

Novel treatment (new drug/intervention; established drug/procedure in new situation)

Emergency endovascular stenting of the right iliac artery in a patient with secondary haemorrhage following transplant nephrectomy

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Summary

A patient presented with abdominal pain, hypotension and a retroperitoneal haematoma 5 days after transplant nephrectomy. Vascular injury sustained from transplant nephrectomy was repaired using endovascular techniques. Several known advantages to endovascular repair include: (1) intervention by a less invasive approach, (2) performance under local anaesthesia, (3) association with a shorter hospital stay and (4) reduction in morbidity and mortality. There were no infectious complications to the stent or the patient despite positive blood cultures obtained upon admission to the hospital. It was concluded that endovascular repair of an iliac artery used for kidney transplantation had favourable outcomes with respect to infection control and use of the vessel for future anastomosis.

BACKGROUND

This case demonstrates that an endovascular procedure can correct an abnormality that previously required open surgery. Endovascular repair options should be offered to a patient if equipment and expertise are available and if the patient is stable enough not to require open surgery. We encourage the use of endovascular procedures when appropriately indicated owing to excellent outcomes.

CASE PRESENTATION

Introduction

Vascular injury occurs rarely after transplant nephrectomy. Standard treatment for an iliac artery bleed involves surgical ligation and reconstruction of the vessel. In our case of haemorrhage from an iliac artery after transplant nephrectomy, endovascular techniques effectively excluded the transplant stump and prevented further haemorrhage. This method offered a less invasive approach for artery repair. It was performed under local anaesthesia and was associated with a shorter hospital stay than that after surgery.

Case report

A 54-year-old African American man presented to the hospital complaining of abdominal pain concentrated over his transplanted kidney. He received a cadaver-donor kidney transplant 5 years ago for renal failure due to complications related to hypertension, diabetes mellitus and hepatitis C. He rejected his cadaveric kidney transplant 52 months later and was restarted on haemodialysis. Immunosuppressive medications were slowly tapered over a 6-month period. Ultrasound of the transplanted kidney showed thrombosis of the renal vein and an enlarged, edematous kidney. The patient

subsequently required surgical removal of the kidney (graft or transplant nephrectomy). He was discharged from the hospital after nephrectomy without further complaints until he presented 5 days later with severe abdominal pain. In the emergency room, his blood pressure was 74/50 mm Hg with a pulse of 94 beats/min. He had diffuse tenderness over the right lower quadrant of his abdomen without rebound. His initial haemoglobin level of 9.9 g/dl and haematocrit of 31.6% fell to 6.5 g/dl and 21.6%, respectively, within 8 h. An intravenous contrast-enhanced abdominal CT scan showed a large retroperitoneal haematoma (figure 1). Subsequent studies showed blood extravasating from the right external iliac artery stump where the transplant renal artery was originally anastomosed (figure 2). An iliac limb GoreExcluder Stent graft (W. L. Gore and Associates, Inc., Flagstaff, Arizona, USA) was urgently placed to successfully exclude the transplant artery stump (figure 3).

The patient stabilised haemodynamically after stent placement. Blood cultures drawn on admission grew methicillin-resistant staph aureus. Thus, he was treated with vancomycin. Four days after stent placement, he developed a low-grade fever and new abdominal pain. Drainage appeared through the nephrectomy incision. Repeat CT scan showed the haematoma was unchanged in size. However, new pockets of free air were present. The patient was taken to the operating room for surgical exploration, whereupon the peritoneal space was drained and irrigated with copious purulent material and old blood products. He completed a 2-week course of intravenous vancomycin and blood cultures off antibiotics were negative.

In hindsight, the haematoma was the result of secondary haemorrhage due to infection and hence the eventual release of pus from the groin.



Figure 1 CT scan.

INVESTIGATIONS

Contrast enhanced CT scan shows significant intra peritoneal hemorrhage (figure 1). Catheter angiogram shows stump of ligated transplant renal artery. The suspected site of hemorrhage (figure 2).

DIFFERENTIAL DIAGNOSIS

Hypotension due to acute blood loss versus septicaemia.



Figure 2 Iliac artery angiogram with bleeding.



Figure 3 Iliac artery repaired.

TREATMENT

Catheter angiogram following stent graft insertion, thus excluding stump of ligated transplant renal artery (figure 3).

OUTCOME AND FOLLOW-UP

The patient's right iliac artery with a stent remains free of complication 4 years postoperatively while he receives haemodialysis and awaits another kidney transplant.

DISCUSSION

The indications and appropriate time for removal of failed kidney graft remain areas of controversy.¹⁻³ The incidence for transplant nephrectomy ranged between 4.5% and 84.3% from studies with 28-154 patients, with variability due to the initial graft failure.⁴ Patients who required urgent nephrectomy for sepsis, renal vein or arterial thrombosis, abscess formation or renal rupture sustained a higher morbidity and mortality rate (83.4% and 33%, respectively) compared to a non-urgent group (43% and 2.5%, respectively).⁴

Graft nephrectomy-associated vascular injury occurred at an incidence rate of 2-14%.^{5 6} In one case series, 5.6% of transplant nephrectomies (9 cases out of 161) sustained significant vascular complications. Seven patients required ligation of the external iliac artery to control haemorrhage, whereas the others required vascular reconstructions (femoral-femoral cross-over bypass, vein patch to an external iliac artery). Two patients died from

overwhelming sepsis.⁷ In another case series, 34 haemorrhagic events were noted in 22 patients with nephrectomy (representing a rate of 50%). Retroperitoneal haemorrhage with shock occurred in two patients, requiring re-operation with ligation of the iliac artery.⁴

Standard treatment involved direct surgical reconstruction of the vessel with ligation of the external iliac artery. Patients encountered procedure-related morbidity and mortality.⁸ In our case, we used endovascular repair to effectively exclude the transplant stump and prevented further extravasation. This non-invasive procedure, using local anaesthesia, resulted in a shorter hospital stay.⁹ Endovascular repair on the iliac artery is also used to treat for aneurysms and pseudoaneurysms.^{10 11}

The impact of bacteraemia on endovascular stents continues to be a major concern and a source for future morbidity and mortality. As patients with end-stage renal disease have a poor immune state, they frequently experience bacteraemia during haemodialysis. Bacteraemia results from frequent venipuncture of the arteriovenous access, contaminated dialysate, as well as intraluminal and periluminal contamination of central venous catheters.^{12–15} However, there does not appear to be any long-term complications from infection with endovascular repair. Though data remain limited, this case illustrates that bacteraemia and dialysis through a central venous catheter have no infectious impact on endovascular stents. To our knowledge, this is the first reported case of endovascular repair while the patient was bacteraemic.

One may wonder whether an iliac artery lesion corrected by endovascular repair using stents can be used for future graft anastomosis. Stents used in endovascular repair allow for future cannulation. A review of the literature did not reveal any contra-indication in using the iliac artery with a stent placed during endovascular repair for future anastomosis. We suspect that most transplant surgeons would not want to use this groin in the future unless absolutely necessary.

Conclusions

This case illustrates that blood vessels injured during kidney-transplanted nephrectomy may be corrected by using endovascular repair techniques if equipment and expertise are available instead of traditional surgical procedures. Endovascular repair results in decreased morbidity and mortality. In addition, the outcomes appear favourable with respect to infection control and use of the vessel for future anastomosis.

Learning points

- ▶ Transplant nephrectomy rarely occurs. Urgent transplant nephrectomy, compared to elective transplant nephrectomy, has higher morbidity and mortality rates.
- ▶ Endovascular techniques may be used instead of open surgery to repair damaged vessels if equipment and expertise are available.
- ▶ Minimally invasive endovascular procedures, compared to open surgery, have lower morbidity and mortality rates.

Competing interests None.

Patient consent Obtained.

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