Case Report

Laparoscopic radical surgery produces a good prognosis in an elderly patient with small Wilms' tumor

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Abbreviations & Acronyms
AMACR = alpha-methylacyl-CoA racemase
CK7 = cytokeratin 7
CK20 = cytokeratin 20
CT = computed tomography
LRN = laparoscopic radical nephrectomy
MRI = magnetic resonance imaging
OS = overall survival
RAPN = robot-assisted laparoscopic partial nephrectomy
RCC = renal cell carcinoma
WT1 = Wilms' tumor 1

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Introduction: Renal nephroblastoma, also known as Wilms' tumor, is the most common malignant renal tumor to affect children. Although rare in adults, nephroblastoma in adults is often found in its advanced stages and has a poorer prognosis than cases occurring in childhood. No report has described the efficacy of laparoscopic surgery in small diameter renal tumors in elderly patients.
Case presentation: Here, we report a very rare case of 71-year-old woman with asymptomatic small nephroblastoma removed by laparoscopic radical nephrectomy.
Conclusion: The patient refused additional treatments but shows no sign of recurrence 15 months after surgery. These findings support, therefore, that laparoscopic surgery may be effective for small nephroblastoma in elderly patients refusing other treatment modalities.

Key words: elderly patient, laparoscopic radical surgery, nephroblastoma, renal cancer, Wilms' tumor.

Keynote message

This is a first case of elderly patient for small nephroblastoma who had successfully obtained over 1 year disease free survival by laparoscopic radical surgery alone. We proposed in this article that laparoscopic radical surgery could be effective for small nephroblastoma in elderly patients refusing other treatment modalities.

Introduction

Renal nephroblastoma, or Wilms' tumor, accounts for 6–7% of malignant tumors in children: >80% cases are found in children <5 years old, and adult onset of nephroblastoma is relatively rare.[1] Prognosis in adults is typically poor due to detection at a higher tumor stage compared to cases in children. A standard treatment protocol for nephroblastoma in adults has not been established because of a lack of data. And awareness of this tumor entity in adults among pathologists, radiologists, and urologists is limited. RAPN was recently developed, and its application to small renal tumors should now be investigated.

Case presentation

A 71-year-old Asian female was admitted to our hospital with an asymptomatic left renal tumor found during abdominal CT for diabetes. Hematological examination showed high hemoglobin A1c (9.8%), but there were no other abnormalities. Non-contrast-enhanced CT revealed a round, left renal sinus mass (38 × 32 mm) with homogeneous iso-attenuation relative to renal parenchyma. Dynamic contrast-enhanced CT showed that the tumor was slightly and gradually enhanced (Fig. 1a,b). MRI revealed iso-intensity on T1-weighted images and hypo-intensity on T2-weighted images compared to the renal parenchyma. We did not identify a tumor pseudocapsule (Fig. 1c,d) or any metastatic lesions. We diagnosed left renal cell carcinoma with hypo-

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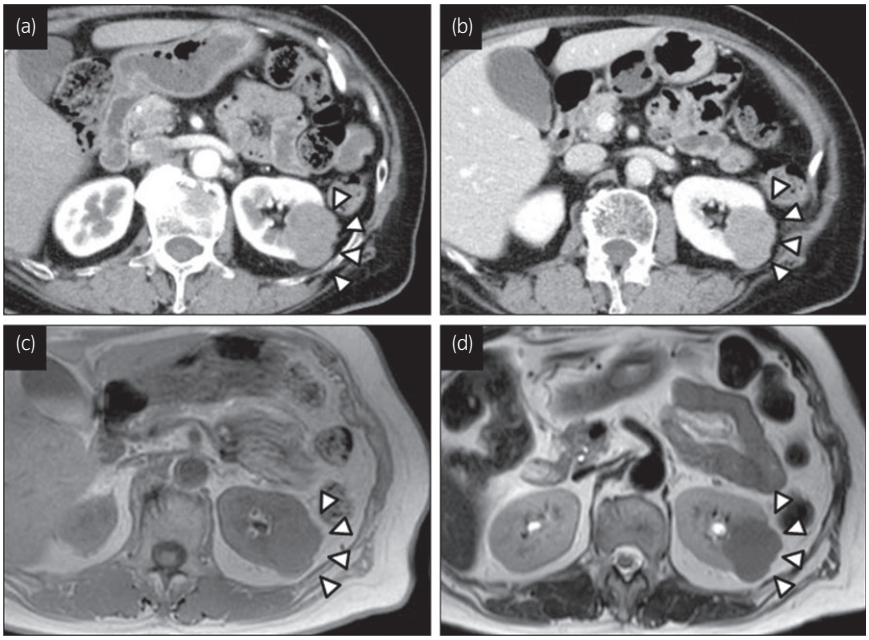

Fig. 1 (a,b) Abdominal-enhanced CT, (c) T1-weighted MRI, and (d) T2-weighted MRI of a 38 mm sized renal tumor (white arrow).

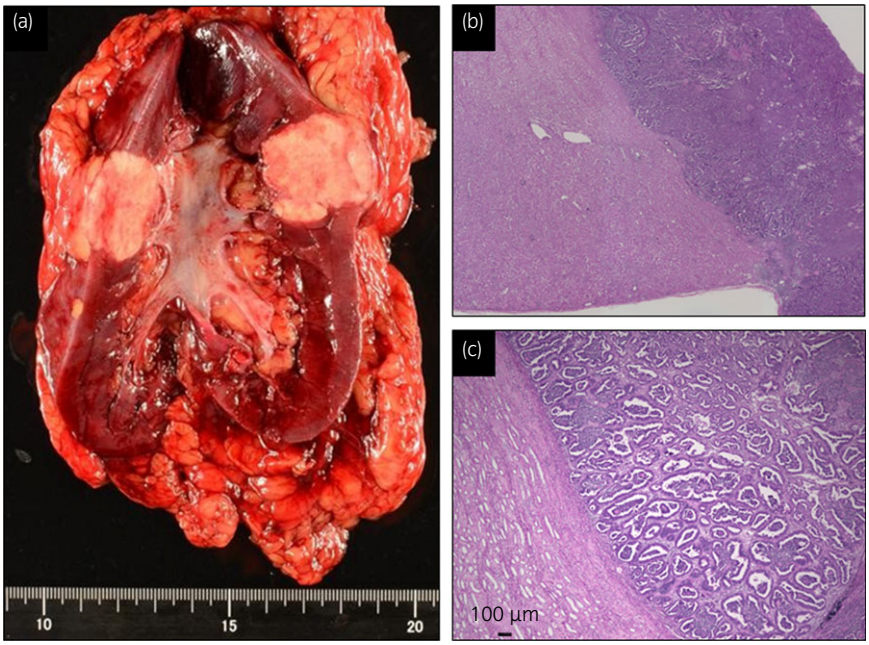

Fig. 2 (a) Macroscopic findings of a left nephrectomy specimen. A tiny, yellowish tumor was observed surrounded by normal tissue. (b,c) Hematoxylin and eosin staining of the tumor specimen.

vascular pattern, cT1aN0M0. After informed consent, we performed LRN. The tumor was solitary and rounded, and the cut surface of the tumor was pale gray and sharply demarcated from the adjacent renal parenchyma (Fig. 2a). The tumor was composed of blastemal cells, with an atypical small rounded shape and scant cytoplasm. These cells showed primitive epithelial differentiation into tubules with early forms resembling primitive rosettes with stroma (Fig. 2b,c). The tumor cells were immunoreactive for CD10 (Fig. 3e), RCC (Fig. 3f), AMACR (Fig. 3g), and negative for CK7 (Fig. 3b), CK20 (Fig. 3c), WT1 (Fig. 3d), CDX-2, thyroid transcription factor-1, and estrogen receptor. These histopathological findings were consistent with nephroblastoma stage I with favorable histology, although the immune-profile was indicative of renal cell carcinoma. No diffuse blastemal pattern or anaplasia was evident in the tumor. The serum creatinine level was increased from 0.7 to 1.07 mg/dL at 30 days post-operation. We recommended adjuvant chemotherapy, but the patient refused further treatment. She was thus monitored on an outpatient basis, and there have been no signs of recurrence 15 months after surgery.

Discussion

Discriminating a small Wilms' tumor in adults by imaging is very difficult. Wu *et al.* reported the image findings of 16 cases of adult nephroblastoma.[2] On dynamic CT, the CT values for Wilms' tumor were lower than that of the renal cortex and

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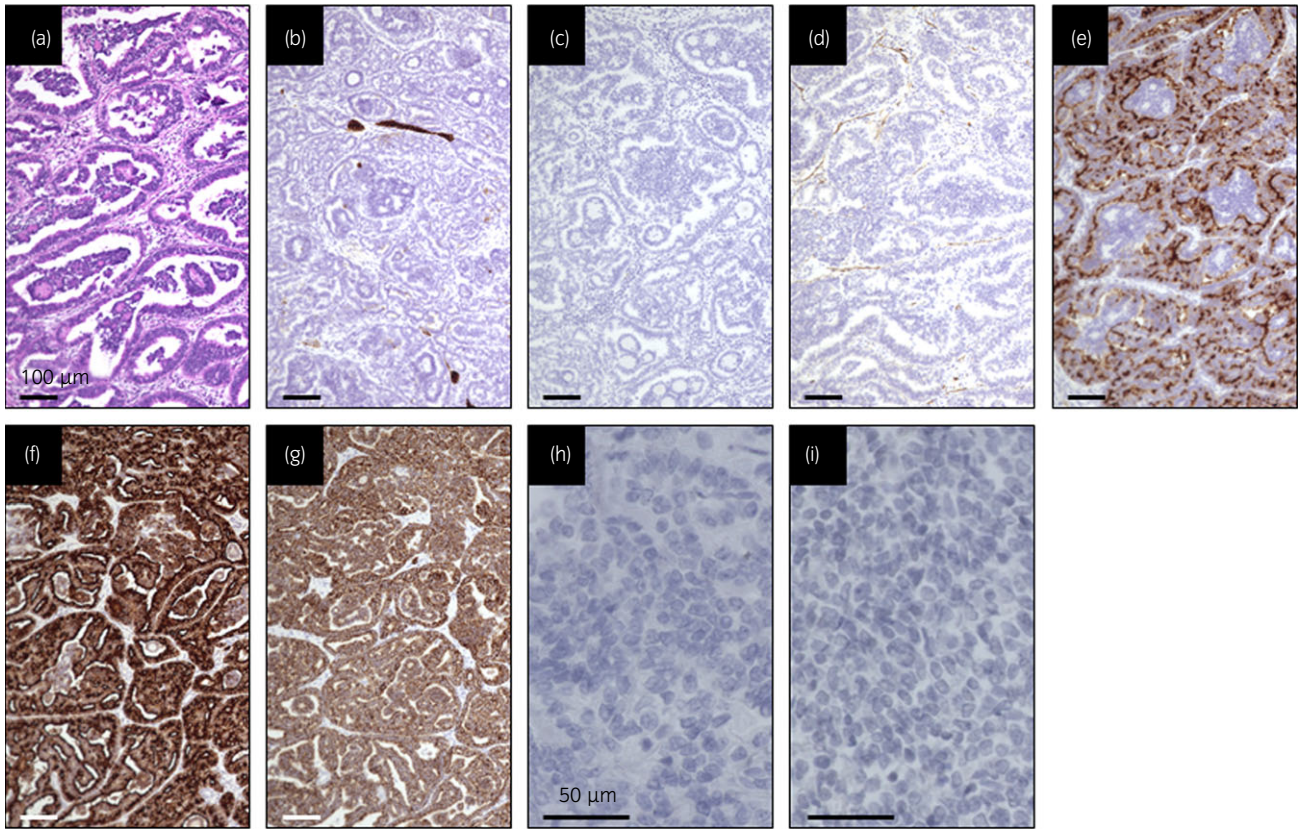

Fig. 3 (a) Hematoxylin and eosin staining of the tumor specimen. (b–g) Immunohistochemical staining of the tumor lesion shows negativity for (b) CK7, (c) CK20, and (d) WT1, and positivity for (e) CD10, (f) RCC, and (g) AMACR. MIB-1 index of blastoma cells demonstrated 0% in immunohistochemical analysis for Ki67 (h), and immunohistochemical analysis of P53 was negative (i).

medulla on early and delayed phase. On T2 weighted images, Wilms' tumors were iso- or hypo-intense. These findings are similar to those of our case (Fig. 1). They also reported that Wilms' tumors have a cystic component and hemorrhage in their images;[2] this was not evident, perhaps because of the small size of the tumor. Diagnosis was difficult to define because the tumor did not have specific characteristics due to its small size.

Various treatment modalities for nephroblastoma in children, including surgery, chemotherapy and radiation have been studied in randomized trials. However, treatment of nephroblastoma in patients >16 years has been consistently reported as difficult. The literature consists mainly of single case reports, and studies on larger patient cohorts are rare. Reinhard *et al.* collected adult nephroblastoma cases and treated them by preoperative chemotherapy with vincristine and actinomycin-D (International Society of Paediatric Oncology 93-01 protocol), and reported that the tumor stages of the adult patients at diagnosis were higher than in pediatric patients, but they could be treated following a multimodal pediatric treatment strategy using higher toxicity levels.[3] Ali *et al.* reported the characteristics and outcomes of adult nephroblastoma when >2000 patients were stratified into pediatric (<16 years) or adult (≥16 years) groups.[4] The adult patients had statistically worse OS than pediatric patients (5-year OS 69% *vs* 88%, $P < 0.01$, respectively) because of inadequate staging, lack of lymph node sampling, and subsequent under-treatment. However, there was no report as to the prognosis in elderly patient with small nephroblastoma. Our patient should have commenced adjuvant chemotherapy, even in a stage I tumor with favorable histology. And she did not provide consent due to anxiety of adverse events. To date, the patient shows no signs of recurrence or metastasis. Clinical outcomes in pediatric nephroblastoma patients are currently predicted using histopathology and stage of disease at the time of resection. Prognostic analyses using several biomarkers have also been reported, with >10% WT1, >5% Ki67, or >5% P53 positivity in tumor cells correlating with poor survival,[5–7] but these markers have not been fully assessed in adult nephroblastoma. Immunohistochemical analysis of our case revealed 3.2% WT1, 0% Ki67 (Fig. 3h), and 0% P53 (Fig. 3i) positivity. This profile might underlie the good prognosis in our case.

For the treatment of nephroblastoma, open radical nephrectomy with lymph node sampling is recommended, but there are growing reports for the use of laparoscopic surgery and nephron sparing surgery in pediatric patients. Lopes *et al.* reported the efficacy of laparoscopic-assisted partial nephrectomy,[8] but no elderly case has been described. The widespread availability of abdominal ultrasound and CT has increased the diagnosis of incidental small renal tumors; consequently, the evidence base for RAPN in small carcinoma is growing. Due to good renal function in healthy side, old age, and no identification of pseudo-capsule in the estimation on preoperative CT, we performed LRN in this case. However, we found a clear border in nephrectomy specimen between

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the tumor and normal tissue in this case (Fig. 2b), therefore, RAPN could be possible. Our conclusion is limited by the fact that it is based on only one case; however, elderly stage I nephroblastoma patients with very favorable histology may appear to be able to prolong survival in laparoscopic surgery alone. Future prospective trials using imaging modalities to select nephroblastoma patients are warranted to evaluate this approach in elderly patients with small incidentaloma.

Conclusion

LRN resulted in good outcomes in a 71-year-old female with a 38 mm sized nephroblastoma originated from left kidney.

Declarations

This article was approved by the Nagoya City University Institutional Review Board, the approval number was 60180056. Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in Chief of this journal.

Conflict of interest

The authors declare no conflict of interest.

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