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Original Research

INITIAL EXPERIENCE WITH KIDNEY TRANSPLANTATION FROM BRAIN-DEAD DONORS AT THONG NHAT HOSPITAL: A CASE SERIES OF FOUR CLINICAL CASES

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ABSTRACT: In Vietnam, kidney transplantation has been performed since 1992. However, the number of transplants remains limited, mainly due to reliance on living donors. Expanding the donor pool with brain-dead donors is considered a humane and sustainable solution to address the current organ shortage, particularly in kidney transplantation. Since May 2022, Thong Nhat Hospital has launched a kidney transplant program with technical support from Cho Ray Hospital. As of March 2025, we have successfully performed 21 kidney transplants, including 4 cases using kidneys from 2 brain-dead donors. This is a descriptive clinical study of the first 4 kidney transplants using organs from 2 brain-dead donors, performed on November 24, 2024, and March 19, 2025. There were two brain-dead donors: the first was a male, 18 years old, who died from traumatic brain injury, with 174 hours between injury and brain death diagnosis; the second was a male, 44 years old, who suffered a fatal occupational accident, with 45 hours from accident to brain death confirmation. Renal function in both donors was assessed before organ retrieval. Four recipients with end-stage chronic kidney disease undergoing regular hemodialysis were selected, including 3 males and 1 female, with a mean age of 33.25 years. Two kidneys were transplanted into the right iliac fossa and two into the left. All patients produced urine immediately on the operating table. The average operative time was 270 minutes, with arterial and venous anastomosis times averaging 15.5 and 12.5 minutes, respectively. Vascular anastomoses were performed in an end-to-side fashion. Ureteroneocystostomy was performed using the Lich-Grégoir technique with JJ stent placement. Renal function recovered rapidly within one week in the first two patients, while the other two experienced delayed recovery. One female patient underwent reoperation on postoperative day 13 due to perinephric fluid and hematoma; her condition stabilized after drainage and she was discharged one week later. Initial results suggest that kidney transplantation from brain-dead donors is feasible at Thong Nhat Hospital. Although technical support from Cho Ray Hospital is still necessary, the surgical team at Thong Nhat has gradually gained control over key steps of the transplant procedure. Compared to living-donor transplants, kidneys from brain-dead donors tend to have slower functional recovery. However, from a surgical standpoint, vascular anastomoses are more straightforward due to the presence of vascular patches, which facilitate safer and easier anastomosis. Kidney transplantation from brain-dead donors is a humane, safe, and effective solution that significantly improves the quality of life for end-stage renal disease patients and serves as a strategic direction for organ transplantation development at Thong Nhat Hospital.

Keywords: Kidney transplantation; brain-dead donor; vascular patch; Thong Nhat Hospital; initial experience

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1. INTRODUCTION

Kidney transplantation remains the most effective therapeutic intervention for patients with end-stage renal disease, significantly improving both survival and quality of life. Despite increasing demand for kidney transplantation, the availability of donor organs continues to lag behind. In Vietnam, the first kidney transplant was performed in 1992, but the majority of transplantations still rely on living donors. The implementation of organ donation from brain-dead donors provides a promising, ethical, and sustainable solution to this shortfall. Since 2010, several major Vietnamese medical centers, including Viet Duc Hospital, Cho Ray Hospital, the Military Medical Academy, and Hue Central Hospital, have commenced brain-dead donor transplant programs.

Thong Nhat Hospital officially initiated its kidney transplant program in May 2022, with technical guidance from Cho Ray Hospital. By March 2025, the hospital had completed 21 kidney transplants, four of which were performed using kidneys retrieved from two brain-dead donors.

2. SUBJECTS AND METHODS

2.1. Study subjects

A descriptive case series study including 4 kidney transplant cases from brain-dead donors at Thong Nhat Hospital. Of which:

The first 2 cases were performed on November 24, 2024.

The next 2 cases were performed on March 19, 2025.

2.2. Study methods

Retrospective descriptive study, analyzing clinical characteristics, paraclinical features, surgical technical procedures and initial results of 4 kidney transplant cases from brain-dead donors.

3. RESULTS

Donor Characteristics: Brain death was confirmed following Ministry of Health guidelines, which require clinical evaluation by both anesthesiology-critical care and neurosurgical teams. A Glasgow Coma Scale score of 3, confirmed three times at six-hour intervals, along with confirmatory testing via electroencephalography, transcranial Doppler, and cerebral angiography, was utilized.

Two donors were included: an 18-year-old male with traumatic brain injury (174 hours from injury to brain death confirmation), and a 44-year-old male who experienced a fatal occupational accident (45 hours from trauma to brain death confirmation).

4. DISCUSSION

4.1. Pre-operative and intra-operative characteristics

Our cohort reflects successful early implementation of deceased donor kidney transplantation in a developing transplant center. Recipient demographics (3 males, 1 female, average age 33.25 years) were consistent with previous Vietnamese studies.

Transplant kidney position included 2 cases in right iliac fossa and 2 cases in left iliac fossa (due to patients having femoral catheter on the right side). According to literature, there is currently no evidence showing preference for placing left or right transplant kidney in the iliac fossa .

Table 1. Characteristics of donors

Characteristics	Donor pair transplant 1	Donor pair transplant 2
Age	18	44
Gender	Nam	Nam
Time from accident to brain death diagnosis (Hours)	174	45
Creatinine (µmol/L)	45.9	183.0
eGFR (ml/min/1.73m^2 BSA)	220.38	37.26

Table 2. Characteristics of recipients

Characteristics	Transplant pair 1		Transplant pair 2	
	Recipient 1	Recipient 2	Recipient 3	Recipient 4
Age	33	27	41	32
Gender	Male	Female	Male	Male
Mismatch	3/6	5/6	4/6	4/6
Preoperative creatinine (µmol/L)	523.0	609	767.0	891
Preoperative eGFR (ml/min/1.73m^{2}BSA)	11.76	7.62	7.23	6.4
Warm ischemia time (minutes)	58	55	26	26
Cold ischemia time (minutes)	269	297	99	99
Arterial anastomosis time (minutes)	17	15	8	10
Venous anastomosis time (minutes)	28	22	6	6
Surgery time (minutes)	300	330	180	270
Transplant position	Left iliac fossa	Left iliac fossa	Right iliac fossa	Right iliac fossa
Vascular anastomosis technique	End-to-side	End-to-side	End-to-side	End-to-side
Ureter reimplantation technique	Lich-Grégoir, JJ stent placement	Lich-Grégoir, JJ stent placement	Lich-Grégoir, JJ stent placement	Lich-Grégoir, JJ stent placement
Urine output in first 24h (ml)	7600	9300	5722	5100
Creatinine 3 days post-op (µmol/L)	107.0	155.0	285.0	679.0
eGFR 3 days post-op (ml/min/1.73m^2 BSA)	73.37	36.98	22.67	8.81
Creatinine 1 week post-op (µmol/L)	79.0	71.0	172.0	322.0
eGFR 1 week post-op (ml/min/1.73m^2 BSA)	104.13	91.03	40.6	20.71
Hospital stay (days)	8	19	10	10

Average surgery time was 270 minutes.

Vascular anastomosis technique: renal artery and vein were anastomosed end-to-side to external iliac artery and vein. Arterial anastomosis utilized arterial patch (Carrel patch), and the vein was extended with inferior vena cava segment. Average arterial anastomosis time was 15.5 minutes, venous anastomosis was 12.5 minutes. After clamp release, artery and vein distended well, no anastomotic bleeding was recorded. Our arterial-venous anastomosis time was equivalent to Le Nguyen Vu's research results (18 minutes artery, 21.33 minutes vein) .

Ureter was implanted into bladder using Lich-Grégoir technique with JJ stent placement. According to EAU guidelines, this technique helps significantly reduce postoperative complications (urine leak, ureteral stenosis, hematuria).

4.2. Follow-up and postoperative results

All 4 cases had urine immediately after

transplant, average urine output in first 24 hours was 6930.5 ml, which was an important sign reflecting that transplant kidney function had recovered rapidly after transplant. This urine output met the usual standard of approximately 2 ml/kg/hour . According to Lucan et al., post-transplant course from brain-dead donors is similar to living donor transplants . According to Vietnamese literature, urine output after living donor transplant is 6327±2479 ml , brain-dead donor is 11155±5012 ml , donation after cardiac death is about 2500 ml .

Ultrasound examination after transplant showed that the most of transplant kidneys were well perfused, arterial-venous anastomoses were patent. Ultrasound is the first-line tool to assess early dysfunction status of transplant kidney .

Kidney function (serum creatinine) of the first transplant pair recovered rapidly, decreased significantly in the first 3 days, normalized after 1 week. This result is consistent with Le Nguyen Vu's research .

Conversely, the second transplant pair (19/3/2025) had significantly slower functional recovery, creatinine was still not normal at discharge. The cause may be due to prolonged ischemia and temporary cardiac arrest before transplant.

Delayed graft function (DGF) is more common in deceased donor transplants compared to living donors. Domestic and international studies also show DGF is significantly higher in donation after circulatory death compared to brain-dead donation . Slow kidney function recovery has important significance, as it increases the risk of acute and chronic rejection.

4.3. Postoperative complications

Kidney transplantation from brain-dead donors usually has higher complication rates compared to living donor transplants, due to neurological and hemodynamic dysregulation in the donor .

In our study, one case (recipient 2) had postoperative bleeding complications, received blood transfusion, monitored until postoperative day 13 then underwent surgery to drain fluid collection. Patient had good progress after intervention and was discharged on postoperative day 19.

According to EAU guidelines, hematoma after kidney transplant is a minor but quite common complication with reported rates of about 0.2-25% .

5. CONCLUSION

Brain-dead kidney donors in the study were all males, young age, died mainly from traumatic brain injury and met brain death diagnostic criteria according to Ministry of Health regulations.

Initial results on 4 kidney recipients show survival rates of transplant kidneys and recipients consistent with domestic and international reports. Therefore, using kidneys from brain-dead donors is a feasible, humane and sustainable solution to address organ shortage in kidney transplantation.

However, due to small number of patients and short follow-up time, continued research with larger numbers and longer follow-up periods is needed to more fully evaluate the effectiveness of this method.

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