

## Delayed Severe Bleeding Following Partial Nephrectomy Managed with Selective Embolization: A Case Report

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### Abstract

Partial nephrectomy (PN), has been established as the standard surgical treatment for renal tumors in clinical stage T1a and in select cases of T1b and T2. The complications of PN include postoperative hemorrhage which can have potentially serious consequences. A 60 year old adult male underwent left partial nephrectomy for T2b renal tumor. He presented himself to the emergency services of the hospital with massive hematuria. Selective renal angiography revealed two pseudo aneurysms on the affected side. Selective embolization of the lesions was done. Selective vascular embolization is the treatment of choice for patients with symptoms of severe bleed in a hemodynamically stable patient.

**Keywords:** Partial nephrectomy; Postoperative hemorrhage; Renal cell carcinoma

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### Introduction

Partial nephrectomy (PN) is the surgical technique of choice in the treatment of renal tumors in clinical stage T1a ( $\leq 4$  cm), and also in selected cases in stage T1b and T2 [1-3]. Complications following PN have been extensively studied and reported in the literature. Among the complications, postoperative hemorrhage is one with potentially serious consequences. It is estimated that, including immediate and delayed bleeding, its incidence is between 4 and 6% after laparoscopic PN, and about 1.6% after open PN [4,5]. Very few studies have focused on the diagnosis and treatment of delayed bleeding, the one that occurs after the patient is discharged. The occurrence of delayed bleeding after PN is rare, and it is usually attributed to the presence of artery pseudoaneurysms (AP) [6]. The incidence of symptomatic AP is over 0.43% after open PN [7], and 1.7-7.5% after laparoscopic PN [8]. The real incidence of AP could be much higher as most of the AP do not get to produce clinical manifestations. We reported a case of delayed post-operative bleeding following open partial nephrectomy and managed by angio-embolization of the arterial pseudoaneurysms.

### Case Report

A 65 year old male was brought to the emergency services of the hospital with two episodes of gross hematuria. Informed patients

consent was taken during the consultation and approval from Institutional Review Board (IRB) was taken prior to the study. The patient was catheterized and bladder irrigation started. Hemoglobin was 10.5 gm%. Patient was a known case of renal cell

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carcinoma and had undergone left partial nephrectomy a month earlier for T1b lesion. Post-operative period was uneventful. Repeat hemoglobin done four hours later, was 8.5 gm%. In view of falling hemoglobin level, the patient was referred to the department of interventional radiology.

## Technique

Under local anesthesia using retrograde Seldinger's technique right femoral arterial access was obtained and diagnostic bilateral renal artery angiograms were performed using cobra catheter (AngioDynamics, Inc., Queensbury, NY, USA) which showed a partially thrombosed aneurysm measuring 5.2 X 3 mm with neck of 2.8 mm arising from left main renal artery and another larger pseudo aneurysm measuring 8 X 8 X 12 mm in the middle pole of left kidney (**Figure 1**). Using co-axial technique of 5F cobra catheter (AngioDynamics, Inc., Queensbury, NY, USA) and Progreat microcatheter (Terumo Corporation, Japan), the artery supplying the large ruptured aneurysm in midpole of left kidney was embolized by using two cook fibered microcoils (Cook Medical, USA) (**Figure 2a**). A single helical coil (**Figure 2b**) was placed in the pseudoaneurysm of the main renal artery using SL 10 microcatheter. Check angiogram of the left renal artery showed completely thrombosis of the embolized aneurysm with maintained flow to rest of the left kidney. Patient tolerated the

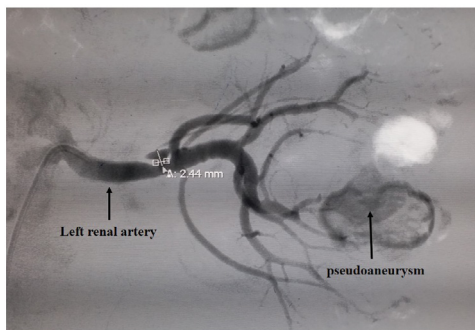
procedure well and there was no untoward reaction to contrast media. Right femoral arterial sheath was removed at the end of procedure and hemostasis achieved at puncture site by digital compression. The patient had an uneventful recovery following embolization.

## Discussion

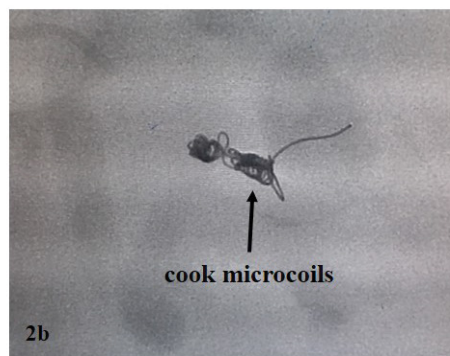
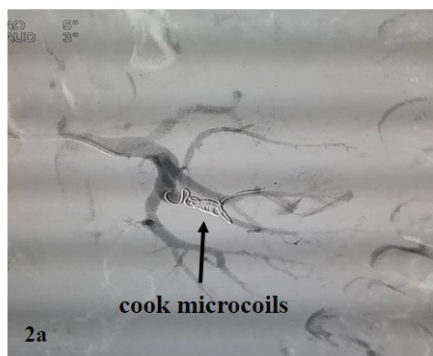
Partial nephrectomy has become the treatment of choice for localized renal tumors. Despite the relatively low incidence of bleeding after partial nephrectomy, it remains one of the most serious complications, and this is especially so for centrally located tumors [4,5,9]. Several studies have examined several factors in relation to hemorrhage following partial nephrectomy, including patient and demographic factors, operative techniques, and tumor related parameters [5]. Van Poppel et al. [10], in their study of 76 open partial nephrectomies, suggested that tumors that were large in size and centrally located had an increased risk of postoperative hemorrhage. Similarly, Ramani et al. [5] reported that the incidence of postoperative bleeding was higher in patients with tumors that were centrally located and with deeper infiltration.

Jung et al. [11] evaluated the frequency and clinical characteristics of postoperative hemorrhage following partial nephrectomy in their series of 300 patients. Thirteen (4.3%) experienced postoperative hemorrhage severe enough to require intervention more invasive than transfusion (Clavien grade III or higher). Analysis of the bleeding and non-bleeding groups showed that the exophyticity (E) score was significantly higher for severe postoperative hemorrhage ( $p=0.04$ ). In most of the cases requiring intervention, selective embolization was sufficient, but in one case explorative laparotomy and nephrectomy were required. Clinical characteristics varied significantly among severe hemorrhage cases, with time of onset ranging from the first to the 30<sup>th</sup> postoperative day and symptoms presenting in a diverse manner, such as gross hematuria and pleuritic chest pain. Computed tomography and angiographic findings were consistent with either arteriovenous fistula or pseudo aneurysms.

Renal embolization can be lifesaving, be used to facilitate perioperative hemostasis, and often eliminate the need for



**Figure 1** Left renal angiogram shows a large pseudo aneurysm measuring 8 X 8 X 12 mm in the midpole.



**Figure 2** (a) Selective embolization done using Cook micro coils. Post embolization no pseudo aneurysm seen. (b) Cook microcoil in place.

a surgical intervention in patients with life threatening renal hemorrhage following partial nephrectomy. Ciudin et al. [12] evaluated treatment and outcomes of delayed bleeding in their series of 230 patients with partial nephrectomy. Three patients developed delayed bleeding (1.3%), 17-25 days after surgery and consisted of hematuria or lumbar pain. Diagnosis was made on the findings on abdominal computed tomography and renal angiography. In all the three patients, a complicated pseudoaneurysm was diagnosed and all patients underwent renal artery catheterization with selective renal artery embolization. In all patients, immediate control of bleeding was achieved. Outcome

after a follow-up of 61-92 months was favorable.

## Conclusion

Delayed bleeding or hemorrhage following partial nephrectomy occurs due to arterial pseudoaneurysms. Selective vascular embolization is the treatment of choice for patients with symptoms of severe bleed in a hemodynamically stable patient.

## Conflict of Interest

Authors declare conflict of interest as none.

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