

# Endovascular Treatment of Renal Arteriovenous Fistula Following a Stab Wound

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## INTRODUCTION

Renal arteriovenous fistula (AVF) due to a noniatrogenic penetrating trauma is uncommon. In most reported cases, renal AVF has been one of the complications of interventional urologic procedures.<sup>(1)</sup> Most cases secondary to percutaneous needle biopsy of the kidney are resolved spontaneously in contrast to those caused by traumas.<sup>(2)</sup> Angiographic renal embolization has been reported to be effective in the treatment of penetrating renovascular injuries as an alternative to other possible options such as direct vascular repair or partial nephrectomy.<sup>(3,4)</sup> We report a case of renal AVF following a stab wound, which was treated by endovascular coiling.

## CASE REPORT

A 42-year-old man presented to our department with gross hematuria for 20 days after a single stab wound to the left flank area. He was hemodynamically stable, but the hemoglobin level had decreased to 9 g/dL.

The patient underwent selective left renal digital subtraction angiography (Advantex, General Electric Medical System, Milwaukee, Illinois, USA) via the right femoral artery with a 5-F Cobra II catheter (Cordis Corporation, Miami, Florida, USA). A moderate-sized AVF was detected in the lower pole of the kidney (Figure 1). The arterial branch of the AVF was then selectively catheterized (Figure 2), and was completely occluded by a 5-mm soft platinum coil (Cook Corp, Bloomington,

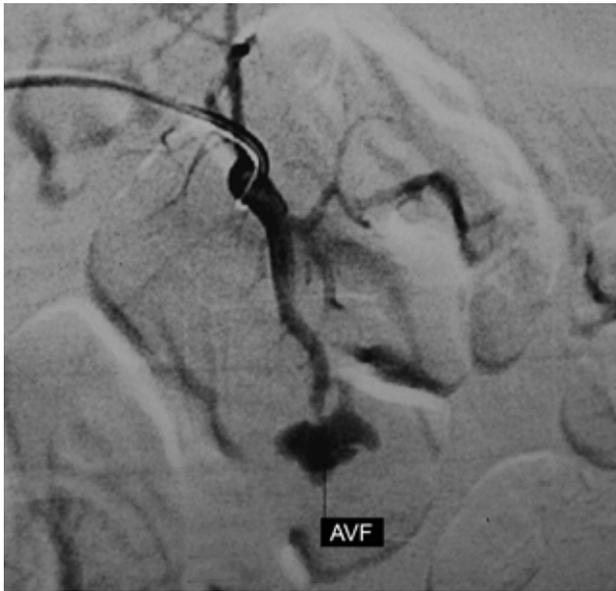


**Figure 1.** Digital subtraction angiography of the left kidney shows AVF in the lower pole of the kidney with feeding artery (black arrow) and draining vein (white arrows). AVF indicates arteriovenous fistula.

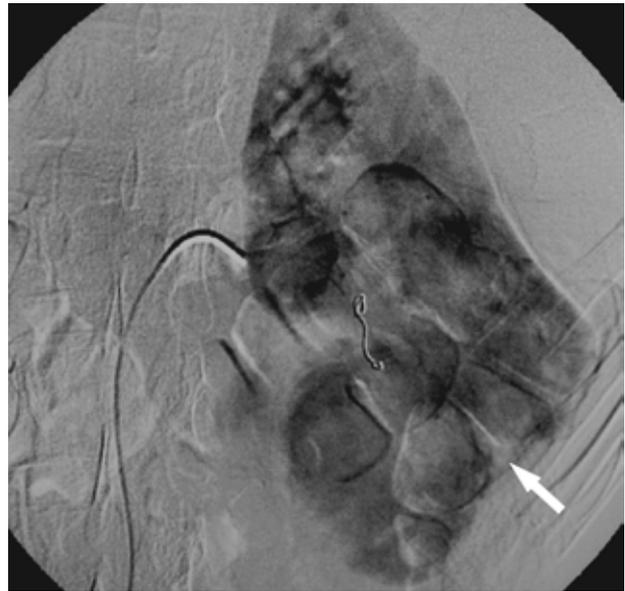
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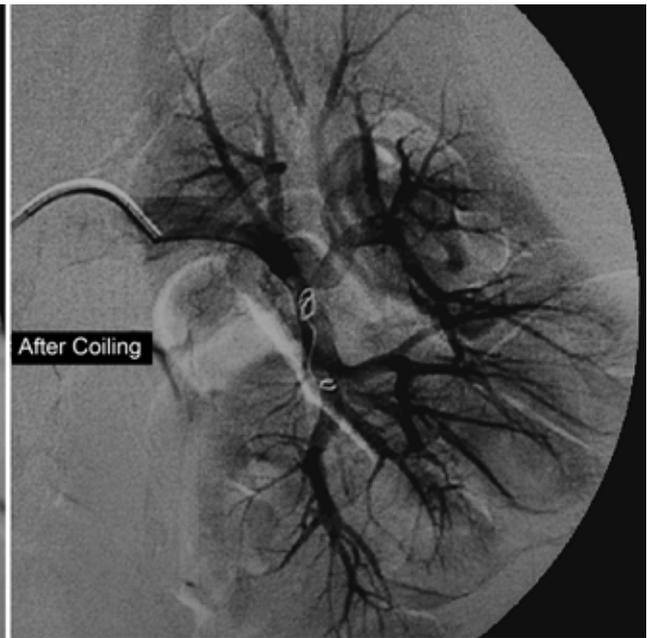
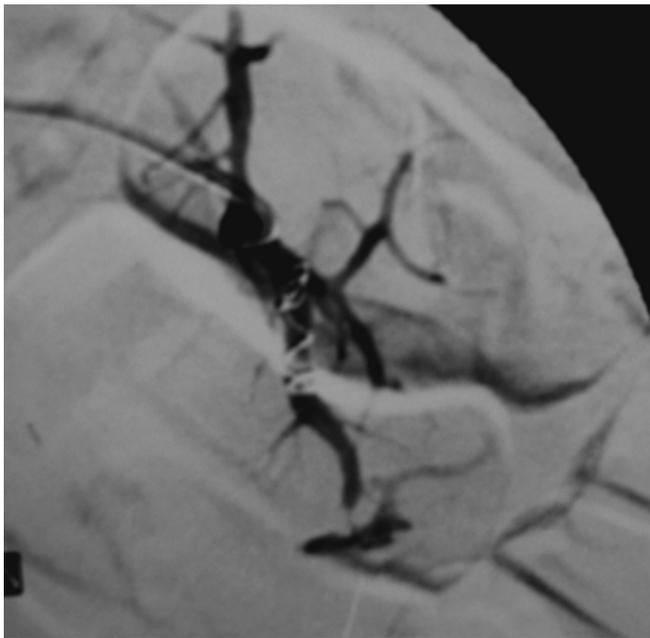
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**Figure 2.** Selective catheterization of the feeding artery of AVF. AVF indicates arteriovenous fistula.



**Figure 4.** Control angiography after selective occlusion of the arteriovenous fistula feeding artery in capillary (nephrogram) phase shows a small infarction (white arrow) in less than 10% of the renal parenchyma.



**Figure 3.** **Left,** Selective coiling of the feeding artery of the arteriovenous fistula with a 5-mm soft platinum coil. **Right,** Control angiography after selective occlusion of the arteriovenous fistula feeding artery (only the proximal portion of the coiled artery can be seen as a more dense part due to superimposition of 2 parallel arteries. Note a small meniscus of clot just proximal to the coil; late arterial phase).

Indiana, USA; Figure 3).

After embolization, less than 10% of the kidney tissue showed vascular deprivation (Figure 4). No complication was noted. Urine became clear in the recovery room after 3 hours. No clinical sign of recurrence or hypertension was found after 2.5

years of follow-up.

## DISCUSSION

Traumatic renal AVF is mostly iatrogenic, typically as a complication of percutaneous biopsy of the kidney. To our knowledge, less

than 20 cases of renal AVF after stab wounds have been reported in the literature.<sup>(5)</sup> In the majority of these cases, renal injuries are self-limiting and conservative treatment is accepted as the preferred approach to most injuries to the kidneys.<sup>(6,7)</sup> However, continuous gross hematuria and decreasing hemoglobin necessitates intervention for controlling hemorrhage in these patients.

Color Doppler ultrasonography can be a diagnostic tool. Also, due to real-time visualization of the AVF, some authors have used ultrasonography-guided compression treatment for low-flow thrombosing fistulas.<sup>(8)</sup> However, angiography remains the “gold standard” method for diagnosis of the renovascular injuries with the additional advantage of the potential for therapeutic intervention.<sup>(9)</sup> Since their first use in 1973 for management of an AVF due to kidney biopsy,<sup>(4)</sup> endovascular techniques have been used to manage a variety of renovascular injuries with much success, whereas aggressive surgeries such as vascular repair or nephrectomy have resulted in only 25% to 35% renal salvage rate.<sup>(10)</sup>

Complications of catheter therapy are relatively rare. Renal artery dissection has been described in up to 7.5% of the patients. Postembolization syndrome, a form of hyperpyrexia after embolization which usually occurs after tumor ablation, has also been described in patients treated by selective embolization with polyvinyl alcohol particles and gelatin sponges. Coils can migrate to nontargeted points, usually to the lungs, especially when they are smaller than the size of the AVF. Arterial hypertension is a rare complication that in most cases, resolves spontaneously. There is no evidence to show that the incidence of renal hypertension might increase after superselective renal embolization.<sup>(11)</sup>

In conclusion, selective embolization is a quite useful technique for the treatment of a traumatic renal AVF.

## CONFLICT OF INTEREST

None declared.

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