

Renal Artery Pseudoaneurysm after Partial Nephrectomy Complicated by Rupture into the Collecting System, Managed by Selective Angiographic Embolization

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Nephron-sparing surgery has become the standard of care for localized renal lesions. Owing to improvements in early diagnosis and advanced surgical techniques, the use of this procedure has become much more prevalent. Renal artery pseudoaneurysm is a rare complication of renal biopsy percutaneous renal procedures, penetrating trauma and, rarely, blunt renal trauma. We describe a case in which a massive hematuria and urinary clot retention were the presenting signs in a 63 year old woman 10 days after the surgical procedure. The condition was diagnosed by computed tomographic angiography and successfully treated by selective embolization of the arterial branch supplying the pseudoaneurysm.

Patient Description

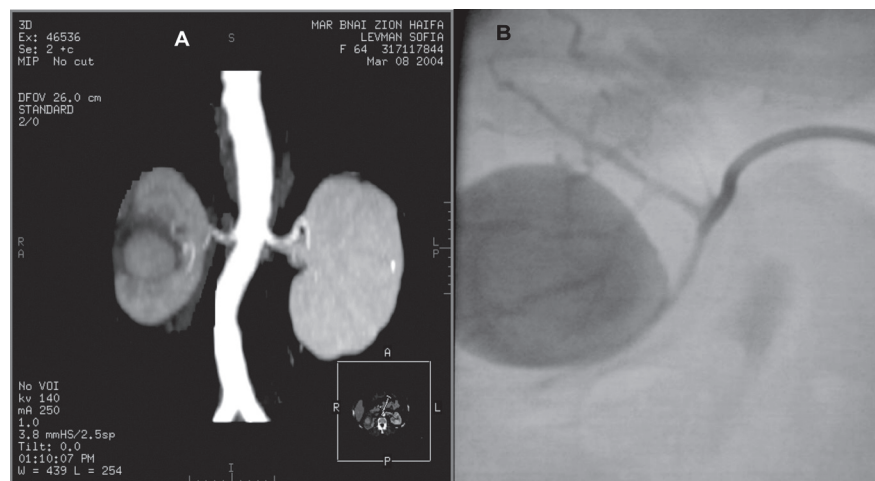
A 63 year old woman with hypertension and a history of cholecystectomy underwent renal ultrasound as part of the evaluation of her fever of unknown origin. The ultrasound demonstrated a solid mass in her right kidney. Contrast CT confirmed an enhancing 22 x 25 mm solid lesion in the upper lateral aspect of her right kidney. Right nephron-sparing surgery was performed through an extraperitoneal flank incision. During the surgery cold and warm ischemic time was 20 and 21 minutes respectively. The tumor bed was closed with nephrotomy sutures, the collecting system was not interrupted, and the renal capsule was closed with vicryl 2/0 after removal of the vascular clamp. Pathologic analysis revealed renal cell carcinoma, clear cell type, with surgical margins free of tumor. The postoperative recovery was notable for a temporary high fever, sterile blood and urine culture and no clinical or laboratory evidence of active infection. The

patient was treated with broad-spectrum antibiotics and on postoperative day 3 the fever subsided. On postoperative day 8 she was discharged home with normal renal function (creatinine 0.83 mg/dl)

Two days later, the patient returned to the emergency room complaining of macrohematuria and urinary clot retention. Her hemoglobin level dropped from 10.7 mg/dl at discharge to 8.38 mg/dl. At this point the patient was managed with 2 units of red blood cells and radiologic investigation was begun. Urinary ultrasound showed a 20 ml perirenal hematoma and blood clots in the bladder. Intravenous pyelography showed nephrogenic effect with reduced contrast uptake in the lateral aspect of the mid-right kidney. Abdominal CT demonstrated blood clots at the right renal pelvis and ischemic area around it. Decreased right renal function without obstruction was noted on DTPA scan.

During her hospitalization the patient was hemodynamically stable and was treated conservatively until the hematuria subsided and she was discharged home with normal renal function. On follow-up the patient was doing fine apart from one episode of urinary tract infection, which was treated with antibiotics. Hemoglobin level and renal function remain stable.

Seven weeks later a similar episode of macrohematuria and urinary clot retention reoccurred; her hemoglobin level was 11.5 mg/dl and her renal function normal. CT angiography revealed pseudoaneurysm of the right kidney. Selective renal angiography confirmed the diagnosis [Figure], which was successfully managed by selective coil embolization. The embolization procedure was performed by an interventional radiologist. Transfemorally, a 5-F cobra catheter was introduced close to the branch supplying the pseudoaneurysm. Cook detachable



[A]. Coronal section of CT angiography. Reconstruction with MIP (maximal intensity projection) technique. Note the 3 cm ball-shaped renal artery pseudoaneurysm in the middle of the right kidney with a hypodense rim around it. **[B].** Right renal artery super-selective angiography shows pseudoaneurysm of the middle segmental branch.

coils of different sizes were used for the embolization.

Complete resolution of the hematuria was noted following termination of the procedure. A follow-up DMSA scan revealed a significant decrease in right kidney function from 14% preoperatively to 4% of the injected dose 9 months later. Renal function remains stable with creatinine level of 1.04 mg/dl one year after the surgery.

Comment

Renal cancer surgery has evolved in recent years toward a trend of nephron-sparing surgery. Partial nephrectomy, with the advantage of function preservation and an equivalent cancer-specific survival rate, has become standard treatment whenever technically possible [1].

A pseudoaneurysm is the presence of arterial blood entering into adjacent tissue (in this case renal parenchyma) with continuous blood flow within this space. Renal pseudoaneurysm is a known complication of renal biopsy [2], penetration during percutaneous renal procedures and, rarely, after blunt renal trauma [3]. Time to presentation is variable – from immediately after the incidence to weeks later.

Renal pseudoaneurysm after partial

nephrectomy is a rare complication with only a few cases described in the literature [4]. Symptoms may include hematuria, abdominal tenderness, abdominal mass, hypertension and shock. Diagnosis is possible with the aid of CT angiography or Doppler ultrasound.

Treatment of renal pseudoaneurysm consists of nephrectomy, open vascular surgery, or angiographic embolization, depending on the patient's clinical condition. Angiographic embolization should be the procedure of choice due to its advantage of being minimally invasive and its selective treatment with maximal preservation of renal parenchyma.

We describe a case in which massive macrohematuria and urinary clot retention 10 days after partial nephrectomy were the presenting signs of renal pseudoaneurysm rupture into the collecting system. A retrospective review of the patient's imaging studies showed signs suggestive of pseudoaneurysm; however, a definite and final diagnosis was made only with the aid of CT angiography. From this case we learn that renal pseudoaneurysm, despite being a rare complication after partial nephrectomy, should be borne in mind when encountering a patient with gross hematuria postoperatively. This diagnosis is crucial to prevent delayed diagnosis and possible complications. Renal

pseudoaneurysm can be managed successfully with angiographic embolization. Although it was a selective embolization, a significant reduction in kidney function was observed (DMSA 14% preoperatively and only 4% 9 months later).

References

1. Nieder AM, Taneja SS The role of partial nephrectomy for renal cell carcinoma in contemporary practice. *Urol Clin North Am* 2003;30:529–42.
2. Lee RS, Porter JR. Traumatic renal artery pseudoaneurysm: diagnosis and management techniques. *J Trauma* 2003; 55(5):972–8.
3. Halachmi S, Chait P, Hodapp J, et al. Renal pseudoaneurysm after blunt renal trauma in a pediatric patient: management by angiographic embolization. *Urology* 2003;61:224xiii–xv.
4. Albani JM, Novick AC. Renal artery pseudoaneurysm after partial nephrectomy: three case reports and a literature review. *Urology* 2003;62(2):227–31.
5. Dinkel H-P, Danuser H, Triller J. Blunt renal trauma: minimally invasive management with microcatheter embolization – experience in nine patients. *Radiology* 2002;223:723–30.

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