

## Bilateral renal leiomyoma with 5 year follow-up: Case report

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### Abstract

Renal leiomyomas are exceptionally rare benign tumours of the kidney. Although the renal leiomyomas usually do not metastasize, the differential diagnosis between renal leiomyomas and malign lesions (leiomyosarcoma or renal cell carcinoma) cannot be done by radiological examinations, but is possible by histological examination. Surgery is the preferred treatment. After surgery, the prognosis is excellent without recurrence. Although uterine leiomyomas can be multicentric, renal leiomyomas have been single lesions. We report an incidentally detected case of bilateral renal leiomyoma in a 50-year-old woman with a 5-year follow-up. We also review the literature and discuss clinical, radiological and histological features of renal leiomyomas.

### Introduction

Leiomyomas are benign neoplasms of the smooth muscles, usually occurring in the uterus.<sup>1</sup> Renal leiomyomas are exceptionally rare neoplasms that occur at a much lower frequency (0.001%) and show a marked female predominance.<sup>1</sup> They rarely present with flank pain and hematuria.<sup>2</sup> Renal leiomyomas are usually detected as single-kidney-masses.<sup>3</sup> There are no reports in literature regarding long-term survival or subsequent recurrence with sarcomatous differentiation.

We present a 5-year case of bilateral renal leiomyoma detected via contrast-enhanced computed tomography (CECT), magnetic-resonance-imaging (MRI), and histopathologic images.

### Case report

A 50-year-old female, with migraine, presented with a non-specific complaint of left flank pain. The hematological, bio-

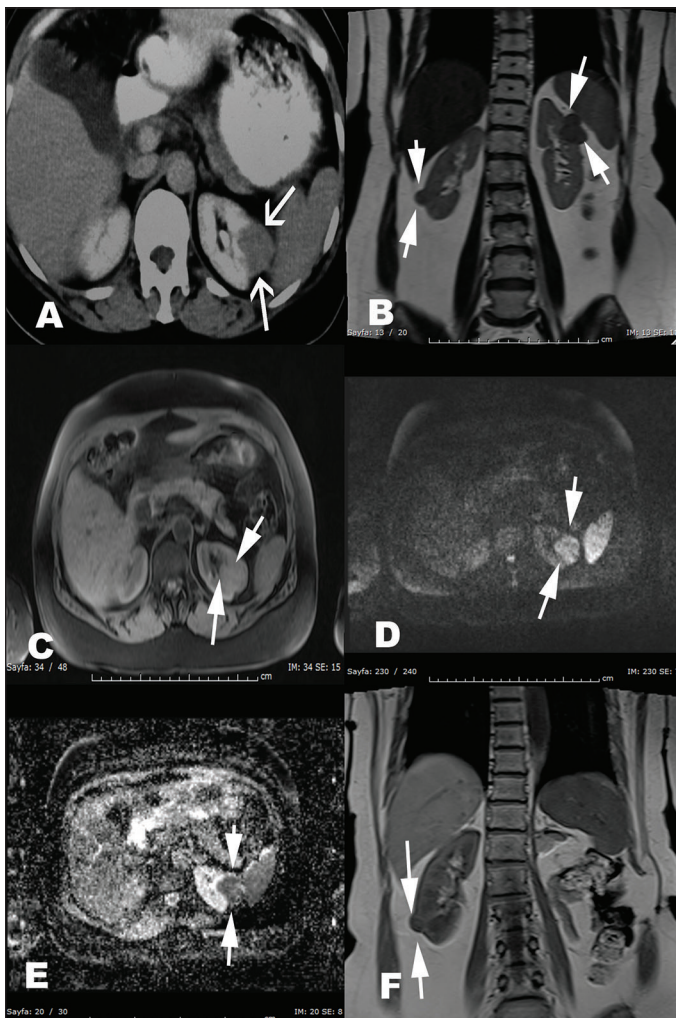
chemical parameters, and urine analyses were within normal limits. Ultrasonography revealed hypoechoic 30 × 25-mm left mid-pole and 11 × 10-mm right lower-pole renal-masses. CECT of the abdomen revealed a 30 × 35-mm well-circumscribed mid-polar exophytic left renal-mass enhancing less than renal parenchyma on corticomedullary phase with a suspicious renal pelvis invasion and a 10 × 10-mm right lower pole exophytic mass showing a similar enhancing pattern (Fig. 1).

Gadolinium-enhanced MRI revealed a 30 × 35-mm well-circumscribed mild exophytic mid-pole renal-mass with renal pelvis invasion; no pathological lymph nodes were detected. On T1-weighted images, both lesions were isointense to muscle tissue and hypointense to renal parenchyma. Enhanced T1-weighted images revealed a peripheral and centrally reticular enhanced left renal mass. Both lesions had no intracellular fat on inphase/outphase images. Malignancy was suggestive due to intense diffusion restriction on diffusion-weighted images (Fig. 1).

The left renal mass had renal pelvis invasion on MRI; therefore left radical nephrectomy was performed. Active surveillance was planned for the right renal-mass.

A microscopic examination of the left renal mass revealed a leiomyoma. Necrosis, nuclear pleomorphism, and mitotic activity were not detected. Immunohistochemically, the tumour stained strongly with smooth-muscle-actin (SMA) (Fig. 2). HMB45, S100 and desmin were negatively stained.

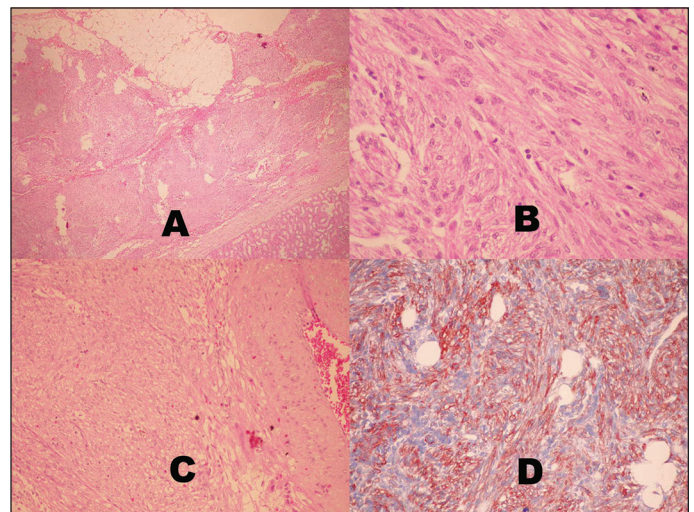
MRI and CECT findings were re-evaluated according to the histopathological findings. Both lesions were homogeneous and had nodular areas and isointense to adjacent muscles on T1 and T2-weighted images. These lesions were isointense and hypointense to renal cortex on T1 and T2-weighted images, respectively. Gadolinium-enhancements of these lesions were peripheral and in a septate pattern through the arterial to late venous phase. MRI features of both lesions, such as hyperintensity on high-b-values and apparent-diffusion-coefficient (ADC) maps, were similar. Evaluation of the lesions according to hypercellular leiomyoma MRI



**Fig. 1.** Radiological images of the renal leiomyomas. A: Axial contrast enhancing computed tomography shows a 30 × 35-mm well-circumscribed mid-polar exophytic left renal-mass enhancing less than renal parenchyma on corticomedullary phase. B: Coronal T1-weighted pre-contrast magnetic resonance imaging (MRI) shows bilateral exophytic renal-masses isointense to muscle tissue. C: Axial fat-saturated post-contrast T1-weighted image shows an enhancing left renal-mass with renal pelvis involvement. D: Axial diffusion weighted MRI shows hyperintense left renal-mass. E: Apparent-diffusion-coefficient map images show restriction of the left renal-mass mimics malignancy. F: 5-year follow-up MRI imaging of the right renal-mass shows no differentiation of size and signal characteristics.

characteristics revealed similar findings.<sup>4</sup> The needle biopsy of the right renal mass revealed leiomyoma with similar histopathological findings.

The patient was followed up for the right renal-mass with ultrasonography every 3 months and with MRI annually. The MRI findings of the right renal mass did not alter from the initial MRI at the 5-year follow-up (Fig. 1).



**Fig. 2.** Histopathological sections of left renal leiomyoma. A Neoplastic differentiation consists of clustered spindle cells adjacent to renal capsule. Hematoxylin and eosin (H&E) ×40. B: Tumour composed of spindle-shaped cells with cigar-shaped nuclei. H&E ×400. C: A thick wall vessel seen within the tumour. H&E ×100; D: Smooth-muscle-actin (SMA) positive staining cells in the tumour; SMA ×200.

## Discussion

Leiomyomas are benign mesenchymal tumours, which are more common in the uterus.<sup>5</sup> Although leiomyomas can occur in any organ of the genitourinary system, they commonly affect the kidney.<sup>5</sup> Leiomyomas originate from smooth muscle cells of the renal capsule, pelvis, calices, and blood vessels.<sup>6</sup>

Renal leiomyomas account for 1.5% of benign lesions and 0.29% of all treated renal tumours, with autopsy evidence in 4.2% to 5.2% of cases.<sup>7</sup> However, current reports of renal leiomyomas consists mostly of case reports and case series.<sup>7</sup>

Renal and uterine leiomyomas have similar ultrasonographic features. Renal leiomyomas are incidentally detected with ultrasonography.<sup>3</sup> Uterine leiomyomas can be hypoechoic to normal myometrium.<sup>8</sup> However, it can be iso-echoic or even hyperechoic. Calcification can be seen as echogenic foci with shadowing, and cystic areas of necrosis or degeneration may be seen.<sup>8</sup>

CECT is commonly used for the differential diagnosis of a renal mass. CECT cannot precisely diagnose leiomyomas, even uterine leiomyomas.<sup>3</sup> CECT features of uterine leiomyomas are soft-tissue density, exhibit coarse peripheral or central calcification. The enhancement pattern is variable and they also may distort the usually smooth uterine contour.<sup>3</sup>

MRI is the most accurate imaging modality for leiomyomas.<sup>9</sup> Uterine leiomyomas can be seen as hypointense/isointense to normal myometrium on T1 images and they might have characteristic high signal intensity on T1-weighted images.<sup>9</sup> Variable enhancement can be seen with gado-

linium administration.<sup>9</sup> Renal cell carcinoma (RCC) of the kidney has similar MRI features.<sup>10</sup> The following radiological features may suggest renal leiomyomas: homogeneous density or signal, peripheral mass with well-defined margins, less heterogenous or homogeneous enhancement than adjacent renal parenchyma, continuous and homogeneous enhancement.<sup>11</sup>

In our case, lesions were hypointense with low-b-values, hyperintense with high-b-values on diffusion-weighted-images, and low signal-intensity on all ADC maps compared with the normal renal parenchyma. Both lesions were similar to uterine leiomyoma. However, RCC has similar MRI features and it was not possible to rule out malignancy.<sup>12</sup>

Macroscopically, renal leiomyoma is a solid, well-circumscribed, encapsulated mass with a whorled surface.<sup>13</sup> Focal areas of hemorrhage and calcification can be seen. Histologically, the tumour shows intersecting fascicles of spindle cells with cigar-shaped nuclei and eosinophilic cytoplasm without significant nuclear pleomorphism or tumour necrosis.<sup>13</sup>

The histological differential diagnosis of renal leiomyoma includes other benign and malignant renal spindle cell neoplasms.<sup>14,15</sup> Immunohistochemical markers, such as desmin and actin, can be used to differentiate renal leiomyoma from mesenchymal tumours.<sup>1</sup> Renal leiomyomas can be differentiated from angiomyolipoma with the lack of a fat component and lack of expression of melanocytic markers, such as HMB-45 and Melan-A.<sup>1,13</sup> Nuclear pleomorphism, atypical mitotic figures, cytological atypia, and tumour necrosis are seen in leiomyosarcoma, but not in leiomyoma.<sup>1,13</sup>

In renal masses, including renal leiomyoma, surgery is still the gold standard.<sup>16</sup> Renal biopsy is a way to inform treatment decision in small renal masses (SRM) ( $\leq 4$  cm).<sup>17,18</sup> Percutaneous renal tumour biopsy (PRTB) could be an option for bilateral SRMs, such as in our case. PRTB is safe and at least 80% of first PRTBs are diagnostic.<sup>18</sup> The frequent benign pathology found with excised SRMs and the lack of specificity in imaging have led to an increasing acceptance of the role for pre-treatment PRTB.<sup>18</sup> However, multiple tumours may have different histological feature and therefore repeat biopsies may be required to identify tumour histology.

## Conclusion

Renal leiomyomas are rare, benign non-metastasizing tumours. They have excellent prognosis after the surgery. This bilateral renal leiomyoma case reflects clinical and radiological features. In our case, although the MRI features did not change during follow-up, the differential diagnosis is still possible by histopathological examination.

**Competing interests:** The authors all declare no competing financial or personal interests.

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