Non-mycotic anastomotic pseudoaneurysm of renal allograft artery.

Case Report

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Vascular complications after kidney transplantation are uncommon, and in most cases they present in the early post-transplant period. Anastomotic pseudo-aneurysms usually involve the renal transplant artery anastomosis and in most cases are the consequence of a mycotic contamination during organ recovery or handling of the graft. We report the case of a 61 year-old woman, who presented, eight months after successful kidney transplantation from a deceased donor, with mild pain in the right iliac fossa. Graft sonography and computed tomography scan demonstrated a 33-mm pseudo-aneurysm of the transplant renal artery at the anastomotic site with the external iliac artery. The patient underwent an emergent surgical intervention with resection of the pseudo-aneurysm. Renal transplant artery was re-perfused with a by-pass with the internal iliac artery, while the common iliac artery was revascularized through an autologous vein by-pass between the proximal external iliac artery and the common femoral artery. Postoperative course was complicated by inguinal lymphorrhea, with complete resolution on postoperative day 22. Histopathologic examination of the pseudo-aneurysm wall did not reveal any sign of mycotic infection. At 6-month follow-up, graft function was stable and graft sonography demonstrated the patency of iliac-femoral by-pass and a normal renal graft perfusion. In conclusion, pseudo-aneurysm of the renal transplant artery is a rare but potentially life-threatening complication of kidney transplantation, occurring even in the late post-transplant period. Surgical resection of the pseudo-aneurysm, although challenging, may be a valuable option for definitive treatment of the pseudo-aneurysm, while preserving the renal graft function.

KEY WORDS: Aneurysm, Deceased donor, Kidney transplantation, Pseudo-aneurysm, Renal artery Surgery, Vascular complications

Introduction

Kidney transplantation is the best replacement therapy for patients with end-stage renal disease. Despite the impressive improvements in surgical techniques in last decades, kidney transplantation may be complicated by vascular, urological and medical complications in up to 10% of cases. Vascular complications after renal transplantation are uncommon, with an incidence ranging between 3.5% to 14%, and include stenosis or thrombosis of the renal artery, thrombosis of the renal or iliac vein, artery-venous fistulae or pseudo-aneurysm. Anastomotic pseudo-aneurysm occurs as a result of arterial reconstruction at the site of the anastomosis. Anastomotic pseudo-aneurysm of the transplant renal artery occurs in 0.3-1% of patients, and in most cases they are related to a mycotic infection, as a consequence of the hematogeneous or local spread of fungi.
to the arterial wall, leading to destruction of vascular structures. Pseudo-aneurysms of the transplant renal artery are usually asymptomatic and the diagnosis is mainly incidental, during follow-up outpatient visits. Although rare, these complications may have a high risk of anastomotic leakage or arterial wall rupture, resulting in hemorrhagic shock and graft loss.

We report a rare case of non-mycotic pseudo-aneurysm of the transplant renal artery in a kidney transplant recipient, describing the diagnostic and therapeutical approach.

Case Report

A 61-year-old woman with end-stage renal disease of unknown origin, received a renal transplantation from a deceased donor. Medical history of the patient included hypertension, dyslipidemia, and Sjogren’s syndrome. Kidney transplantation was performed by standard technique in the right iliac fossa, and transplant renal artery and vein were anastomosed with external iliac artery and vein, respectively. She received a triple-drug immunosuppressive therapy with everolimus, cyclosporine, and steroids. The postoperative course was uneventful and the patient was discharged on nine post-operative days with a satisfactory graft function (Scr 2.0 mg/dL). Post-transplant follow-up was complicated by Cytomegalovirus infection one month after transplantation. The patient was, then, scheduled for monthly follow-up visits, which did not reveal any vascular anomalies.

Eight months after transplantation, she was admitted for mild abdominal pain on the right iliac fossa. Renal function was stable (Scr 2.4 mg/dL). Renal sonography showed a hypoechoic mass close to the renal allograft and external iliac artery with a diameter of 30 mm. The echocardiography showed pulsatile flow pattern in the central part of the lesion, so that a presumptive diagnosis of transplant renal artery pseudo-aneurysm was made. An abdominal computed tomography (CT) scan angiography confirmed the diagnosis of a 33-mm pseudo-aneurysm of the transplant renal artery at the anastomotic site with external iliac artery (Fig. 1). Urine and blood culture did not reveal any sign of bacterial or mycotic infection. However, the patient underwent a prophylaxis with fluconazole 200 mg/d.

The patient underwent an urgent surgical procedure by a midline incision. The peritoneum of the right iliac fossa was incised and the common iliac artery was carefully dissected and isolated. A large pseudo-aneurysm of the transplant renal artery at the anastomotic site with external iliac artery was identified. Pseudo-aneurysm was gently dissected and external and internal iliac arteries were identified and dissected: pseudo-aneurysm involved near completely the renal artery, so that a resection of the pseudo-aneurysm and direct anastomosis of the renal artery was not feasible. A 20-cm autologous vein graft was retrieved. After systemic heparinization with a 6000 UI heparin bolus, the internal iliac artery was clamped and the proximal termino-terminal anastomosis between the external iliac artery and the autologous vein graft was performed. After then, the common iliac artery was clamped and the kidney was cooled with cold saline solution. The pseudo-aneurysm was excised and its wall was sent for histopathological and microbiological examinations. Distal anastomosis between the transplant renal artery and the vein graft was performed, while external iliac artery was revascularized through an autologous vein bypass between the proximal external iliac artery and the common femoral artery (Fig. 2). Total warm ischemia time of kidney graft was 36 min. An intraoperative echocardiography demonstrated the correct perfusion of the renal graft and the patency of iliac-femoral bypass.

Fig. 1: (A) Abdominal computed tomography scan angiography demonstrated the presence of a pseudoaneurysm at the level of the arterial anastomosis of the renal graft (arrow); (B) Computed tomography scan angiography. 3-D view of the iliac vessels and kidney transplantation, demonstrated the anastomotic pseudoaneurysm (arrow).
Abdominal wall was traditionally closed and the patient was transferred to the intensive care unit. Postoperative graft echocolordoppler confirmed the normal graft perfusion, but serum creatinine increased up to 5.4 mg/dL. Graft function gradually improved and serum creatinine returned to pre-surgery values (SCr 2.4 mg/dL) on sixth post-operative day. Histopathological examination and cultures of the pseudo-aneurysm wall were negative for structures related to spores or fungal hyphae. Postoperative course was complicated by inguinal lymphorrhea, which completely resolved on 22th post-operative day, when the patient was discharged in good health and with stable renal function, and she remained so up to the most recent 6-month follow-up visit.

At this time, graft function was stable (SCr 2.1 mg/dL) and echocolordoppler showed a well-perfused graft and the patency of the iliac-femoral by-pass.

**Discussion**

Despite the excellent patient survival and excellent cost-benefits of kidney transplantation, a significant number of transplant recipients could develop a postoperative vascular complication in the short or long term after transplantation. Vascular complications may cause declining graft function, hypertension and, finally, graft loss. Anastomotic pseudo-aneurysm of renal allograft is a rare and life-threatening vascular complication after kidney transplantation, occurring in less than 1% of cases. Intrarenal pseudo-aneurysms are more common and usually resolve spontaneously. In contrast, extrarenal pseudo-aneurysms are related to a mycotic infection at the site of anastomosis, and usually occur in the early weeks after transplantation as a result of anastomotic defects such as suture rupture, anastomotic leakage, vessel wall ischemia or arterial dehiscence caused by local infection. In case of infection, the risk of pseudo-aneurysm rupture and graft loss is high. Fungal infection may originate from the donor or, more likely, from exogenous sources leading to contamination during graft handling and implantation.

In our patient, the pseudo-aneurysm was diagnosed eight months after transplantation, and histopathological examination of the wall and content of the pseudo-aneurysm did not reveal any signs of mycotic or bacterial infection. The indications to repair and management of false aneurysm is still subject to debate. Currently, there are no therapeutic guidelines to prevent vascular or systemic complications of fungal infections in kidney transplant recipients. Due to the high risk of anastomotic rupture with hemorrhagic shock, most reports emphasized the need for prophylactic nephrectomy when a systemic infection or a contamination of preservation fluid from *Candida sp* are confirmed. However, such a policy of graft removal would lead to a large number of preventable nephrectomies. In contrast, recent evidences, reported a favorable outcome in patients treated with prophylactic antifungal therapy, suggesting that graft nephrectomy should not be proposed systematically.
Actually, indications for repair include progressive enlargement or size over 2.5 cm and presence of symptoms (fever, anemia, compression of adjacent structures, hypertension, graft loss, hemorrhage due to acute rupture) even if there is no documented existing size for developing symptoms. Infected pseudo-aneurysm or small asymptomatic pseudo-aneurysm size could be treated conservatively. Fujikata et al reported a high rate of complications in seven patients with pseudo-aneurysms in patients unfit for traditional surgical procedure. However, they may cause a high risk of graft loss, particularly in case of coil embolization or with the use of covered stent graft. Droffner et al reported high rate of complications in seven patients with pseudo-aneurysm of kidney transplant artery treated with coil embolization: these included renal artery thrombosis, haemorrhage and infarction of renal parenchyma. Smeds et al reported the first successful endovascular repair of a para-anastomotic pseudo-aneurysm after renal transplantation with kissing covered stent, while Patil et al performed a successful endovascular repair of renal transplant para-anastomotic pseudo-aneurysm with covered stent and ostial flare balloon.

Buimer et al proposed a hybrid approach for the treatment of an anastomotic pseudo-aneurysm after renal transplantation, by using a covered stent to exclude the pseudo-aneurysm and a surgical bypass for allowing the renal perfusion. Poels et al reported a combined use of a thrombotic agent and covered stents to successful exclude a pseudo-aneurysm, while preserving the renal function.

In our patient, the pseudo-aneurysm involved most of the transplant renal artery, so that an endovascular procedure of pseudo-aneurysm exclusion might result in graft loss. We decided, therefore, for an open surgical repair, although challenging, with the aim of preserving renal function. After the excision of the pseudo-aneurysm, the kidney was revascularised through a venous by-pass between external iliac artery and renal artery, allowing for the maintenance of the renal perfusion while performing the proximal anastomosis, finally reducing the warm ischemia time.

In conclusion, pseudo-aneurysm of the renal transplant artery is a rare but potentially life-threatening complication of kidney transplantation, occurring even in the late post-transplant period. Early diagnosis with sonography and CT scan may allow for a definitive treatment. Surgical resection of the pseudoaneurysm, although challenging, may be a valuable option for definitive treatment of the pseudo-aneurysm, while preserving the renal graft function.

Riassunto

Le complicanze vascolari dopo il trapianto renale non sono comuni, e nella maggior parte dei casi si presentano nel periodo post-trapianto precoce. Gli pseudoaneurismi arteriosi coinvolgono l’anastomosi arteriosa del rene trapiantato e nella maggior parte dei casi riconoscono una eziologia micotica. Una donna di 62 anni, che è stata sottoposta otto mesi prima ad un trapianto renale, presentava un vago dolore in fossa iliaca destra. L’ecografia del rene trapiantato dimostrava la presenza di un’area ipoecogena in corrispondenza dell’ilio renale, che all’ecocolor Doppler appariva riccamente vascolarizzata. La tomografia computerizzata confermava la diagnosi di pseudo-aneurisma anastomotico di 33 mm di diametro, coinvolgente l’arteria del rene trapiantato e nel caso da noi descritto. In conclusione, lo pseudo-aneurisma dell’arteria renale rappresenta una rara complicanza del trapianto renale. Nella maggior parte dei casi riconosce una eziologia micotica, spesso a causa di contaminazione diretta dell’organo. Il trattamento è molto complesso, e in molti casi richiede l’espianto del graft. Tuttavia, in alcuni casi selezionati, è possibile eseguire il trattamento dell’aneurisma, conservando il rene trapiantato, come nel caso da noi descritto. In conclusione, lo pseudoaneurisma dell’arteria renale è una complicanza rara ma potenzialmente letale del trapianto renale. L’intervento chirurgico di resezione dell’aneurisma, sebbene tecnicamente complesso, consente di preservare la funzionalità del rene trapiantato.
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References


