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A practical guide and decision-making protocol for the management of complex renal cystic masses



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KEYWORDS

Complex renal;
Bosniak classification;
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ABBREVIATIONS

BCS, Bosniak classification system;
(CE)US, (contrast-enhanced) ultrasonography;

Abstract Objectives: To analyse the management, pathology and outcomes of complex renal cystic masses (CRCM) and to develop a decision-making tool for daily clinical care using the Bosniak classification system for CRCM.

Patients and methods: A comprehensive dataset of 185 patients with 188 CRCM and a minimum follow-up of 3 years were analysed for management, pathology and outcomes.

Results: We analysed 35 Bosniak II, 34 Bosniak IIF, 58 Bosniak III, and 61 Bosniak IV lesions. The overall incidence of renal cell carcinoma was 8.6%, 29.4%, 62.1%, and 78.7% for each category. Based on our surveillance strategy of Bosniak IIF masses, we recommend computed tomography (CT)/magnetic resonance imaging (MRI) every 2 years after the initial examination. We also recommend performing one MRI (as an adjunct to CT) during the early follow-up period (< 4 years). The use of MRI correlation for differential diagnostic purposes has proven useful for marginal Bosniak II, IIF and III cases.

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CRCM, complex renal cystic masses; EAU, European Association of Urology

Conclusions: From our data, we have created a decision-making protocol to guide urologists in planning a safe and effective diagnostic and treatment strategy for CRCM. The Bosniak classification is a useful tool for clinical decision-making. Uncertainties still remain for Bosniak IIF and III lesions. Our protocol shows that individualised decision-making is necessary in a significant proportion of CRCM.

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Introduction

The Bosniak classification system (BCS) for cystic renal lesions was developed based on CT findings [1]. The BCS is reader dependent and prone to inter- and intra-reader variations [2–4]. Israel et al. [5] showed that the BCS in CT and MRI are similar in most cystic renal lesions. With regard to recent evidence, MRI and contrast-enhanced ultrasonography (CEUS) tend to downgrade/upgrade some lesions and are therefore recommended as additional diagnostic tools for borderline cases [6–8]. Data suggest an individualised approach to reduce unnecessary surgical interventions, especially for Bosniak IIF and III lesions [6,9–11]. However, to date, no other systematic approach has been more accurate at predicting the malignant potential on final histology [1].

Decision-making for further diagnostics and management of cystic renal lesions is a frequent clinical task. However, there are no straightforward guidelines for appropriate management that can be applied in the daily setting, with most recommendations being based on expert opinion. In the present study, we aimed to establish a practical guide for primary care and office urologists based on our multi-institutional dataset. In addition, we propose a surveillance scheme for complex renal cystic masses (CRCM) and histologically confirmed RCC.

Patients and methods

The aim of this retrospective study was to analyse the management, pathology and outcomes of CRCM and to develop a decision-making tool for daily clinical care. However, Bosniak IIF lesions were prospectively followed, and retrospectively evaluated. We studied 190 patients who were diagnosed with a total of 199 CRCM at three tertiary academic urology centres (University hospitals of Bratislava, Slovakia; Pilsen, Czech Republic; Vienna, Austria) between 2004 and 2013. All participating centres received ethical approval by their Institutional Review Board. Only patients with ≥ 3 years follow-up were included for the final analysis. Patients with known polycystic kidney disease, Von Hippel–Lindau disease, family history of RCC, and previous surgery for RCC, were excluded from the study, leaving 185 patients with 188 lesions in the final cohort.

Management approach

The clinical decision-making processes were similar amongst the three centres. As we were continuously collaborating on our data [2,12], the general management did not differ. All patients underwent conventional ultrasonography (US) and four-phase contrast-enhanced CT or MRI of the abdomen. All imaging studies were performed with and without i.v. iodine/gadolinium contrast medium. Slice thickness varied between 2.5 and 5 mm. All lesions were classified according to the BCS by a senior radiologist at each institution.

The final indication for surgery was made by experienced urologists. Partial or radical nephrectomy was recommended for cases with Bosniak category III and IV lesions, which was consistent with guidelines on RCC treatment at that time [13]. All the surgeons tended to favour partial nephrectomy, when technically feasible. Patients with Bosniak category IIF lesions entered a surveillance protocol with biannual CT/MRI for a total of 2 years and annually thereafter. Surgery was recommended in cases of progression, which was defined as an increase in Bosniak category, presence of new solid nodules or enhancement, increase in numbers of septa, thickening of septa or an increase in size of $> 20\%$ from the initially single largest axial dimension [12].

Analysed variables

Data were retrospectively collected in a computerised database and included: age, gender, symptoms, radiological tumour size, Bosniak category, histology, and follow-up. Histology was coded as malignant or benign. In case of RCC, the 2010 TNM stage, the histological subtype, and the Fuhrman grade were recorded. The histological slides were evaluated by a senior genitourinary pathologist at each institution. Multilocular cystic clear cell RCC, cystic RCC, as well as RCC with cystic degeneration, were included in the clear cell group.

Statistical analysis

The primary point of interest was to analyse the management, pathology, and outcomes at the three academic centres. The secondary point of interest was to develop a decision-making protocol for daily clinical

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