



CASE REPORT

Enhancing Awareness and Advocacy for Paediatric Organ Donation: An Anaesthetist's Perspective in Successful En Bloc Kidney Transplantation from a Paediatric Donor

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ABSTRACT

The global shortage of transplantable organs continues to limit access to life-saving transplantation. Paediatric organ donation represents a valuable yet underutilised resource due to ethical concerns, technical challenges and limited public awareness. En bloc kidney transplantation from paediatric donors has emerged as a practical strategy to expand the donor pool while preserving vascular integrity and nephron mass. We report a successful en bloc renal transplantation from a 5-year-3-month-old donor weighing 14.5 kg into a 42-year-old adult recipient with end-stage kidney disease secondary to hypertensive nephrosclerosis. Anaesthetic management focused on maintaining haemodynamic stability, optimising graft perfusion and balancing fluid administration in a recipient with significant cardiovascular comorbidities. Continuous invasive haemodynamic

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monitoring and goal-directed fluid therapy were utilised throughout the procedure. Attention was paid to maintaining adequate mean arterial pressure during vascular anastomosis and reperfusion while avoiding fluid overload in the presence of diastolic dysfunction. Immediate urine output following reperfusion indicated early graft function. The postoperative course was uneventful, and the patient was transferred from the intensive care unit after two days. This case highlights the important role of anaesthetists in perioperative transplant management and underscores the need for greater awareness and advocacy for paediatric organ donation.

Keywords: Paediatric organ donation, en bloc kidney transplantation, renal transplantation, anaesthesia, organ donation advocacy

INTRODUCTION

Renal transplantation remains the treatment of choice for many patients with end-stage kidney disease (ESKD). Despite advances in transplantation, the availability of suitable donor organs remains a major limiting factor worldwide. The utilisation of paediatric donor organs has been proposed as one strategy to address this shortage; however, such donations remain relatively uncommon because of ethical concerns, technical difficulties and limited public awareness.

En bloc kidney transplantation involves transplantation of both kidneys together with the donor aorta and inferior vena cava. This technique is particularly useful when kidneys are retrieved from small paediatric donors because it preserves vascular integrity and provides sufficient nephron mass for the recipient. Several studies have demonstrated favourable outcomes with this approach compared with single kidney transplantation from small paediatric donors.¹

Anaesthetists play an essential role throughout the transplant process, including donor optimisation, intraoperative haemodynamic management, graft preservation and post-operative care. We present a case of successful en bloc

kidney transplantation from a paediatric donor into an adult recipient, highlighting important anaesthetic considerations and the broader significance of paediatric organ donation.

CASE PRESENTATION

A 42-year-old man with end-stage kidney disease secondary to hypertensive nephrosclerosis was admitted for deceased donor en bloc renal transplantation. He had been receiving haemodialysis twice weekly since 2022 and adhered to a strict fluid restriction of approximately 500 mL daily. His residual urine output was approximately 150 mL/day.

His medical history was significant for resistant hypertension requiring five antihypertensive medications, previous seizures secondary to hypertensive encephalopathy, tertiary hyperparathyroidism requiring parathyroidectomy and a history of heparin-induced thrombocytopenia.

His MET was >4. Preoperative echocardiography demonstrated a left ventricular ejection fraction of 50%, severe left ventricular hypertrophy and evidence of diastolic dysfunction. Coronary angiography revealed minor coronary artery disease.

The donor was a 5-year-3-month-old child weighing 14.5 kg who had been declared brain dead following complications of a cerebral abscess. Brain death was confirmed according to institutional protocols. Following consent for organ donation, organ retrieval was performed. During donor management, efforts were made to maintain normoxia, normocarbida and adequate mean arterial pressure to optimise organ perfusion. Owing to the small donor size, both kidneys were retrieved en bloc together with the donor aorta and inferior vena cava.²

Anaesthetic Management

Standard monitoring was established upon arrival in the operating theatre. In addition to electrocardiography, pulse oximetry and capnography, invasive arterial blood pressure monitoring and central venous pressure (CVP) monitoring were instituted. Given the presence of resistant hypertension, severe left ventricular hypertrophy and diastolic dysfunction, invasive arterial blood pressure monitoring was considered justified despite the importance of preserving upper limb vasculature. Continuous beat-to-beat monitoring was deemed essential for optimisation of graft perfusion during vascular anastomosis and reperfusion.

Anaesthesia was induced with fentanyl, propofol and atracurium, and maintained using inhalational anaesthesia with intermittent neuromuscular blockade. Multimodal analgesia was used while avoiding nephrotoxic analgesic agents. Right-sided transversus abdominal plane block was given after induction. Intravenous fentanyl was given at induction, followed by IV paracetamol and IV morphine.

The primary anaesthetic objectives were to maintain adequate renal graft perfusion, preserve cardiovascular stability and avoid

excessive fluid administration in view of the patient's severe left ventricular hypertrophy and diastolic dysfunction. Fluid therapy was guided using serial haemodynamic assessment, arterial pressure trends, CVP monitoring, heart rate and urine output. CVP target was kept at 20% of his baseline CVP, which is 14 mmHg. Balanced crystalloid solution was administered cautiously to optimise preload while minimising the risk of fluid overload.

Particular attention was paid to maintaining adequate perfusion pressure during vascular anastomosis and reperfusion. Prior to reperfusion, intravascular volume status was optimised and haemodynamic stability ensured. The anaesthetic goal was to maintain adequate mean arterial pressure of >80 mmHg to ensure optimal graft perfusion throughout the reperfusion period.

Despite the patient's high cardiovascular risk profile, haemodynamic stability was maintained throughout the procedure, and vasopressor support was not required. Cold ischaemia time was approximately 35 minutes. Following completion of vascular anastomosis, reperfusion occurred approximately 45 minutes later. Haemodynamic stability was maintained and was associated with immediate urine output, indicating satisfactory early graft function.

Postoperative Course

Following surgery, the patient was transferred to the intensive care unit for close monitoring. Haemodynamic stability was maintained without vasopressor support. Urine output remained satisfactory, indicating continued graft function.

Postoperative analgesia was provided using a multimodal regimen consisting of regular

paracetamol and opioid analgesia as required. Nephrotoxic analgesic agents were avoided.

The postoperative course was uncomplicated, and the patient was transferred to the surgical ward after two days.

DISCUSSION

Transplantation of kidneys from paediatric donors presents unique surgical and anaesthetic challenges. Small vessel calibre increases technical complexity and may predispose to vascular thrombosis. En bloc transplantation addresses these challenges by preserving the donor aorta and inferior vena cava, facilitating vascular anastomosis and improving graft perfusion. Furthermore, transplantation of both kidneys provides sufficient nephron mass to support renal function in adult recipients.¹

Several studies have demonstrated favourable outcomes following en bloc kidney transplantation. Sureshkumar and colleagues reported graft survival rates comparable to those achieved with living donor kidney transplantation.³ Similarly, Kayler et al. demonstrated superior outcomes when kidneys from small paediatric donors were transplanted en bloc rather than as single grafts.⁴

From an anaesthetic perspective, maintenance of adequate graft perfusion while avoiding cardiovascular complications is critical. Patients with ESKD frequently have significant cardiovascular disease, including hypertension, ventricular hypertrophy and impaired diastolic function, all of which complicate perioperative fluid management. Excessive fluid administration may precipitate pulmonary oedema and cardiac decompensation, whereas inadequate intravascular volume may compromise graft perfusion and increase the risk of delayed graft function.

Reperfusion represents one of the most critical phases of renal transplantation. Sudden restoration of blood flow may be associated with metabolic and haemodynamic disturbances, including acidosis, hyperkalaemia and hypotension. Careful preparation prior to reperfusion and vigilant haemodynamic monitoring are therefore essential to ensure adequate graft perfusion and early graft function.

The present case illustrates the importance of individualised haemodynamic management in a recipient with significant cardiovascular comorbidity receiving kidneys from a small paediatric donor. Continuous invasive monitoring, cautious fluid administration and maintenance of adequate perfusion pressure contributed to successful transplantation and favourable early graft function.

Beyond intraoperative care, anaesthetists contribute significantly to donor optimisation, multidisciplinary coordination and public advocacy for organ donation. Paediatric organ donation remains underutilised in many regions because of cultural, emotional and ethical concerns. Increasing awareness of successful transplant outcomes may help improve public confidence and acceptance of paediatric organ donation.

CONCLUSION

This case demonstrates successful en bloc kidney transplantation from a paediatric donor into an adult recipient with significant cardiovascular comorbidities. Careful anaesthetic management focusing on haemodynamic stability, optimisation of graft perfusion and judicious fluid therapy contributed to early graft function and an uncomplicated postoperative recovery. En bloc transplantation from paediatric donors represents a valuable

strategy for expanding the donor pool. Greater awareness and advocacy for paediatric organ donation are essential to address the continuing shortage of transplantable organs.

AUTHORS' CONTRIBUTIONS

Concept and design: SS, AA, JA, SM

Literature review: SS, AA

Compilation of manuscript: SS, AA

Manuscript editing & proofreading: SS, AA

DECLARATION OF CONFLICTS OF INTEREST

There are no conflicts of interest to be reported.

DECLARATION OF PATIENT'S CONSENT

Obtained written informed consent from the patient for publication as a case report.

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