

Renal artery pseudoaneurysm following open partial nephrectomy

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KEY WORDS

renal artery ► nephrectomy ► pseudoaneurysm
► embolization

ABSTRACT

Renal artery pseudoaneurysm (RAP) is an uncommon complication following an open partial nephrectomy. We present a case of RAP diagnosed four and a half months following open partial nephrectomy for renal cell carcinoma. RAP was managed by selective angiographic embolization using coils. The etiology and management of this potentially life-threatening condition is discussed.

INTRODUCTION

Partial nephrectomy (PN) is the preferred method to manage ≤ 4 cm renal cell carcinoma (RCC) with overall oncologic outcome similar to that of radical nephrectomy, and preservation of renal function [1]. Complications of the procedure include urinary fistula, hemorrhage, ureteral obstruction, renal insufficiency, and infection. RAP is a known complication of abdominal trauma and percutaneous procedures, but rarely presents as a complication following PN [2]. We describe a case of RAP that occurred after an open PN for left sided RCC and discuss the management of this life-threatening condition.

CASE PRESENTATION AND MANAGEMENT

A 46 year old woman presented with left flank pain. Past medical history was significant for chondrosarcoma of the right humer-

us and endometrial carcinoma. Renal ultrasound and CT scan were performed and revealed an endophytic 3.3 cm x 2.7 cm complex cystic mass consistent with RCC. Using a flank incision a standard left open PN was performed. During the procedure, the renal artery and the renal vein were individually occluded. Monocryl® and 4-0 chromic sutures were used to repair the collecting system and ligate individual vessels. Crosseal®, 2-0 chromic sutures, and Gelfoam® bolsters were used to approximate the transected cortical margins to aid hemostasis. The incision was closed in a standard manner. Estimated blood loss was 100 ml. Pathology report indicated a pT1a clear cell type, Fuhrman grade 1 RCC, with negative surgical margins. After an uneventful recovery, the patient was discharged on the fourth post operative day.

Four and a half months following the PN, the patient presented with left flank pain. CT scan of the abdomen showed a 9 cm collection on the posterior surface of the left kidney. This collection showed accumulation of contrast suggesting a pseudoaneurysm or AV-fistula (Fig. 1a). A duplex ultrasound demonstrated color flow within the renal lesion that was consistent with a pseudoaneurysm (Fig. 2).

An abdominal aortogram confirmed extravasation of contrast at the mid region of the left kidney from subsegmental renal arteries (Fig. 3a). 4 mm x 10 cm and 4 mm x 7 cm Trufill DCS Orbit® coils along with a 4/3 Tornado® coil were used for selective embolization of the arterial branch feeding the RAP (Fig. 3b). An angiogram performed post embolization demonstrated no further extravasation. A CT scan two months following the procedure showed complete resolution (Fig. 1b).

DISCUSSION

Vascular complications, particularly false aneurysms are a rare occurrence following a PN. A pseudoaneurysm results most likely from arterial injury not noted during the PN that further develops

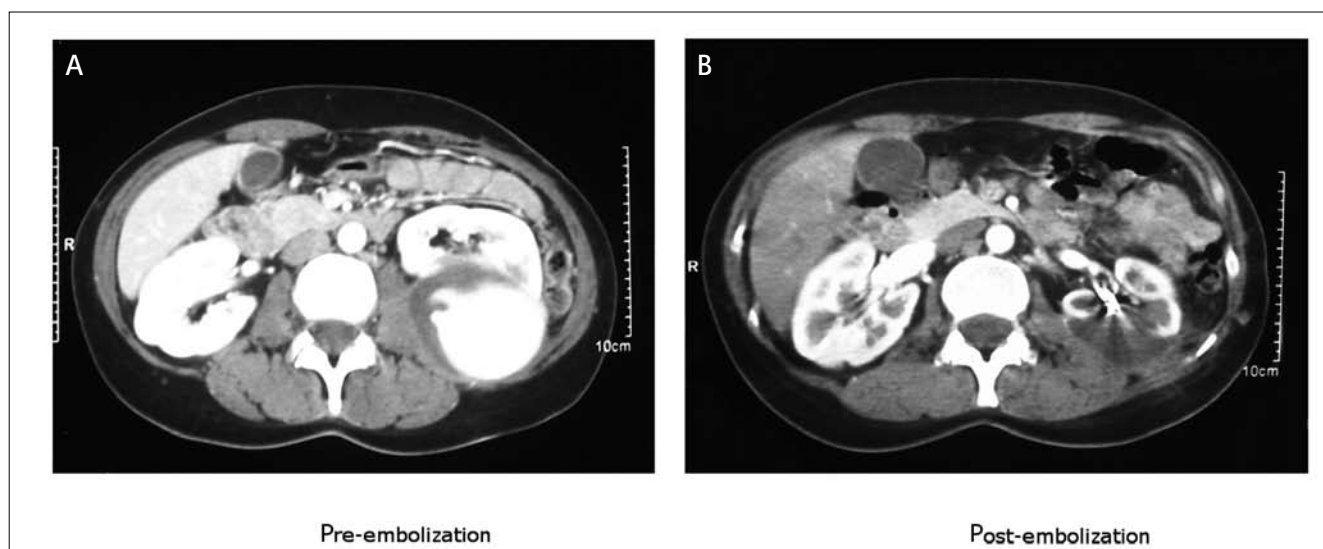


Fig. 1. CT scan image of the abdomen post contrast showing a) a left RAP and b) subsequent resolution of the RAP following coil embolization.



Fig. 2. CT abdominal examination (a cross section): left kidney and retroperitoneal hematoma.

into a bleeding cavity contained only by adjacent tissues, such as the renal parenchyma [1, 3]. The arterial injury may go unnoticed for various reasons; non recognition during surgery might be caused by cross-clamping and arterial spasm [4]. The compression sutures do not provide enough tension to ensure long term hemostasis [4]. As activity levels increase in the postoperative period, it is possible that increased blood flow unplugs the injured wall and RAP develops [4]. The interval between PN and the RAP is prolonged in part because of the use of tissue sealants, as in this case, or from tissue treated with argon beam that becomes sloughed from the injured wall [4].

Patients with RAP present a few days to several months after surgery with painless gross hematuria and prolonged nonspecific complaints such as abdominal pain and/or lower urinary tract symptoms followed by hypotension [1, 5, 6]. In our case, the patient had a late postoperative presentation (four and a half months after open PN) with nonspecific left flank pain.

Diagnostic imaging techniques such as CT scan of the abdomen and pelvis with and without contrast are used to identify pseudoaneurysms in stable patients [2]. Most of the time, a RAP is observed as a focal lesion with high attenuation equal to the adjacent ar-

terial vessels on contrast-enhanced CT scan; at the same time, it provides information regarding other possible intra-abdominal pathologic features.

Pseudoaneurysms can resolve spontaneously or require further treatment. Wall rupture can cause a life threatening hemorrhage [4]. RAP can be managed by endovascular treatment or open surgery. In endovascular treatment, the pseudoaneurysm can be either occluded as in angiographic embolization or excluded as in arterial stent insertion. Selective angiographic embolization is often used in view of near 90% success in patients with renal vascular injuries as well as the low morbidity and hospital costs [7-10]. It demonstrates high effectiveness in management of vascular complications after open procedures maximizing renal conservation as seen in this case. However, it is important to obtain follow up imaging to ensure that thrombogenic coils successfully occluded the pseudoaneurysm.

A differential diagnosis of RAP should be considered when non specific symptoms such as abdominal pain or gross hematuria occur after partial nephrectomy and should prompt further evaluation. A RAP is the diagnosis if a CT scan reveals a saccular lesion with focal high attenuation equal to that of adjacent arterial vessels in the previously dissected kidney. A pseudoaneurysm can occur several months after surgery and can be successfully treated with radiographic coil embolization.

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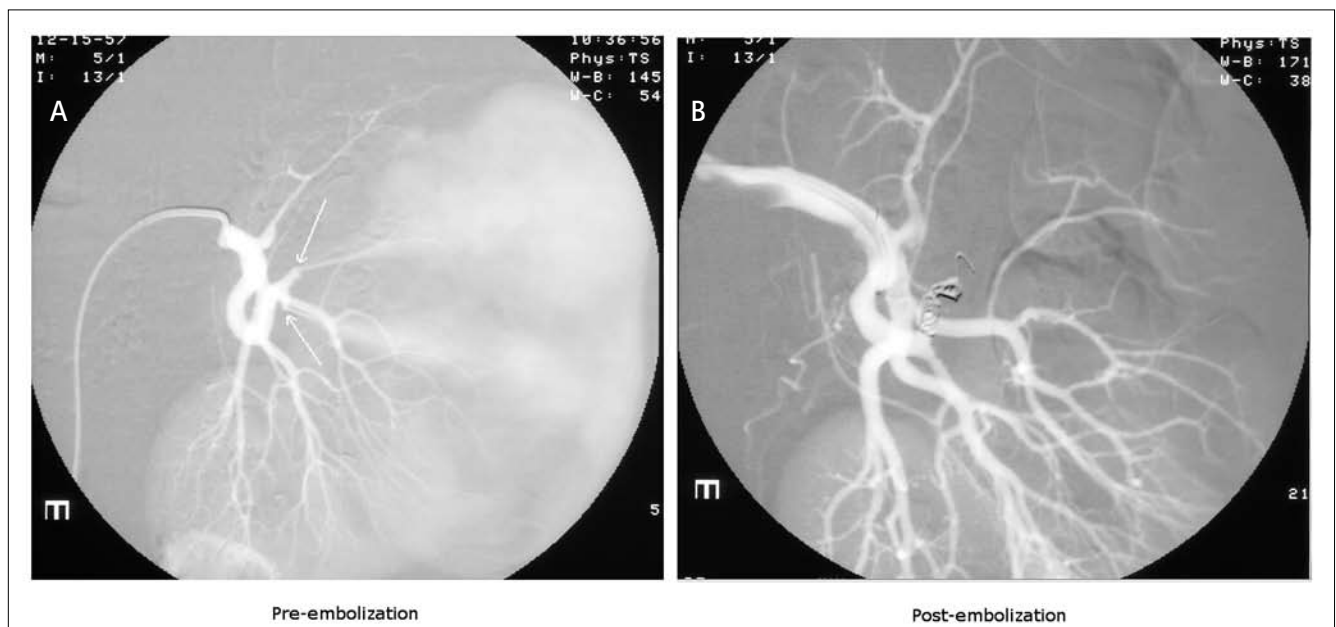


Fig. 3. Angiography of the left renal artery showing a) feeders of the pseudoaneurysm and b) post embolization blood flow interruption to the RAP.

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