



## Oncology

## Detection of renal artery pseudo-aneurysm six months after robotic assisted partial nephrectomy in a patient whose only complaint was flank pain

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## ABSTRACT

Renal artery pseudoaneurysm (RAP) is a potentially life-threatening complication after partial nephrectomy (PN). Studies suggest that most cases present within 15 days post-operatively with one of three classic symptoms: gross hematuria, flank pain and/or anemia. However, there are a limited number of reports in the literature regarding delayed RAP ( $\geq$  four months). To the best of our knowledge we report the first case of RAP six months following robotic-assisted PN.

## Introduction

Partial nephrectomy (PN) represents a current standard for surgical management of cT1 renal tumors that are amenable to this approach. Bleeding due to renal artery pseudoaneurysm (RAP) is a rare but potentially life-threatening complication of PN. In a meta-analysis, RAP was reported in 1.5% of cases after 5,229 PN.<sup>1</sup> These authors suggested that RAP is most commonly seen after minimally invasive PN (~2%) vs. open PN (~1%). Most cases present within 15 days post-operatively with one of three classic symptoms: gross hematuria, flank pain and/or anemia<sup>1</sup>; yet asymptomatic cases have been reported. However, there are a limited number of reports in the literature regarding delayed RAP (2–4 months).<sup>2,3</sup> To the best of our knowledge we report the first case of RAP presenting six months after robotic-assisted PN.

## Case report

A 37-year-old female without a significant past medical history presented with an incidentally found renal mass after workup for abdominal pain and diarrhea. Contrast enhanced computed tomography showed a 3.0 × 2.6 cm lobulated hypodense mass mid to upper pole lateral right kidney (Fig. 1). Robotic assisted right-sided partial nephrectomy was performed without complications. After resection the site was oversewn using 3-0 V-lock suture x2. A second 3-0 V-lock was used to re-approximate the parenchymal edges using the sliding Hem-o-

lok clip technique. Her hospital course was uncomplicated, and she was discharged on postoperative day two. Final pathology showed a cT1a chromophobe renal cell carcinoma with negative margins.

Three months after surgery the patient started to complain of mild intermittent right flank pain that was attributed to her profession (Law Enforcement) given the absence of additional symptoms. On six-month follow-up visit, the patient complained of worsening, constant, right flank pain not improved by analgesics. She denied gross hematuria, or bothersome urinary symptoms. Physical examination revealed mild right upper quadrant tenderness. Her hemoglobin was 14.4 mg/dL, creatinine 0.83 mg/dL, microscopic urinalysis showed 0–2 RBC/hpf and negative culture. Contrast enhanced computed tomography (CT) showed a 2.7 × 2.2 cm enhancing irregular soft tissue lesion in the right kidney bed (Fig. 2A). Magnetic resonance imaging (MRI) of the abdomen was obtained to rule out recurrence; this showed a definitive vascular lesion of 3.0 × 1.6 cm (Fig. 2B). Selective renal angiography was performed which confirmed a 4 cm renal artery pseudoaneurysm in the interpolar region, arising from a branch of the main renal artery (Fig. 3A). Selective angioembolization was successfully performed (Fig. 3B). The patient subsequently reported significant improvement of her symptoms. Follow up MRI at 10 months showed no residual pseudoaneurysm or tumor recurrence.

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**Fig. 1.** Initial CT abdomen with 3.0 cm lobulated hypodense mass of right kidney.

**Discussion**

RAP is a potentially life threatening complication after PN whose etiology is thought to be due to partially transected artery during tumor resection that bleeds into a contained hematoma cavity, particularly near the apex of wedge resection or due to a false puncture made into a vessel during tumor bed closure with the need for needle redirection.<sup>4,5</sup>

A high index of suspicion is essential to diagnose RAP, as patients may present with atypical symptoms. Gross hematuria and/or flank pain are classic symptoms, but others include abdominal pain, dizziness, syncope or fever. The timing for RAP presentation typically is close to the time of index surgery. Our case report, however, is of a RAP

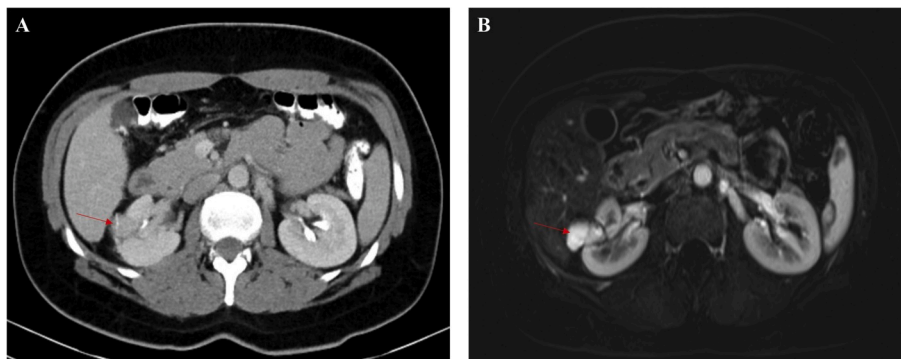
presentation six months post operatively. Our patient did not have typical symptoms (namely gross hematuria) and her only presenting complaint, flank pain, was confounded by her profession (Law Enforcement). The combination of these two factors likely hid the diagnosis, which was eventually revealed by the progression of her flank pain.

Angiography ± angioembolization is the gold standard diagnostic and therapeutic procedure for RAP. Nonetheless, some authors recommend that a CT scan, renal ultrasound or magnetic resonance imaging first be performed in a hemodynamically stable patient. Management of RAP will depend on clinical presentation and hemodynamic stability. Selective angioembolization is the most common and preferable approach used to treat RAP to preserve renal function while achieving symptom resolution in 96% of cases.<sup>4</sup> In addition, it has been shown to be a more effective strategy than surgical exploration.<sup>1</sup> In rare cases, conservative management, with observation and serial hemoglobin, has been proposed for patients hemodynamically stable with a success rate of 11%.<sup>1,2</sup>

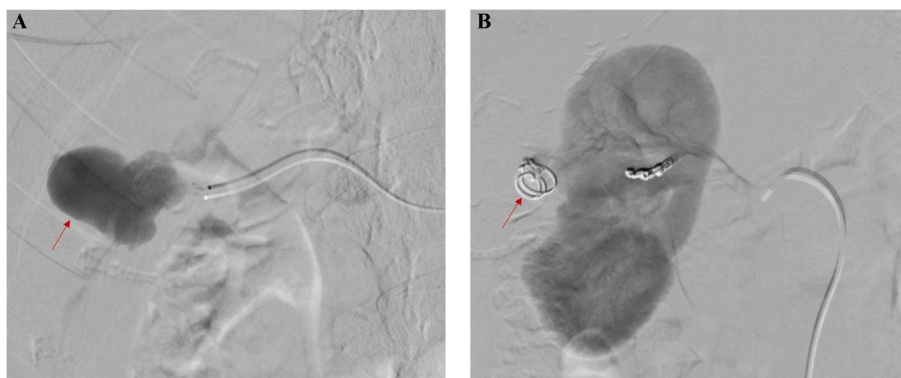
Various technical maneuvers to decrease RAP development have been described. Placing the running suture more tightly to oversew any transected vessels at the nephrectomy bed is one example.<sup>4,5</sup> During hemostatic renorrhaphy, one should try to avoid unnecessary renal parenchymal puncture.<sup>4,5</sup> Avoidance of hemostatic material over the resection bed that may separate the cut edges of the renal parenchyma and delay close tissue apposition has also been described in the literature.<sup>2</sup> Finally, inspection of surgical site after desufflation, in laparoscopic cases, is important to unmask any potential bleeding sites.<sup>5</sup>

**Conclusion**

This is a case of a 37-year-old female who underwent a robotic assisted PN for a right, 3.0 cm renal mass and who presented



**Fig. 2.** A. Contrast enhanced CT abdomen showing 2.7 cm irregular mass in right partial nephrectomy bed B. MRI abdomen showing a 3.0 cm definitive vascular lesion in right kidney bed.



**Fig. 3.** A. Right renal angiogram with 4 cm renal inter-polar artery pseudoaneurysm B. Post-coiled embolization right renal angiogram.

approximately six months after with progressive flank pain and was found to have a RAP. She did not have any other symptomatology to indicate development of this complication. Current literature describes reports of RAP up to four months after the index surgery.<sup>3</sup> To our knowledge, this is the first reported case of detection of RAP six months after the initial resection.

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#### Author contributions

Victor Otaño-Rivera, MD: Conception, interpretation of data, manuscript writing. Raju Chelluri, MD, MS: Conception, interpretation of data, manuscript writing. Thomas J. Guzzo, MD, MPH: Interpretation

of data, manuscript writing. Alan Wein, MD PhD (Hon): Interpretation of data, manuscript writing. Phillip Mucksavage, MD: Conception, interpretation of data, manuscript writing.

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