other radiologic features is necessary when RCC is suspected.

Introduction

The incidence of incidental solid renal lesions has risen significantly with the widespread availability of medical imaging. As these lesions can represent either benign or malignant pathology, they should be considered RCCs until proven otherwise. Radiologic evaluation is paramount in determining whether surgical intervention is indicated. One radiologic characteristic which strongly favours a benign diagnosis is presence of macroscopic fat within the tumour, historically thought to be pathognomonic for angiomyolipoma (AML). A number of cases have now reported RCCs with intratumoural fat identified on CT imaging,¹⁻³ therefore, other differentiating features should be sought before a diagnosis of AML is made.

Case presentation

A 53-year-old gentleman presented to clinic following an incidental finding of a right renal mass on abdominal ultrasound. Further investigation with CT revealed an exophytic irregular soft tissue mass emerging from the upper pole of the right kidney measuring 7.2cm in maximum diameter. No lymphadenopathy, renal vein involvement or invasion beyond Gerota's fascia was evident. Several foci of macroscopic fat were present within the tumour, which is considered a classic characteristic of an angiomyolipoma (Fig. 1). Other imaging features raised suspicion for

a renal cell carcinoma (RCC), including increased vascularity, large size, an irregular border, and focal areas of calcification. The patient proceeded to a laparoscopic radical right nephrectomy. Histopathology revealed the tumour to be a RCC confined within the renal capsule. Immunohistochemistry demonstrated clear-cell sub-type, nucleolar grade 3, with positive staining for vimentin and epithelial membrane antigen. Macroscopically, the tumour was composed of large areas of carcinoma separated by sclerotic fibrosis containing areas of calcification and ossification, with associated scattered nodular areas of fat up to 6mm in diameter (Fig. 2). These foci were composed of mature adipocytes and represented fatty metaplasia (Fig. 3).

Discussion

Fat can occur within an RCC by three mechanisms: by engulfment of perinephric or renal sinus fat,¹ by cholesterol necrosis mimicking macroscopic fat,² and through metaplasia usually associated with fibrosis and sometimes osseous metaplasia.³ The latter is a type of repair mechanism in poorly vascularised scar tissue, and results in the growth of nodular areas of mature adipose tissue foci associated with areas of ossification, as observed in our reported case. As calcification is exceedingly rare in angiomyolipomas, with only a few documented cases in the literature,⁴ the appearance of calcification within a fat-containing renal lesion is strongly suggestive of renal cell carcinoma,

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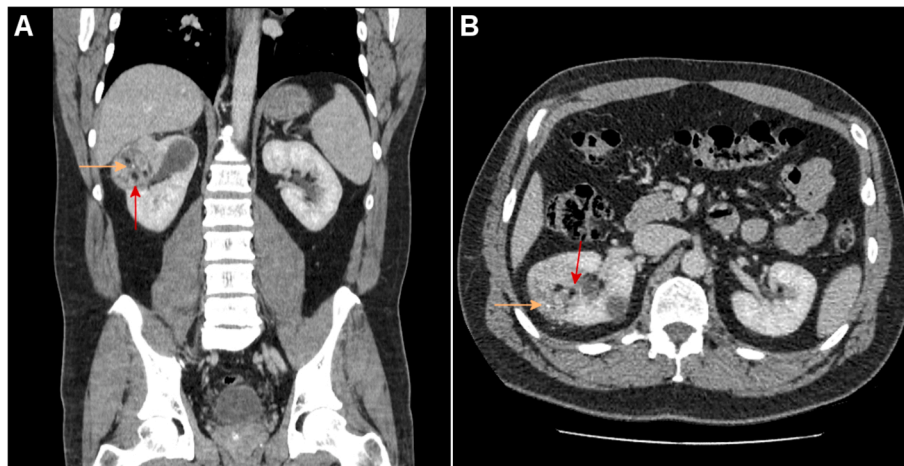


Fig. 1. Abdominal CT scan demonstrating macroscopic fat (red arrows) contained within a large, contrast enhancing renal mass associated with calcification (orange arrows), suspicious for a renal cell carcinoma. A. Coronal view, B. Axial view.

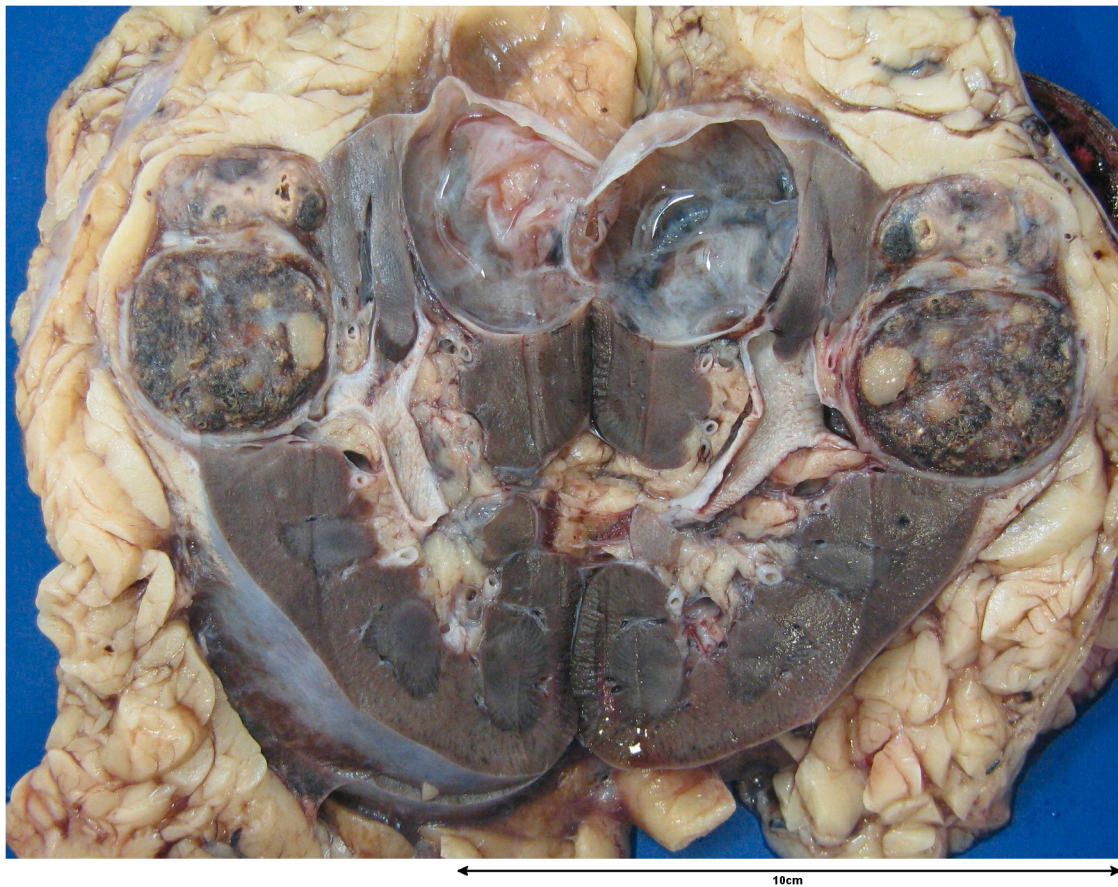


Fig. 2. Whole radical nephrectomy specimen (vertically transected), demonstrating multiple foci of intra-tumoral fat within a renal cell carcinoma. An incidental benign cyst is also present.

and surgical resection should be strongly considered. Conversely, the absence of calcification in fat-containing solid renal lesions does not exclude the possibility of malignancy. RCCs containing intratumoural fat without calcification that closely mimic angiomyolipomas have been rarely reported.⁵

Conclusion

We described the radiologic and histopathologic findings of an

incidental fat-containing renal cell carcinoma. This rare phenomenon has been increasingly reported, and therefore this radiologic finding cannot reliably exclude malignancy. Careful evaluation of other radiologic features of solid renal lesions such as vascularity, areas of calcification and border irregularity is necessary before diagnosing patients with AML.

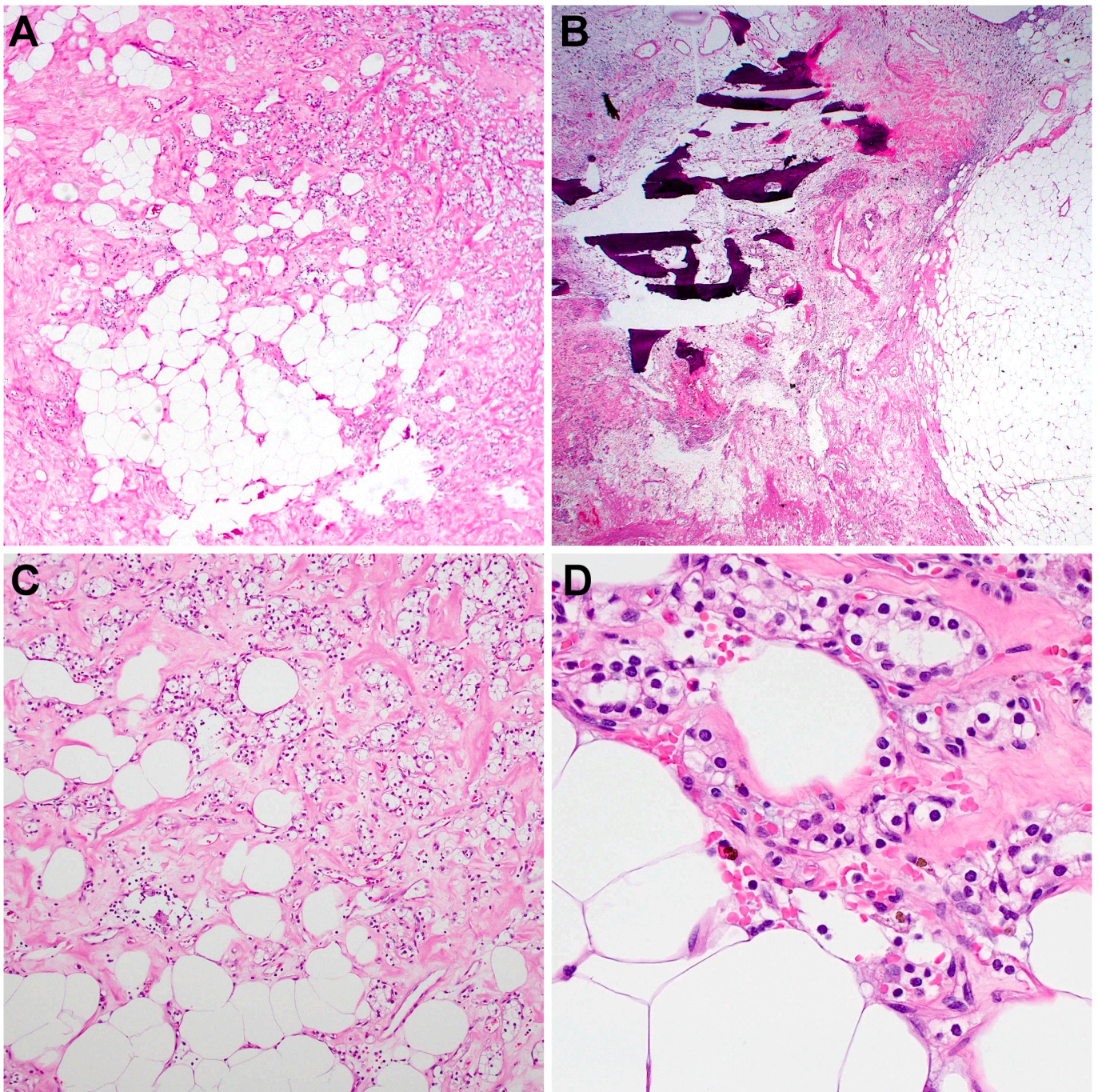


Fig. 3. Images of haematoxylin and eosin stained tumour specimens, demonstrating mature adipocytes associated with areas of calcification (dark purple areas) within the stroma of a clear cell renal cell carcinoma (A, B). Adipocytes were also found directly adjacent to clear cell histology, as demonstrated in low (20x magnification) (C) and high (40x magnification) (D) powered views.

Consent

Written informed consent was obtained from the patient.

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Declaration of competing interest

None.

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