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Renal Artery Pseudoaneurysm After Open Partial Nephrectomy

Kapil Singla, Sistla B Viswaroop, Myilswamy Arul, Ganesh Gopalakrishnan, Sangam V Kandasami
Department of Urology, Vedanayagam Hospital and Postgraduate Institute, Coimbatore, India
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ABSTRACT

Nephron-sparing surgery has become the standard of care for renal masses that are < 4 cm in size. A renal artery pseudoaneurysm (RAP) following nephron-sparing surgery is a rare but well-documented complication. The most common presenting symptom is hematuria, but bleeding is not universal and differential diagnosis is essential to successful treatment. A high index of suspicion and proper imaging tests aid diagnosis. The present 34-year-old male demonstrates an unusual presentation of RAP following nephron-sparing surgery with no evidence of hematuria. In recent years, percutaneous selective arterial embolization has emerged as a simple and effective modality for managing RAPs in hemodynamically stable patients.

KEYWORDS: Pseudoaneurysm; Angioembolization; Partial nephrectomy
CORRESPONDENCE: Dr. Ganesh Gopalakrishnan, Consultant Urologist, Vedanayagam Hospital, R S Puram, Coimbatore, India (ganeshgopalakrishnan@yahoo.com).
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Abbreviations and Acronyms
CT, computed tomography
RAP, renal artery pseudoaneurysm

INTRODUCTION

A renal artery pseudoaneurysm (RAP) is a rare but well-documented complication of percutaneous renal procedures, renal trauma, or partial nephrectomy [1-3]. The incidence following open partial nephrectomy is 0.43% [4] and slightly higher (~1.2%) after laparoscopic partial nephrectomy [5]. Two mechanisms have been proposed for the formation of a pseudoaneurysm: (1) bleeding from a partially transected artery during resection, particularly near the apex of wedge resection; (2) bleeding from a puncture hole in a blood vessel following removal of the initially placed needle during nephrectomy closure [5]. The most common symptom is hematuria, which results from erosion of the pseudoaneurysm into the renal collecting system. Symptoms usually manifest 2-4 weeks after injury. Although gross hematuria is common, it is not a universal finding. The present case demonstrates an unusual presentation of RAP following conservative renal surgery, with no evidence of hematuria.

CASE REPORT

A 34-year-old male was incidentally diagnosed as having a right renal mass on an ultrasound that was performed during an overall health check-up. Contrast-enhanced computed tomography (CT) of the abdomen showed a 27 mm x 23 mm x 29 mm hypodense enhancing renal mass in the middle pole of the right kidney (Figure 1). Nephron-sparing surgery was performed. Histopathology showed T1N0M0 Fuhrman nuclear grade 1 renal clear-cell carcinoma.

During a follow-up examination, the patient complained of pain in the operated area that did not improve with analgesics. An ultrasound of the abdomen showed a 17 mm pseudoaneurysm in the upper pole of the right kidney (Figure 2). Selective renal angiography was performed. Results showed a RAP in the interpolar region, arising from the branch of upper pole segmental artery. It was selectively catheterized and embolized with 018 x 14 cm nester coil. Control arteriography after the embolization showed complete obliteration of the pseudoaneurysm (Figure 3; Figure 4). Following angio-embolization, the patient's symptoms resolved. A CT scan at 2 months showed that the pseudoaneurysm was no longer present (Figure 5).

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Figure 1. CT Scans of the Abdomen Showing Enhancing Renal Mass of the Right Kidney (arrow).

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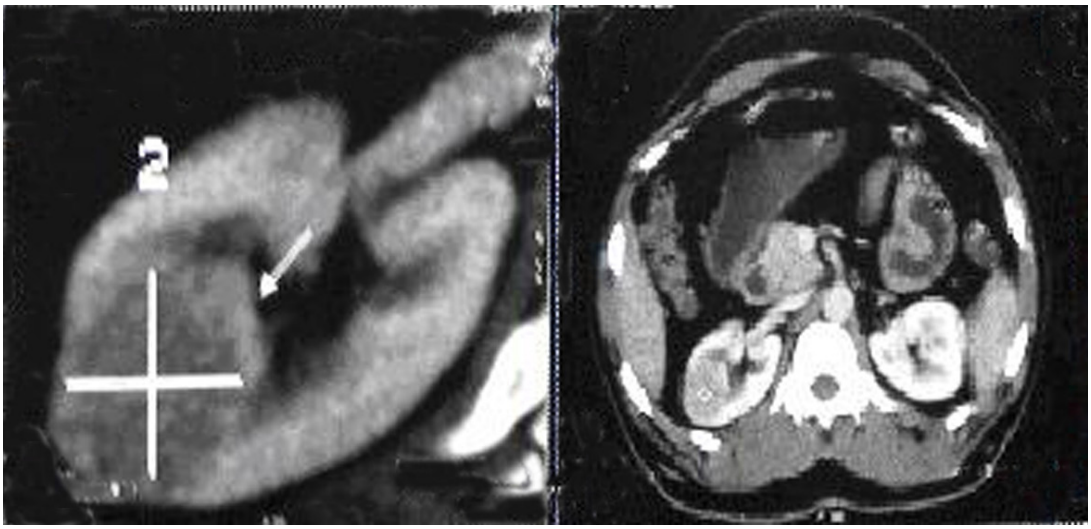

Figure 2. Color Doppler Ultrasound Showing Renal Artery Pseudoaneurysm With Circular Flow.

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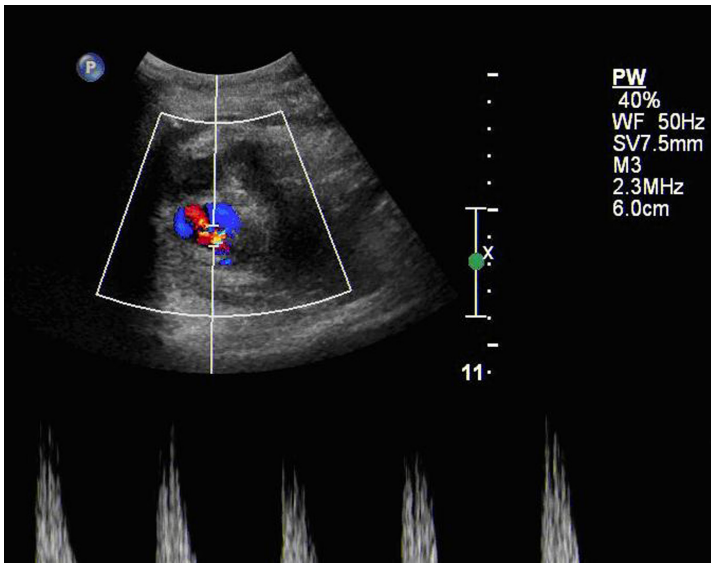

Figure 3. Selective Renal Angiogram Showing Renal Artery Pseudoaneurysm.

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Figure 4. Complete Resolution of Renal Artery Pseudoaneurysm After Coiling Procedure.
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DISCUSSION

Hemorrhage is a typical sign of RAP, but urologists should be aware that bleeding is not universal and differential diagnosis is essential to successful treatment. Angiography is the reference standard for diagnosis of RAP, but in unstable patients noninvasive tests such as CT angiogram or color Doppler ultrasound can be performed.

Treatment options for pseudoaneurysms are observation, aneurysmectomy with surgical repair, endovascular procedures, or total or partial nephrectomy. Observation is indicated for patients with asymptomatic aneurysms measuring < 2 cm in diameter. In recent years, percutaneous selective arterial embolization has emerged as a simple, useful, and effective modality for managing a pseudoaneurysm in hemodynamically stable patients [6]. If a pseudoaneurysm involves the main renal artery, embolization will lead to devascularization of the kidney. In such cases, use of a covered stent has been advocated [7].

CONCLUSIONS

Bleeding is the most common presenting symptom of RAP. However, RAP cannot be ruled out in the absence of bleeding. A

Figure 5. CT Scans Showing No Evidence of the Renal Artery Pseudoaneurysm (arrow).
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high index of suspicion and proper imaging tests aid diagnosis. Minimally invasive procedures such as embolization help to salvage the kidney.

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