Eur J Vasc Endovasc Surg (2010) **39**, 565–568

SHORT REPORT

Anastomotic Pseudoaneurysm Complicating Renal Transplantation: Treatment Options

U.M. Bracale [a], M. Santangelo [b], F. Carbone [a], L. del Guercio [a], S. Maurea [c], M. Porcellini [a,*], G. Bracale [a]

[a] *Department of General, Thoracic, Vascular and Endovascular Surgery, Federico II University of Naples, Via S. Pansini 5, 80131 Naples, Italy*
[b] *Transplantation Unit, Federico II University, Naples, Italy*
[c] *Department of Radiology, Federico II University, Naples, Italy*

Submitted 3 October 2008; accepted 8 December 2009
Available online 1 February 2010

KEYWORDS
Aneurysm, False;
Renal transplantation;
Open repair;
Endovascular repair;
Stent-graft

Abstract *Introduction:* Anastomotic pseudoaneurysm following renal transplantation is uncommon. Indications for repair, treatment options and outcomes remain controversial.
Report: We present 6 renal transplant recipients with large anastomotic pseudoaneurysms. Five of the patients underwent open repair while one had a stent-grafting and delayed transplant nephrectomy for a ruptured pseudoaneurysm. A transplant nephrectomy was needed in all cases but one. Arterial reconstruction enabled limb salvage in all cases. One patient died of sepsis postoperatively. No patient presented late infection, failure of vascular reconstruction, nor pseudoaneurysm recurrence.
Conclusions: Surgical excision of anastomotic pseudoaneurysms results in high rates of allograft loss. Less invasive techniques have a place in selected cases.

Introduction

Anastomotic pseudoaneurysm is a rare complication of renal transplantation occurring in 0.3%.[1] Etiological factors include arterial wall injury, a defective suture technique or infection and immunological factors.

Small pseudoaneurysms can be managed conservatively, while infected or large ones require treatment to prevent rupture. Therapeutic options include conventional open repair (OR), endovascular repair (EVR), and ultrasound-guided percutaneous thrombin injection (USG-PT). Our aim is to report on our experience with treatment of patients with this challenging renal transplantation complication.

* Corresponding author. Tel.: +39 (0) 817462629; fax: +39 (0) 817462630.
E-mail address: massimo.porcellini@unina.it (M. Porcellini).

1078-5884/$36
doi:10.1016/j.ejvs.2009.12.010

Report

A series of 6 patients were admitted to our institution from the period 1982 to 2009 with large pseudoaneurysms at the end-to-side anastomosis between the external iliac artery and renal transplant artery. Four of the patients were referred to us from several Italian transplant centers. Two were from our transplant unit that had performed 574 renal transplant procedures (0.34%) throughout this period. All the patients had an ultrasound examination while conventional angiography and computed tomography (CT) scans were obtained from the first three operated patients and, once EVR was developed, computed tomography angiography (CTA) (Figs. 1 and 2) was used to measure pseudoaneurysms and to plan for the operative approach in the remaining three patients. Only one pseudoaneurysm occurred early following a renal transplantation (within 3 months).

A blood culture was taken from both high-grade fever patients. *Candida albicans* was identified in one patient who was placed on intravenous amphotericin B for three weeks. The other patient with negative blood culture was given empiric antibiotic therapy. Clinical features and treatments are summarized in Table 1.

An embolization with coils and USG-PT failed to completely thrombose the pseudoaneurysm in patient 5 while none of the less invasive treatment options were attempted in patient 6 due to a total anastomosis failure and suspicion of an infected pseudoaneurysm. Due to these occurrences, both patients were operated on.

The allograft had to be removed in all of the patients with the exception of one who underwent a combined pseudoaneurysm excision and allograft autotransplantation at the level of the internal iliac artery. Cultures of resected pseudoaneurysm tissue grew *C. albicans* in two of the patients, one of which also showed *Staphylococcus epidermidis*. Perioperative complications occurred in three patients (50%) and one (16.6%) died of multiple organ failure (MOF) secondary to systemic sepsis. None of the patients suffered limb loss. At a mean follow-up of 35.8 months (range 9—61 months), none of the patients presented late infection, occlusion of arterial reconstruction, nor pseudoaneurysm recurrence. One patient died from MI during the follow-up period.

Figure 1 CTA showing a 12 × 8 cm pseudoaneurysm at the anastomosis between the donor renal artery and the right external iliac artery.

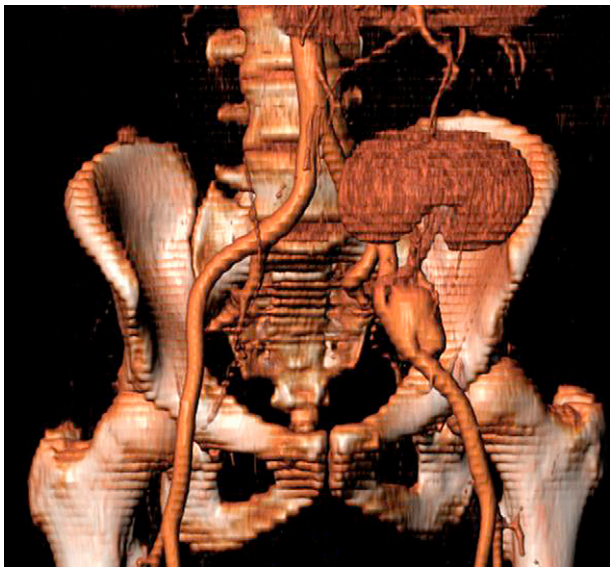

Figure 2 CTA with 3-D reconstruction showing a 4.7 × 3.2 cm pseudoaneurysm at the transplant anastomotic site.

Discussion

Indications for repair of anastomotic pseudoaneurysm in renal transplant recipients and therapeutic strategies are at present controversial. If infection is not present, it is possible to manage asymptomatic small pseudoaneurysms in a conservative manner. Repair indications include a symptomatic pseudoaneurysm, a size larger than 2.5 cm, or increasing enlargement and eventual rupture.[2] Fujikata *et al.*[3] describes a conservative treatment for a mycotic aneurysm with an unaltered size and no complications in his three year follow-up study.

All six of our patients underwent treatment for symptomatic or large anastomotic pseudoaneurysms (from 4.7 cm to 12.0 cm). Despite the high morbidity and mortality rates reported, most surgeons agree that the majority of patients with pseudoaneurysms require a transplant nephrectomy due to persistent rejection or infection or to other ensuing complications arising from a non-functioning graft. When possible, the allograft can be saved by suturing the orifice at the base of the sac, or pseudoaneurysm excision followed by patch angioplasty or reanastomosis. Graft loss also occurs when an interposition graft or an extra-anatomic reconstruction is required.[4]

In our study, all except one of the patients needed a transplant nephrectomy due to irreversible rejection (3) or local infection (2), while another patient received an allograft autotransplantation to preserve renal graft function. Asides from repair indications and attempts to save the allograft, arterial reconstruction following pseudoaneurysm repair can also be considered a controversial measure. Eng