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ScienceDirect

Journal of the Chinese Medical Association 79 (2016) 554–558

www.jcma-online.com

Original Article

Clinical-radiologic correlation of mixed epithelial and stromal tumor of the kidneys: Cases analysis

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Received August 20, 2015; accepted February 26, 2016

Abstract

Background: Mixed epithelial and stromal tumor of the kidney (MESTK) is a rare tumor, with few malignant cases reported. Occurring mostly in middle-aged women, it is characterized by a biphasic pathological structure.
Methods: This study retrospectively reviewed the imaging findings and medical records of six MESTK cases of a single institution in a 10-year period.
Results: All of the patients were middle-aged women without hormone therapy history. The typical image was a renal tumor with varied cystic components. Half of the cases had sinus invagination, but only one had intratumor calcification. On imaging studies, four were Bosniak Category IV, one was Category III, and one presented as a solid tumor. The mean RENAL nephrometry score was 9.3. Five patients underwent partial nephrectomy, with no statistical renal functional deterioration after nephron-sparing surgery. There were no peri-operative complications.
Conclusion: Surgery remains the treatment of choice for MESTK, and nephron-sparing surgery should be considered in feasible cases.

Keywords: Bosniak category; computed tomography; mixed epithelial and stromal tumor of the kidney; nephron-sparing surgery

1. Introduction

Mixed epithelial and stromal tumor of the kidney (MESTK) is a rare neoplasm. The first case was described in 1998 by Michal and Syrucek.[1] Histopathologically, it is composed of epithelial and stromal components, thereby appearing as a cystic renal mass with varying proportions of solid components on imaging. Until 2010, approximately 150 cases had been reported,[2] although most reports focused on the pathologic and radiographic features.[3–5] However, preoperative diagnosis of MESTK is problematic, since most of these tumors are Bosniak Category IV or solid lesions. Therefore most cases are treated surgically.[4] This is a retrospective analysis of six cases of MESTK with detailed imaging profiles, treatment decision-making, and clinical outcomes.

2. Methods

Between March 2004 and November 2013, there were six cases of MESTK diagnosed histopathologically in a single institution. We followed the provisions of the Declaration of

Conflicts of interest: The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

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http://dx.doi.org/10.1016/j.jcma.2016.02.012

Helsinki and obtained informed consent from all six patients. Patients' demographic data (i.e., age, sex, and menopausal status), laterality of the mass, hormone replacement, clinical symptoms, imaging findings, and peri-operative outcomes were reviewed.

Noncontrast and contrast-enhanced computed tomography (CT) before surgery were performed. The CT imaging included the largest diameter of the renal tumor, proportion of cystic component, calcification status, contrast enhancement, sinus invagination, septum, Bosniak category,[6] and RENAL nephrometry score.[7]

The peri-operative outcome variables assessed were surgical technique, estimated blood loss, operative time, ischemia time for partial nephrectomy, complications, and recurrence. Serum creatinine was checked preoperatively and at 3-months postoperatively. Measurement of effective renal plasma flow (ERPF) using scintigraphy with I-131-orthoiodohippurate was also done preoperatively and at 3–6-months postoperatively. The estimated glomerular filtration rate (eGFR) was calculated with the Modification of Diet in Renal Disease equation. The split renal function for the five patients who underwent partial nephrectomy was calculated as the percentage of ERPF of the diseased kidney divided by the total ERPF. Differences in renal function preoperatively and postoperatively were evaluated using Student *t* test for continuous variables.

3. Results

Based on the demographic parameters, all of the patients were female, with a mean age of 50.5 years (range, 44–68 years). Half of them were menopausal, but no patient received hormone replacement therapy. Two patients presented with ipsilateral flank pain, while the rest were incidental findings.

The CT imaging findings revealed that all of the patients had a contrast-enhanced renal tumor without satellite lesions (Fig. 1). The mean tumor diameter was 4.4 cm (range, 2.2–9.0 cm). Five tumors contained cystic components, but the proportion varied (10–80%); the other one presented as a solid renal tumor. Only one tumor had calcification (Fig. 2). Half of the tumors showed sinus invagination (Fig. 3). Based on the Bosniak classification, four tumors were Bosniak Category IV and one was Bosniak Category III (Table 1). The mean RENAL nephrometry score was 9.3 (range, 8–11). The clinico-radiological features of our series and other studies are summarized in Table 1.[4,12,14]

The peri-operative and functional outcomes are reported in Table 2. One patient with a tumor diameter of 9 cm underwent open radical nephrectomy. Another underwent laparoscopic partial nephrectomy, while four received open partial nephrectomy. The mean operative time was 262.5 minutes (range, 190–300 minutes). The mean estimated blood loss was 118.3 mL (range, 50–200 mL), and no patient required a blood transfusion. The mean ischemia time for the five patients who underwent partial nephrectomy was 43 minutes (range, 23–80 min). There were neither peri-operative nor postoperative complications. The average postoperative follow-up without tumor recurrence was 18 months (range, 4–55 months).

All of the six tumors were benign MESTK that presented with a variable mixture of spindle and epithelial cell components. The spindle component varied from ovarian stroma to scar-like fibrous tissue (Fig. 4A). The epithelial component showed tubular, cystic, and glandular structures (Fig. 4B).

Based on the functional outcomes (Table 3), there was no difference in the preoperative and postoperative eGFR. Similarly, there was no difference in the preoperative and postoperative split renal function in the five patients who underwent partial nephrectomy.

4. Discussion

The main feature of MESTK is it's pathologically biphasic structure: the epithelial and matrix components. The epithelial component exhibits a cystic structure lined with flat, hobnail, and cuboidal epithelium. The matrix part surrounding the cyst is composed of spindle cells.

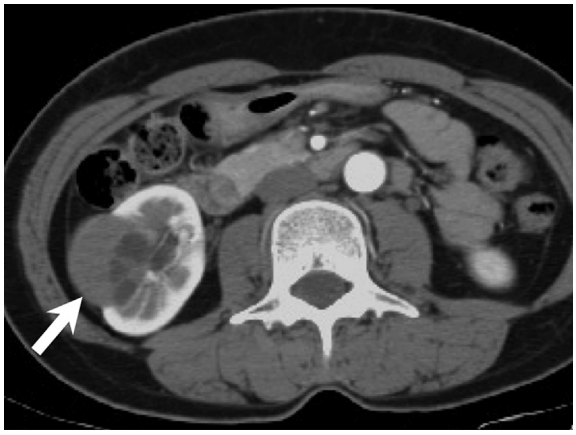

Fig. 1. Case 1: A 58-year-old woman with an epithelial and stromal tumor of the right kidney. Enhanced computed tomography scan in the corticomedullary phase showed a well-demarcated, moderately-enhanced, solid, and cystic renal mass (arrow).

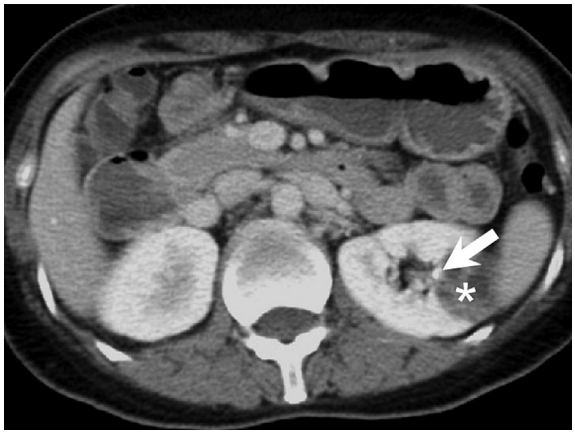

Fig. 2. Case 2: A 46-year-old woman with an epithelial and stromal tumor of the left kidney. Enhanced computed tomography imaging showed a solid and cystic mass (star), with calcification near the collecting system (arrow).