Eur J Vasc Endovasc Surg **28**, 559–561 (2004)
doi: 10.1016/j.ejvs.2004.06.011, available online at http://www.sciencedirect.com on SCIENCE DIRECT®

SHORT REPORT

Arterioureteric Fistula: Successful Treatment of Two Cases

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Key Words: Vascular surgery complications; Arterio-ureteral fistula.

Introduction

Arterioureteric fistula is a rare condition mainly seen after extensive pelvic surgery for cancer, followed by radiation therapy, or after vascular surgery involving the iliac arteries. This complication causes massive and/or recurrent hæmaturia; symptoms are non-specific and the diagnosis is made late and with difficulty. As with other uncommon conditions, physicians' awareness can really make the difference and can significantly reduce mortality and morbidity.

We report two cases of arterioureteric fistula observed in the last 7 years in the Vascular Surgery Unit of 'A. Gemelli' University Hospital in Rome.

Case Reports

Case 1

A 40-year-old woman affected by epidermoid carcinoma of the uterine cervix (FIGO stage IIB) received combined treatment with radiotherapy and chemotherapy (two cycles) and anterior pelvectomy; a neoplastic infiltration of the right wall of the bladder required distal ureteric resection and the formation of an ileal conduit. The postoperative course was complicated by a leak at the uretero-ileal anastomosis, requiring relaparotomy and drainage. The patient was discharged well, with a ureteric trans-stomal stent *in situ*. Twenty five days later, the patient was readmitted with massive haematuria from the stoma, an intermittent fever (39–40 °C) with rigors, a leucocytosis (WBC 20,900) and blood cultures positive for *E. coli*. An abdominal ultrasound revealed mild dilatation of the right kidney with clots in the renal pelvis, and a percutaneous nephrostomy was carried out. Retrograde pyelography (Fig. 1), injecting the contrast medium at high pressure via the ileostomy, revealed a fistula between the right common iliac artery and the right ureter above the ileal anastomosis. A combined treatment was carried out; the right common iliac artery was embolized using Gianturco coils, following which the patient underwent a femoro-femoral (left-to-right) bypass using a PTFE graft. The postoperative course was uneventful, and angiography confirmed complete resolution of the fistula with a patent bypass (Fig. 2). The patient was alive and well at the most recent follow-up (April 2004), with no recurrence of the haematuria.

Case 2

A 60-year-old woman underwent surgery in 1995 for Lériche's syndrome; the patient had a number of risk factors; she was a heavy smoker and suffered from hyperhomocystinæmia and hyperlipidæmia. She had a family history of myocardial infarction, aortic aneurysm and hypertension. She had such small arteries, with an aortic diameter of 10 mm, that an off-the-shelf bifurcating graft could not be used and one was fashioned using an aortic to right iliac 10 mm Dacron graft with an 8 mm Dacron graft between this and the left common femoral artery.

The patient continued to smoke heavily and

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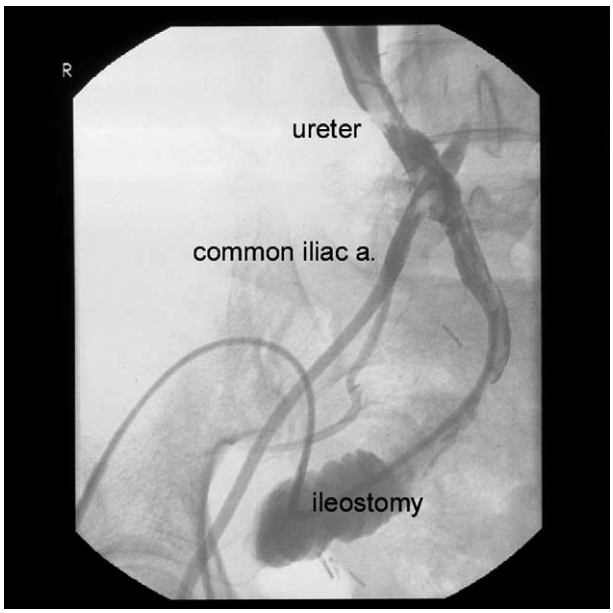

Fig. 1. Case 1. Retrograde pyelography with high pressure injection via the uretero-ileostomy reveals a fistula between the stented right ureter and the right common iliac artery.

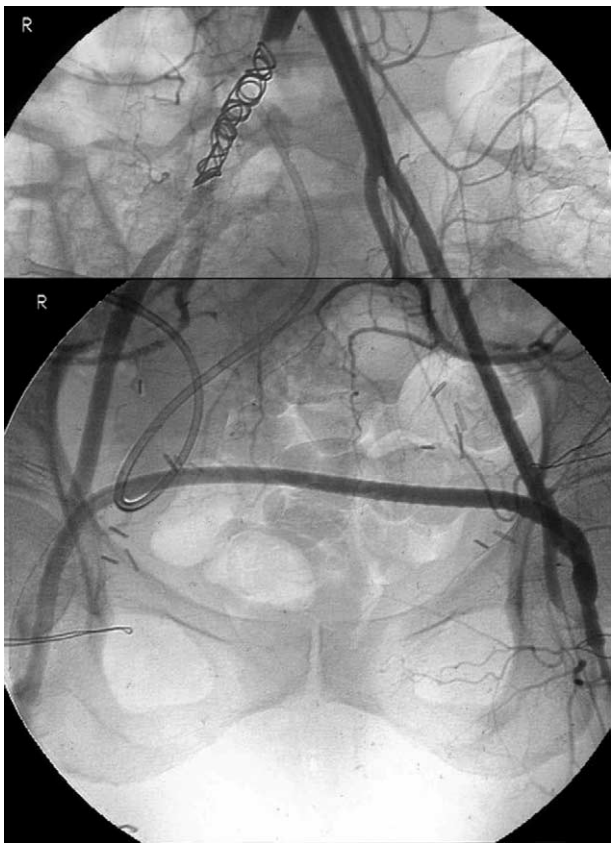

Fig. 2. Case 1. Postoperative angiography after combined treatment (left-to-right femoro-femoral bypass with embolization of the common iliac artery).

defaulted on follow-up; she returned in June 2003, complaining of a three day history of sudden onset of coldness in the legs with a dramatic reduction in her walking distance from previous mild claudication in the right leg. The clinical appearance was suggestive of graft occlusion. There was a recent past history of progressive left hydronephrosis treated with a double-J stent; the left kidney eventually ceased to function. When she presented to us she mentioned a week's history of pyrexia and mild hæmaturia. A cystoscopy had been normal. An angiogram was performed and this revealed complete occlusion of the aorto-iliac-femoral bypass with occlusion of the left renal artery. Local thrombolysis was started using Urokinase (100,000 IU bolus followed by 70,000 IU/h continuous infusion) via a catheter placed in the aorto-iliac graft, under systemic heparinization (25,000 IU/24 h by continuous infusion). Eight hours later, she developed left flank pain with massive haematuria and an emergency CT revealed a dilated left renal pelvis filled with contrast medium, but this finding was interpreted as a late elimination of the contrast medium used for the recent angiogram. Thrombolysis was stopped and the haematuria abated. A second angiogram performed the next day showed partial recanalization of the initial portion of the graft, and a graft-left ureteric fistula with retrograde filling of the left urinary tract (Fig. 3). Anticoagulants were withdrawn in order to provoke re-thrombosis of the graft and the

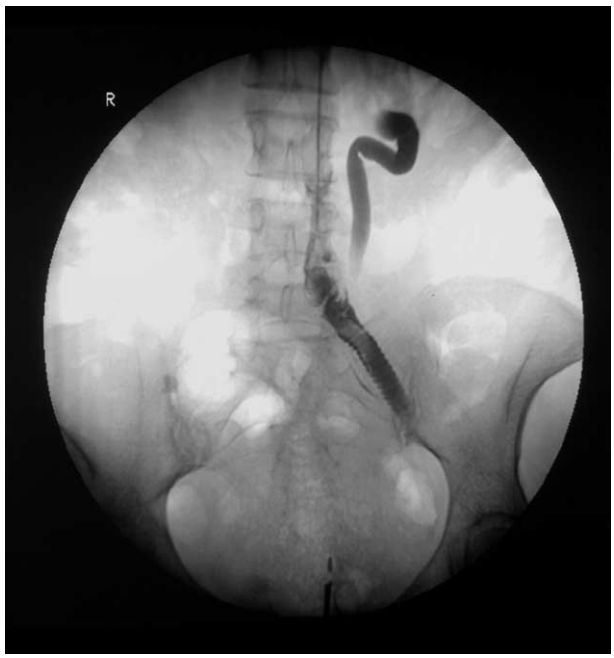

Fig. 3. Case 2. Angiography after local thrombolysis (interrupted because of massive haematuria) reveals a fistula between the iliofemoral graft (still partially occluded by thrombus) and the left ureter.

haematuria settled over 48 h. At surgery an orthotopic reconstruction was performed using an aorto-left femoral venous autograft obtained from both the superficial femoral veins, and a femoro-femoral bypass (left to right) using the left saphenous vein. The Dacron grafts were removed en bloc with the non-functioning left kidney and ureter. Inspection of the specimen revealed a small leak in the left ureter, encased in scar tissue near the anastomosis between the aortoiliac and the iliofemoral graft limbs; there was no fluid or pus. Cultures from the grafts were sterile. The postoperative course was uneventful and the patient was discharged 15 days after the operation.

Discussion

Arterioureteric fistulæ usually occur secondary to previous pelvic procedures (surgery and/or radiation) in 85% of cases; a complicated course during or after the first procedure is found in most patients. Many cases develop outflow obstruction causing hydronephrosis requiring long term ureteric stenting, or further surgery. Ureteric ischæmia and focal ureteric necrosis, caused by extensive surgical dissection or post-radiation fibrosis, is thought to be the underlying pathological ætiology.[1]

The diagnosis is often missed or delayed because this condition is uncommon. Standard imaging such as CT scan, retrograde pyelography, cystoscopy and angiography are often normal and demonstration of the fistula is exceptional.[2,3] In patients with a ureteric stent, the fistula can be unmasked by provocative manoeuvres such as stent removal or replacement. Intraoperative diagnosis during emergency surgery for massive bleeding is reported in many cases; the mortality reported in patients with a clear preoperative diagnosis is zero, compared with 39% in patients diagnosed during surgery.[4]

In an emergency, without a preoperative diagnosis, most patients undergo a nephroureterectomy; this procedure is fast and effective but may cause problems if the contralateral kidney is poorly functioning. Treatment of a fistula following pelvic oncologic surgery and/or irradiation should be by arterial ligation and extraanatomic revascularization to avoid the risk of subsequent graft infection and the known hazards of repeat surgery in an irradiated field. In a few cases, simple ligation of the artery or removal of an earlier graft without further reconstruction have been performed with only mild symptoms of distal ischaemia. In recent years there has been an increasing use of endovascular procedures such embolization of the hypogastric artery or permanent balloon occlusion of the common/external iliac artery in combination with femoro-femoral crossover bypass; the use of a covered stent has also been reported.[5–8]

Late results are unknown because of the short follow-up in published cases; long term results would disclose the incidence of recurrent fistulæ.

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Accepted 7 June 2004

Available online 10 August 2004