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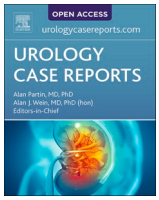

Oncology

# Retroperitoneal laparoscopic partial nephrectomy for metanephric adenoma in a pediatric patient - The first case report from vietnam

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ABSTRACT

Metanephric adenoma presents as a rare benign tumor in children with differentiated diagnoses: Wilms tumor or renal cell carcinoma. When confronted with small renal tumors, whether they fall into one of these three diagnostic categories, tumor resection surgery with laparoscopic partial nephrectomy is considered a viable and effective operative approach. Herein, we report the case of an 11-year-old female patient initially diagnosed with stage T1a renal cell carcinoma with postoperative pathology results confirming metanephric adenoma. Successfully treated with laparoscopic partial nephrectomy, the patient showed no signs of recurrence or metastasis during follow-up.

## 1. Introduction

Metanephric adenoma (MA) presents as a rare benign tumor in children, posing diagnostic challenges, often leading to misdiagnosis as Wilm's tumor (WT) or renal cell carcinoma (RCC). The primary treatment method is tumor resection surgery. Retroperitoneal laparoscopic partial nephrectomy (RLPN) emerges as a viable and effective operative approach. In this report, we present the case of an 11-year-old female patient who was initially diagnosed with renal cell carcinoma, with a differential diagnosis of Wilm's tumor and metanephric adenoma. The patient underwent successful RLPN, with the postoperative pathology result confirming MA.

## 2. Case presentation

An 11-year-old female patient presented at the outpatient clinic due to a persistent two-week history of diarrhea. The patient did not experience any preceding symptoms, such as lower back pain, frequent urination, urgency, dysuria, or gross hematuria. Her medical and family histories were unremarkable, and her vital signs remained stable during physical examination. Routine blood tests and urinalysis returned values within normal ranges. For evaluation of gastrointestinal symptoms, further investigation *via* contrast-enhanced abdominal computed tomography (CT) scan incidentally revealed a 2.5 × 3.1 × 3.2cm mass in the upper left region of the kidney, displaying mild enhancement post-contrast administration and no suspicious metastatic invasion (Fig. 1). The chest X-ray result was unremarkable. The patient was diagnosed with stage 1 left sided RCC T1aN0M0. Differentiate diagnoses are MA and WT. After consultation with the patient, we decided on a retroperitoneal laparoscopic partial nephrectomy to remove the tumor.

The surgical procedure entailed a retroperitoneal approach utilizing two 10 mm trocars and one 5 mm trocar. The first 10 mm trocar is at the costovertebral angle, the other at two-finger breath above the iliac crest, and the 5 mm trocar is at the anterior axillary line. Intraoperatively, examination of the tumor revealed an encapsulated, slightly yellow, firm mass originating from the upper pole of the left kidney. Based on these findings, the surgical team determined the tumor to be a benign adenoma, most likely. Given the absence of radiological evidence suggesting metastasis, lymphadenopathy, or vascular invasion, a nephron-sparing surgery was conducted. The tumor was successfully removed with an estimated warm ischemia time of 20 minutes and approximately 50ml of blood loss (Fig. 2). Postoperatively, the patient was advised bed rest for 24 hours, followed by gradual mobilization. The Foley catheter was removed on the morning of the first postoperative day, while abdominal drainage was discontinued the subsequent day. Following histopathological examination confirmed the diagnosis of metanephric

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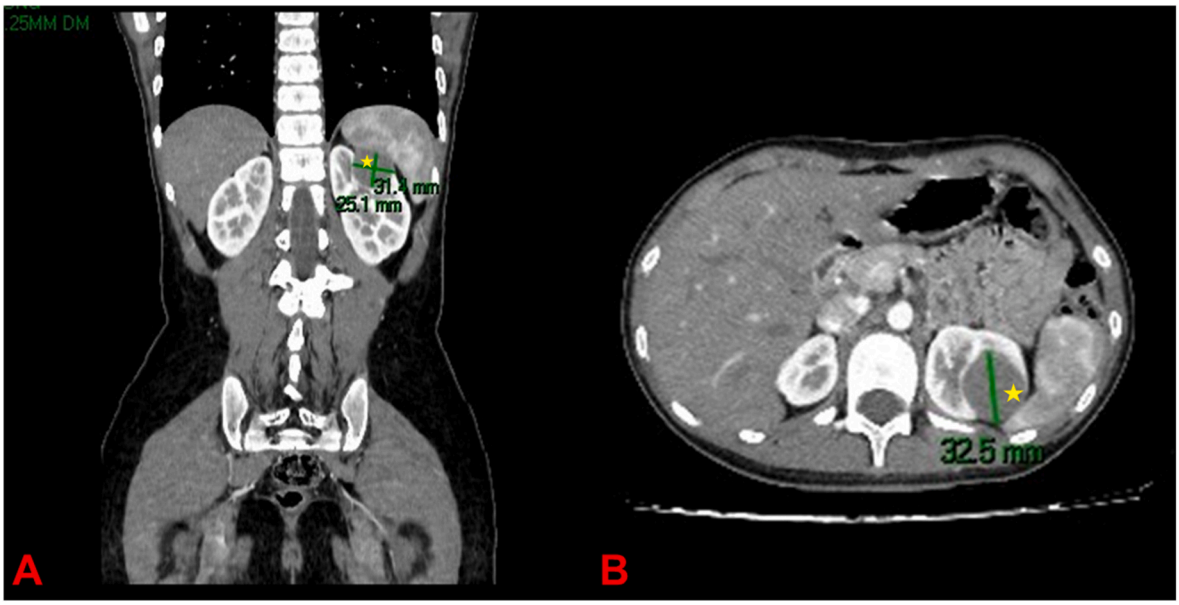


**Fig. 1.** Contrast-enhanced abdominal computed tomography showed a lesion #25 × 31mm (yellow star) at the upper renal pole, suggesting renal cell carcinoma without suspicious local invasion at the frontal (1A) and axial plan (1B). No thrombus was found in renal veins.

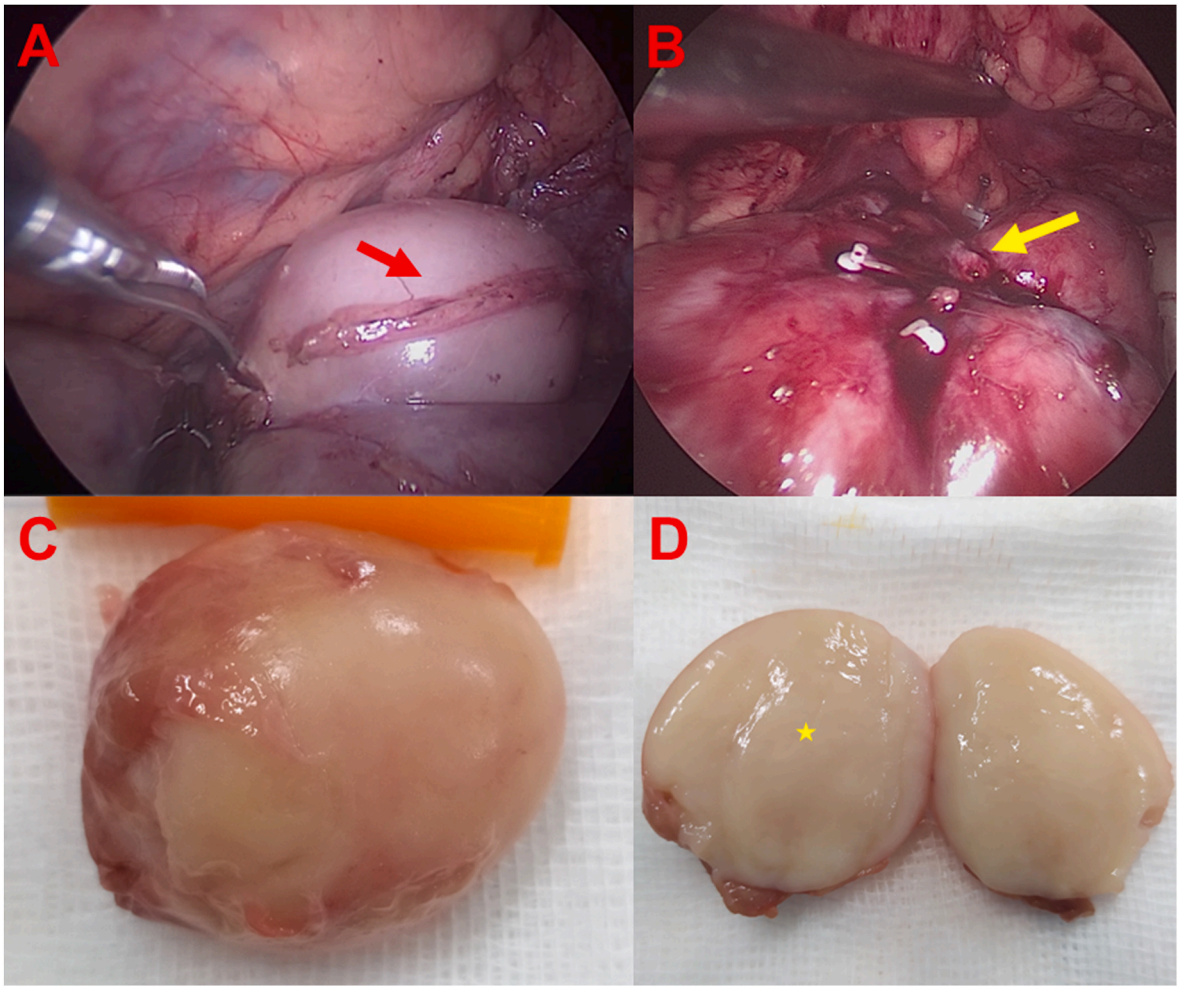


**Fig. 2.** Renal tumor (red arrow) was dissected in retroperitoneum (2A). The left kidney was sutured (yellow arrow) to close the kidney tissue after removing (2B). Gross appearance of exterior (2C) and interior (yellow star) (2D) of kidney tumor with 6 × 3 × 2cm dimensions.

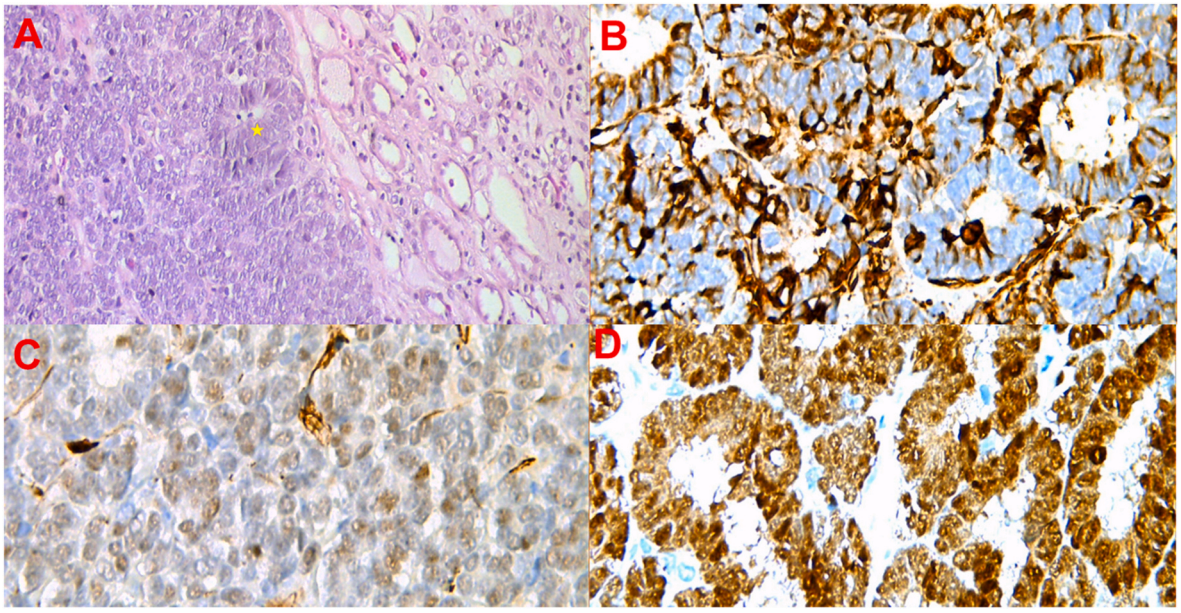


**Fig. 3.** 3A revealed the presence of well-limited tumor tissue with resting renal tissue. The tumor was comprised of numerous small, round, basilic cells with limited cell plasma and unclear nuclei (yellow star). Cells were aligned in clustered, tubular, and pseudo-glomerular patterns. Tissue staining found disseminated cells positive with VIMENTIN (3B), WT1 (3C), and PAX8 (3D), suggesting metanephric adenoma.

adenoma showing small, round, basilic cells with limited cell plasma, unclear nucleus, and stained positive with VIMENTIN, WT1, and PAX8 (Fig. 3). The patient experienced an uneventful recovery and was discharged on the sixth postoperative day. At the 6 months, 1 year, and 2 years follow-up appointments, abdominal ultrasound scans revealed partial removal of the left kidney without evidence of recurrence and complications. The patient remained asymptomatic and in good health to date.

## 3. Discussion

MA is a rare benign renal epithelial tumor first identified by Brisigotti et al., in 1992.[1] Only 28 cases of MA in children have been reported in the literature so far.[2] This condition is usually discovered accidently during a routine physical examination. Nonspecific symptoms were reported, including hematuria, low back pain, and abdominal pain with or without concomitant diarrhea. Diagnosing MA can be challenging for clinicians because of its rarity and similarity in clinical manifestation and imaging characteristics to other malignant renal tumors. MA appears as a well-circumscribed solid mass that can be either hyperechoic or hypoechoic in renal ultrasound. CT may demonstrate a renal mass with uniform density and contrast enhancement. The gold standard diagnosis of MA is a histopathological examination with typical characteristics, including round, small tumor cells with absent mitosis arranged in glomerular, tubular, or papillar patterns.[3] The most common differential diagnoses of MA in children are Wilm's tumor and RCC originating from renal tubules.

The primary treatment of MA is surgical resection, which has shifted from total nephrectomy to nephron-sparing surgery, particular RLPN.[3] This approach has proven safe and effective in treating small malignant and benign renal tumors, particularly MA.[4,5] Compared to total nephrectomy, RLPN is considered to be a better option for improving postoperative survival and similar long-term survival outcomes.[6] Moreover, the retroperitoneal laparoscopic approach has several benefits, including a more comfortable recovery, shorter hospital stays, reduced hospital costs, better cosmetic results, and a lower risk of small bowel obstructions.

Our 11-year-old female patient was initially diagnosed based on clinical and imaging findings with stage T1 RCC, with a differential diagnosis of MA and WT. In any of these scenarios, whether T1 RCC, MA, or WT, RLPN offers a feasible option, preserving kidney tissue and function for the patient.[5–7] Typically, in Vietnam, similar cases are managed with radical nephrectomy due to limited experience. However, based on current evidence and the expertise of highly experienced surgeons, we decided to treat our patient with RLPN. The surgery was successful, and the patient was discharged three days later. Subsequent follow-up examinations revealed no signs of metastasis or recurrence.

## 4. Conclusion

MA is a benign tumor that is rarely found in children. Although the best approach for treating MA is still under debate, it has been shown that retroperitoneal laparoscopic partial nephrectomy is a reliable option and can lead to good long-term outcomes. This nephron-sparing surgery technique may also help to preserve renal function, especially when performed by an experienced laparoscopic surgeon.

## Consent

Informed consent has been obtained from our patient.

## Author agreement

All authors have seen and approved the final version of the manuscript being submitted.

## Declarations of interest

None.

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## CRediT authorship contribution statement

**Vinh Hung Tran:** Writing – original draft, Investigation,

Conceptualization. **Vo Anh Vinh Trang:** Writing – review & editing, Investigation, Conceptualization. **Phu Phat Pham:** Supervision, Investigation, Conceptualization. **Nguyen Hai Dang Le:** Writing – review & editing, Writing – original draft. **Do Huu Toan Tran:** Writing – original draft. **Thien Tan Tri Tai Truyen:** Writing – review & editing.

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