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Case Report
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A Case of Cystic Renal Cell Carcinoma Mimicking a Benign Complicated Renal Cyst on Computed Tomography ; Usefulness of Magnetic Resonance Imaging

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SUMMARY

We present a case of cystic renal cell carcinoma (RCC) mimicking a benign complicated renal cyst. In the present case, the cystic renal mass was classified as Bosniak classification category II on computed tomography (CT), but magnetic resonance imaging (MRI) demonstrated additional septa and enhancement, which led to an upgraded Bosniak classification (category III). The patient underwent radical nephrectomy. Histological examination showed the cystic necrosis type of RCC.

Key Words : Cystic renal cell carcinoma, Renal cyst, Bosniak classification

INTRODUCTION

Differentiation between a benign complicated renal cyst and a cystic renal cell carcinoma (RCC) remains one of the more common problems in renal imaging. Using computed tomography (CT), Bosniak developed a useful classification scheme that divides cystic renal masses into four categories¹⁾. Differentiating category II from category III is important because the recommended management for these categories is different. Herein, we report a case of cystic RCC mimicking a benign complicated renal cyst.

CASE REPORT

A 74-year-old man presented with difficulty in urinating. Ultrasonography (US) demonstrated benign

prostatic enlargement. A right renal mass with a solid component was incidentally found during the examination (Fig. 1). Unenhanced CT showed a cystic renal



Figure 1 Ultrasonography demonstrated a renal mass with a solid component (arrow) in the right kidney (arrowhead).

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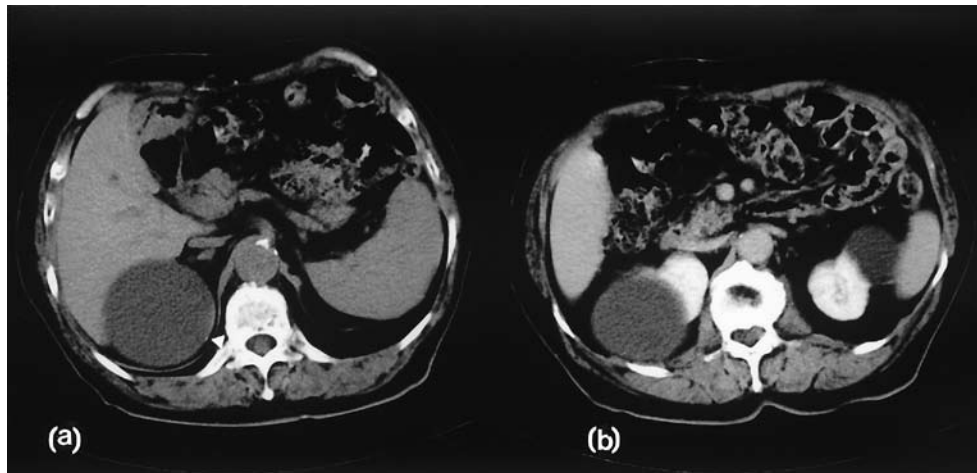


Figure 2 (a) Unenhanced CT showed a right cystic renal mass with minimal marginal calcification (arrowhead). (b) The right cystic renal mass was round and sharply margined without evidence of enhancement after administration of contrast material.

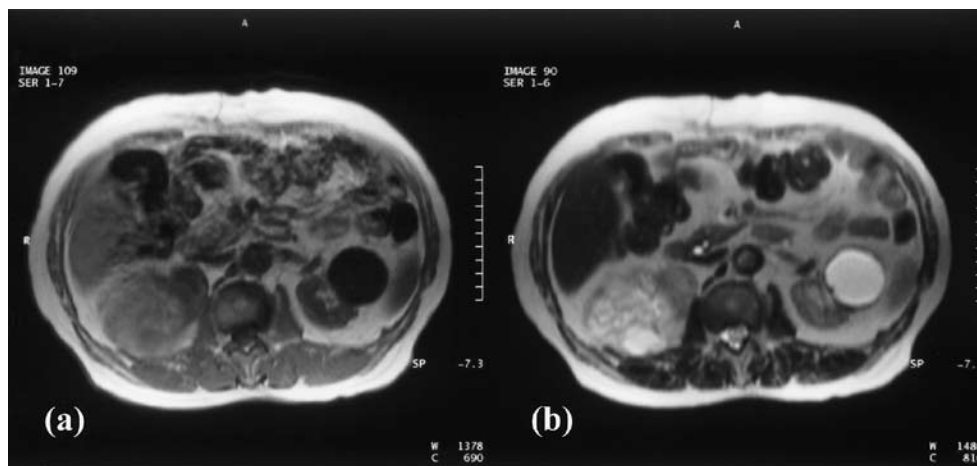


Figure 3 (a) On MRI examination, T1-weighted axial image view demonstrated a right renal mass that was hyper-intense relative to the renal parenchyma. (b) T2-weighted axial image view demonstrated a right hyper-intense mass with thickened septa (>1 mm).

mass with minimal marginal calcification (Fig. 2a). The cystic renal mass was round and sharply margined without evidence of enhancement after the administration of contrast material (Fig. 2b). The cystic renal mass was 8 cm in diameter. On CT examination, it was classified as category II using the Bosniak classification. T1-weighted axial MRI demonstrated a right renal mass that was slightly hyperintense relative to the renal parenchyma (Fig. 3a), and a T2-weighted axial image demonstrated a hyperintense mass with a thickened septa (>1 mm) (Fig. 3b). The administration of Gd-DTPA demonstrated enhance-

ment of the inferior septa (Fig. 4b, 4c), although the lesion showed a low intensity on T1-weighted image (Fig. 4a). On MRI examination, the cystic renal mass was classified as category III. A staging workup demonstrated no other evidence of disease. The patient underwent radical right nephrectomy. Macroscopically, the cystic space was filled with necrotic debris. Histologically, under low magnification, the renal mass showed virtually complete tumor necrosis with rare nests of tumor cells. These cells were identified at the site of the inferior septa that had been visualized as an enhanced region on MRI. On high magnification, these

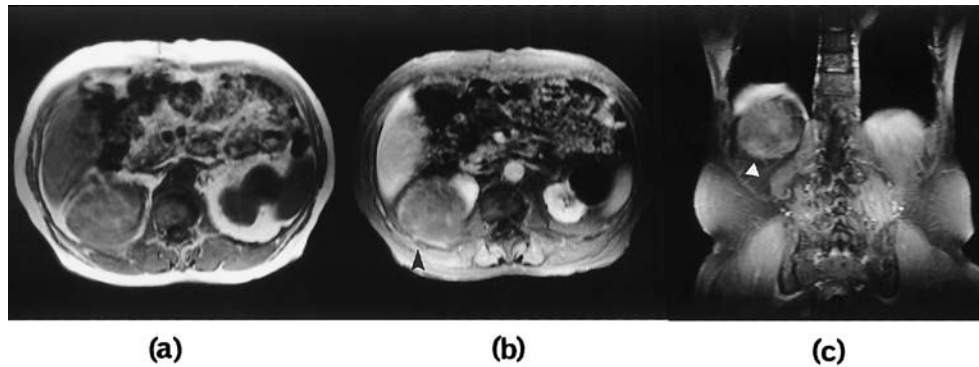


Figure 4 Administration of Gd-DTPA demonstrated enhancement of the inferior septa (arrowhead) (Fig. 4b, 4c), although the lesion showed a low intensity on T1-weighted image (Fig. 4a).

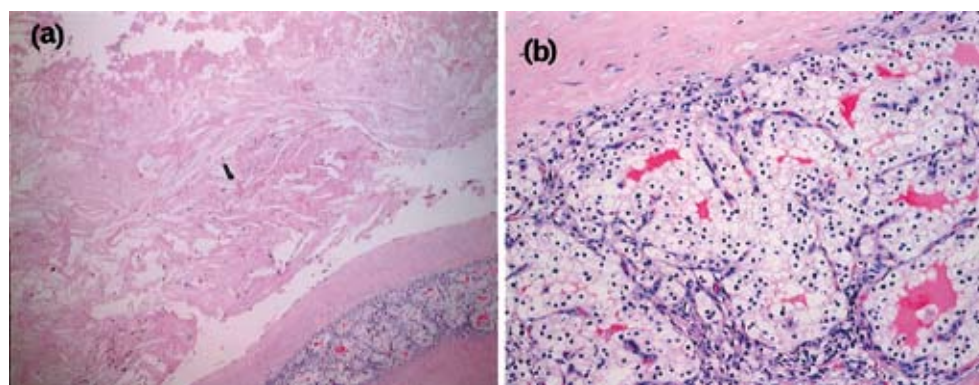


Figure 5 (a) Under low magnification, the renal mass showed virtually complete tumor necrosis with only rare nests of tumor cells. (b) High power magnification, these tumor cells were consistent with clear cell type adenocarcinoma, G1>G2.

tumor cells represented clear cell type of adenocarcinoma, Grade 1>Grade 2 (Fig. 5). The patient has remained free of disease for 96 months since surgery.

DISCUSSION

Cystic RCC account for 1% to 2.5% of all renal neoplasms²⁻³. Hartman et al. classified cystic RCC as showing either (i) intrinsic multiloculated growth ; (ii) intrinsic unilocular growth ; (iii) cystic necrosis ; or (iv) originating from the epithelial lining of a preexisting simple cyst⁴. Differentiation between cystic RCC and benign complicated renal cyst remains one of the more common problems in renal imaging. Using CT, Bosniak proposed a new classification system in 1986 based on the division of renal cystic lesions into four categories¹. Differentiating more complex category III lesions from somewhat less complex category II lesions is important because the recommended approaches to management are different. In 1993, Bosniak revised

his original classification system to add a subset of category II lesions, category IIF (F for follow-up) lesions⁵.

In our case, the cystic renal mass was classified as category II using the Bosniak classification on CT. However, MRI demonstrated additional thickened septa and contrast enhancement that caused the lesion to be upgraded (category III). These findings agree with Israel et al. who reported that gadolinium-enhanced MRI has superior contrast resolution compared with CT⁶⁻⁷. When cystic renal masses contain hemorrhage or debris, they may demonstrate a wide range of signal intensities on T1- and T2-weighted images. In these instances, it is not possible to differentiate complex renal cyst from cystic RCC using morphological features and signal intensities only. The only determining factor to accurately differentiate these lesions is the presence or absence of enhancement. Therefore, the ability to confidently identify enhancement on MRI

is critical for the appropriate characterization of cystic renal masses.

Although the Bosniak renal cyst classification system was developed based on CT findings, Bosniak classification is appropriate for use with MRI in the evaluation of most cystic renal masses. A potential drawback of MRI is its inability to depict calcification within the septa or wall of a cystic lesion. However, neither the diagnosis of malignancy nor the decision to surgically excise a cystic renal mass can be made based on the presence or amount of calcification. Therefore, this potential limitation should not affect patient management.

The Bosniak classification system using CT has proved to be useful because it is often definitive in many instances, providing a starting point for the evaluation of complex cystic renal masses and a framework for a logical approach to the treatment of patients with cystic lesions. However, the classification system is not always definitive because renal cystic disease can often show complex imaging and histological findings. Such factors as the size of the lesion, age of the patient and presence or absence of renal inflammation also dictate the treatment options. Gallium-67 scintigraphy may be useful for differentiating infected cystic renal mass from cystic RCC. Furthermore, there were reports that positron emission tomography (PET) and computed tomography (CT) is useful for differentiating cystic renal cell carcinoma from renal cyst⁸⁻⁹⁾. Ascenti et al.¹⁰⁾ proposed that the use of the Bosniak classification with contrast-enhanced US is also appropriate for classifying renal cysts. The Bosniak classification is based primarily on CT findings but decisions regarding management should be based on a consideration of the findings of other imaging studies, such as MRI and US.

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