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Endovascular Repair of an Iliac Ureteroarterial Fistula with Late Stent Thrombosis and Migration into the Bladder

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Abstract

Purpose—Ureteroarterial fistulas are rare. We describe a case of UAF repaired with an endovascular stent-graft and examine late complications associated with the procedure.

Case Report—A 37-year-old female with a past history of complicated locally invasive cervical cancer treated with chemoradiation presented initially with right leg rest pain and chronic intermittent gross hematuria. She was found to have a ureteroarterial fistula and underwent successful endovascular exclusion with a covered stent with resolution of her symptoms. She returned one year later with stent-graft thrombosis manifesting as lower extremity rest pain, requiring a femoral-femoral bypass. She then returned six months later with imaging evidence of extravascular migration of the stent-graft into the bladder. Due to a poor prognosis of recurrent gynecologic cancer, extraction was not attempted and she underwent complete urinary diversion.

Conclusion—UAFs are a rare occurrence but may be treated successfully with endovascular stent-grafting. Despite technical success, late complications such as stent thrombosis may occur even with anticoagulation. Extravascular stent migration may occur in the presence of a chronically dilated ureter.

1. Introduction

Arteriovenous fistulas (AVF) involving the iliac arteries are rare, with supporting data limited to case reports and small series (1–5). Repair with endovascular stent-grafting has been described, but complications of these procedures not been well documented (4–6). We describe a case of endovascular repair of UAF and examine late complications associated with the procedure.

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2. Case Report

A 37-year-old female presented initially to the emergency department with right lower extremity rest pain and chronic intermittent gross hematuria. She had a past medical history of locally invasive cervical cancer several years prior treated with definitive chemoradiation, complicated by retroperitoneal fibrosis, subsequent ureteral obstruction, and severe hydroureter requiring chronic bilateral ureteral stent placement. She also developed vesicovaginal and rectovaginal fistulas which were surgically repaired. One year prior to this admission, she had undergone a successful right iliofemoral thromboembolectomy and common iliac balloon angioplasty and bare-metal stent placement for acute limb ischemia, presumably secondary to radiation-induced arterial stenosis.

On this hospitalization, she complained of several weeks of rest pain in the right lower extremity with no palpable pulses on physical exam, as well as intermittent hematuria. An arteriogram showed diffuse high-grade stenosis of the common and external iliac arteries below the preexisting stent. Angiography after balloon angioplasty of this segment showed active extravasation of contrast into the dilated ureter and bladder, leading to a diagnosis of arterioureteral fistula [Figure 1]. A self-expanding Viabahn covered stent (W.L. Gore & Assoc., Flagstaff AZ) was placed in the iliac artery to exclude the fistula, with complete resolution of the patient's rest pain and hematuria postoperatively [Figure 1]. The indwelling ureteral stents were removed and percutaneous nephrostomy tubes inserted. She did well and was discharged from the hospital on therapeutic anticoagulation, resumed due to her history of ipsilateral stent thrombosis.

Approximately one year later, the patient was readmitted with insidious onset of right lower extremity rest pain. Duplex ultrasound showed occlusion of the stent graft and ipsilateral common and external iliac arteries despite the patient being continuously therapeutic on warfarin. An extraanatomic right-to-left femoral-femoral bypass graft was then constructed with successful restoration of distal perfusion and resolution of her rest pain; at this time she was again discharged from the hospital.

Six months after placement of the fem-fem bypass, she remained asymptomatic except for chronic recurrent urinary tract infections. A surveillance PET-CT of the abdomen and pelvis revealed migration of the thrombosed Viabahn stent-graft through the dilated ureter into the bladder [Figure 2], as well as recurrent cervical cancer. After urologic and gynecologic consultation, cystoscopy and removal were not attempted due to the anticipated morbidity of any extraction procedure, the asymptomatic course of the indwelling stent, and poor prognosis of her recurrent cancer. She instead underwent bilateral ureteral occlusion for complete urinary diversion and was discharged from the hospital with close follow-up.

3. Discussion

Ureteral-arterial fistulas (UAF) are a rare complex problem involving multiple organ systems, usually occurring in patients with significant comorbid conditions due to malignancy, irradiation, and previous surgical intervention. Recently, surgical takedown of these fistulas has been replaced as the treatment of choice by minimally invasive

endovascular stent-grafting due to high open operative morbidity (1,2). Several recent case reports and small case series describe endovascular stent-grafting as a viable option to avoid an open procedure in an often reoperative, scarred, or irradiated field (1,3,4).

We describe a case of uretero-arterial fistula initially complicated by stent-graft thrombosis at one year despite therapeutic anticoagulation. Although this patient presented only with insidious onset of rest pain, morbidity related to stent-graft thrombosis may range from rest pain and tissue loss to acute limb ischemia requiring amputation (1). Prevention may be difficult due to the recurrent nature of radiation-induced arterial stenosis even in the presence of anticoagulation. This is substantiated by multiple reports of stent occlusion despite concurrent treatment with therapeutic anticoagulation in the majority of cases (1,5,6). Stent thrombosis does not seem to be uncommon; systematic review of treated UAFs (5) found that three of 32 patients (9.4%) who underwent endovascular stent-grafting for UAF developed stent thrombosis. Fox and colleagues (1) described a 50% rate of lower extremity complications including avascular femoral head necrosis and two cases of lower extremity acute ischemia, one requiring thrombectomy and one resulting in amputation. The high rate of lower extremity ischemic complications despite successful technical exclusion of the UAF and cessation of bleeding with endografting suggest that close monitoring of these patients is prudent even in the presence of anticoagulation.

This patient also experienced a second late complication with migration of the occluded stent through the dilated ureter into the bladder nearly eighteen months after initial implantation. Despite the unusual nature of this complication, the patient remained largely asymptomatic due to previous partial urinary diversion and complete thrombosis of the ipsilateral iliac artery system, and continued to do well after bilateral ureteral occlusion. To our knowledge, extravascular migration of a stent-graft through a UAF into the urinary tract has not been described. Migration was likely aided by significant chronic dilation of the ureter as well as repeated manipulation due to ureteral stent changes and, while this may be a consideration in future patients, is not likely to represent a common complication of UAF except in those with suitable anatomic configuration.

4. Conclusion

Due to the rarity of arterioureteral fistulas, the full range and frequency of complications after endovascular repair remains unknown. We describe a case of endovascular treatment of a UAF and demonstrate that stent thrombosis may still occur despite anticoagulation therapy. Additionally, stent migration into the urinary system is a possibility if the ureter is chronically dilated. Patients undergoing this procedure should receive close follow-up due to the potential morbidity of late complications.

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Figure 2.
Computed tomography showing the stent extruded through the dilated ureter into the bladder in axial (A) and coronal (B) views.