



Original Article

Patient survival rate and graft survival rate of kidney transplant recipients in Rajavithi Hospital

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Abstract

Objective: To report the outcomes and complications of transplant activity and the survival data of kidney transplant patients and grafts.

Material and Method: We conducted a retrospective analysis of patients who received a kidney transplant at our institution, and reported the donor, recipient, and transplant characteristics from January 2012 to September 2019.

The primary outcome was patient survival and graft survival at 1, 3, and 5 years.

Results: A total of 136 kidney transplants were performed from January 2012 to September 2019; 29% (37) and 71% (89) were living and deceased donor transplants. Patient survival rates were 96.8%, 96%, and 96% at 1, 3, and 5 years, respectively. Graft survival rates were 95.2%, 94.4%, and 92.9% at 1, 3, and 5 years, respectively. Traffic accident was the most common cause of death in the brain-dead donors. The most common cause of end-stage renal disease was biopsy proved IgA nephropathy. The most common early and late complications after transplant were delayed graft function and renal vascular complication, respectively. Infection was the most common cause of death in kidney transplant recipients.

Conclusion: We have reported the total number, the graft and the patient survival data of kidney transplant recipients in Rajavithi Hospital from 2012 to 2019. Although the number of patients is lower than in other institutions in Thailand, and also in developed countries, the patient and the graft survival rates are comparable. Better outcomes were found in living donor transplants.

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Introduction

Nowadays, there are many people suffering from end-stage renal disease (ESRD). There are several approaches for treating this illness: peritoneal dialysis, hemodialysis, and kidney transplant. Peritoneal dialysis and hemodialysis are ways of removing waste products from a patient's body when their kidneys are nonfunctional.

Kidney transplantation provides a new kidney and life to the patient. But kidney transplantations are insufficient for total ESRD patients and are major operations which need to be prudent and risk averse. The aim of this research was to find useful information that might help decrease the failure rate of kidney transplants in the future.

Material and Method

This research was a retrospective cross-sectional study approved by Rajavithi Hospital Ethics Committee. Data were collected from the medical records of end-stage renal disease patients who underwent kidney transplant in Rajavithi Hospital from 1st January 2012 to 30th March 2019, and who had data recorded until 30th September 2019. Exclusion criteria were incomplete medical records.

Statistical analysis was performed using SPSS version 17. Comparison of categorical data was performed using the Chi-square test. Analysis of survival rate was performed using the Kaplan-Meier estimator. Relative risks were reported with Odds Ratio (OR) (95% CI), and all tests were based on a statistically significant level at a p-value lower than 0.05.

Results

From 1st January 2012 to 30th March 2019, there were 136 patients who underwent kidney transplant in Rajavithi Hospital. After sorting out patients based on the exclusion criteria, there remained 126 patients (89 deceased donor transplants, 37 living donor transplants). Twenty-four (64.9%) were male recipients

and 13 (35.1%) were female recipients for living donor transplants; 52 (58.4%) were male recipients and 37 (41.6%) were female recipients for deceased donor transplants. Sixteen (43.2%) were male donors and 21 (56.8%) were female donor for living donor transplants; 71 (79.8%) were male donors and 18 (20.2%) were female donors for deceased donor transplants.

Mean ages were 37.3 ± 11.5 years for recipients and 40.9 ± 11.8 for donors in living donor transplants; 42.7 ± 9.5 years for recipients and 37.6 ± 13.0 years for donors in deceased donor transplants. Body mass index (BMI) was 22.3 ± 3.9 kg/m² for living donor transplants and 22.9 ± 4.0 for deceased donor transplants. Average warm ischemic time was 7 minutes in living donor transplants. Average cold ischemic time was 16 hours 27 minutes in deceased donor transplants. Average operative times were 5 hours 35 minutes in living donor transplants and 4 hours 36 minutes in deceased donor transplants (Table 1).

The most common cause of brain death among deceased donors was traffic accident (75 patients, 84.3%), followed by cerebrovascular accident (13 patients, 14.6%).

The overall patient survival was 96.8, 96, 96, 95.2% at 1, 3, 5, and 7 years, respectively; 100, 100, 100, 97.3% for the patient survival rate in living donor transplants and 95.5, 94.4, 94.4, 94.4% in deceased donor transplants at 1, 3, 5, and 7 years, respectively (Figure 1, 2).

The overall graft survival was 95.2, 94.4, 92.9, 92.1% at 1, 3, 5, and 7 years, respectively; 100, 100, 100, 97.3% for the patient survival rate in living donor transplants and 93.3, 92.1, 89.9, 89.9% in deceased donor transplants at 1, 3, 5, and 7 years, respectively (Figure 3, 4).

The most common early complications were delayed graft function (38.1%), followed by bacterial infection (16.7%) and other complications (15.1% such as upper gastrointestinal hemorrhage, new-onset diabetes mellitus after transplantation, transaminitis) (Figure 5, 6).

**Table 1.** Characteristics of recipient, donor, and transplant procedures.

	Living donor transplants (n=37)	Deceased donor transplants (n=89)	All transplants (n=126)
Male gender (%)			
- Recipient	24 (64.9)	52 (58.4)	76 (60%)
- Donor	16 (43.2)	71 (79.8)	87 (69%)
Female gender (%)			
- Recipient	13 (35.1)	37 (41.6)	50 (40%)
- Donor	21 (56.8)	18 (20.2)	39 (31)
Age (years), mean \pm SD			
- Recipient	37.3 \pm 11.5	42.7 \pm 9.5	41.1 \pm 10.4
- Donor	40.9 \pm 11.8	37.6 \pm 13.0	38.6 \pm 12.6
BMI (kg/m²), mean\pm-SD	22.3 \pm 3.9	22.9 \pm 4.0	22.7 \pm 3.9
Dialysis modality (%)			
- Hemodialysis	29 (78.4)	86 (96.6)	115 (91.3)
- Peritoneal dialysis	8 (21.6)	3 (3.4)	11 (8.7)
Comorbidities (%)			
- Hypertension	37 (100)	89 (100)	126 (100)
- Diabetic mellitus	2 (5.4)	13 (14.6)	15 (11.9)
- Dyslipidemia	12 (32.4)	48 (53.9)	60 (47.6)
- Ischemic heart disease	4 (10.8%)	8 (9.0%)	12 (9.5%)
- Gout	2 (5.4)	5 (5.6)	7 (5.6)
- Hyperparathyroidism	8 (21.6)	34 (38.2)	42 (33.3)
- Cerebrovascular disease	0 (0)	4 (4.5)	4 (3.2)
- Other	9 (24.3)	17 (19.1)	26 (20.6)
Cause of ESRD (%)			
- IgA nephropathy	9 (24.3)	9 (10.1)	18 (14.3)
- FSGS	3 (8.1)	4 (4.5)	7 (5.6)
- ADPKD	2 (5.4)	4 (4.5)	6 (4.8)
- Other	3 (8.1)	12 (13.5)	15 (11.9)
- Unknown/no biopsy	20 (54.1)	60 (67.4)	80 (63.4)

BMI = body mass index; ESRD = end-stage renal disease; FSGS = focal segmental glomerulosclerosis;
ADPKD = autosomal dominant polycystic kidney disease.

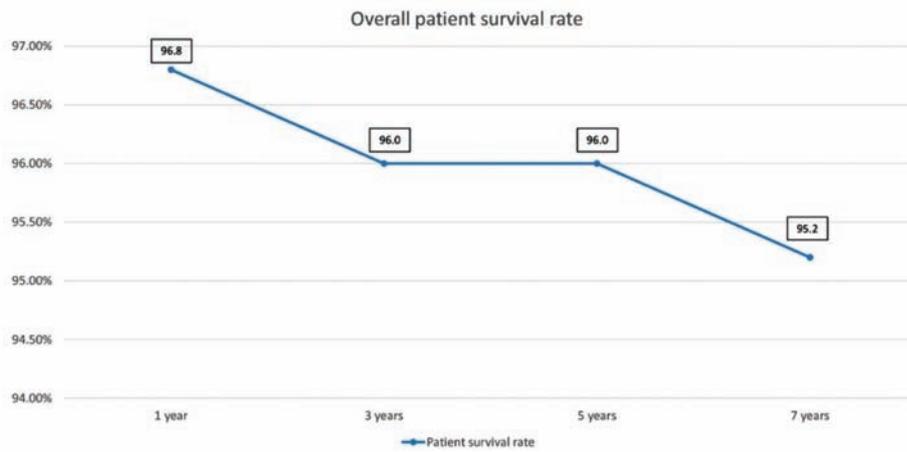


Figure 1.
Overall patient survival rate.

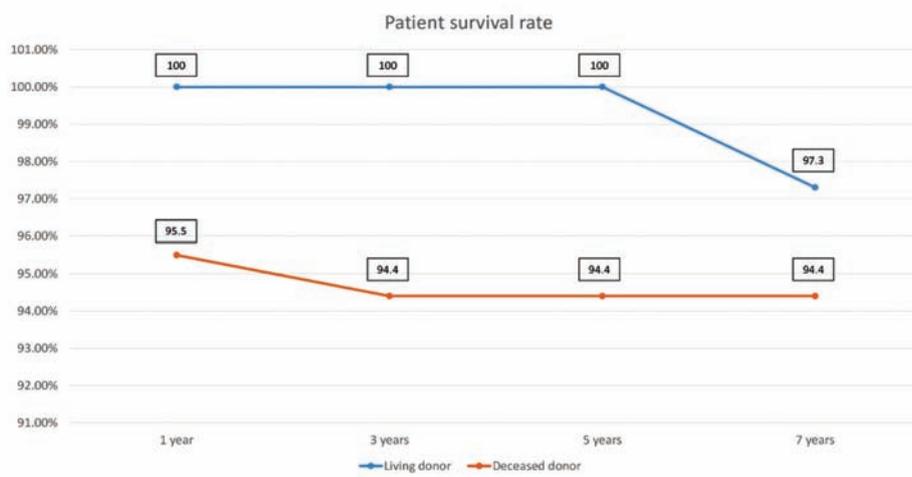


Figure 2.
Patient survival rate.

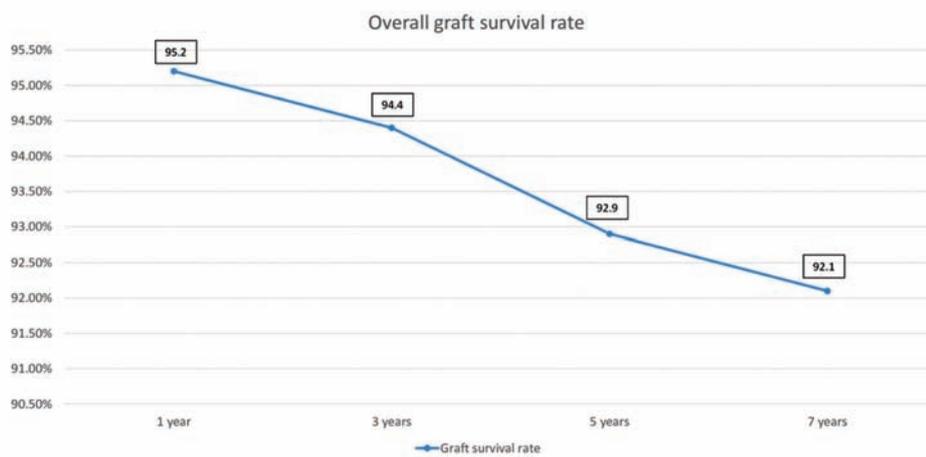


Figure 3.
Overall graft survival rate.

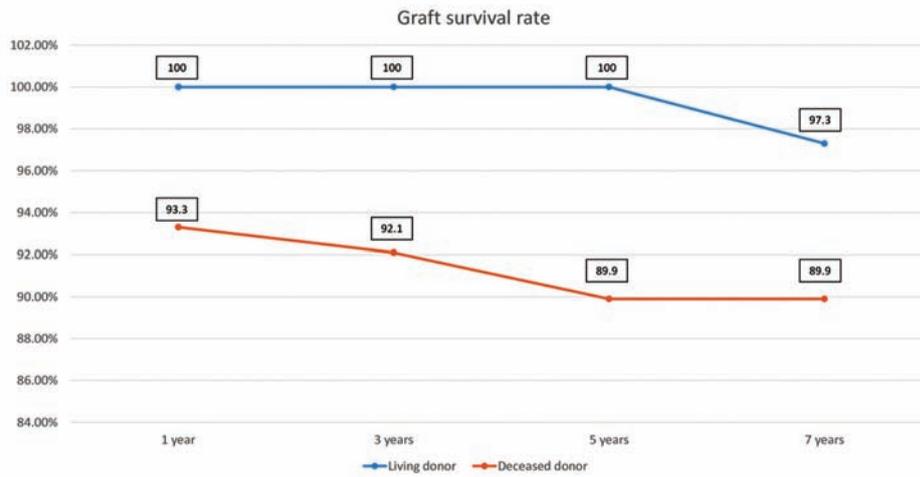


Figure 4. Graft survival rate.

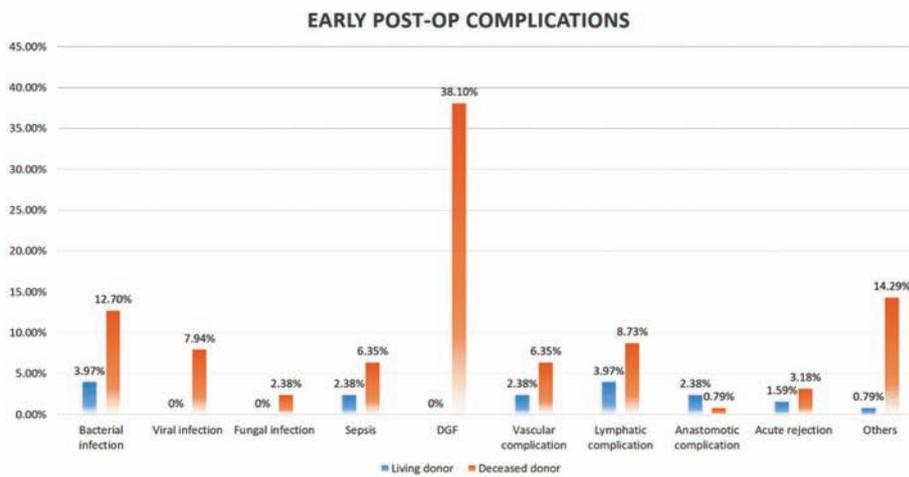


Figure 5. Early post-op complications.

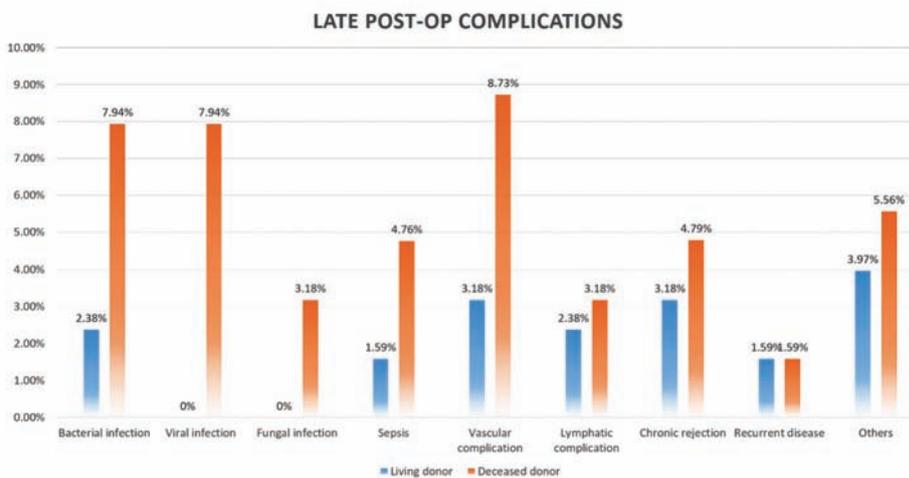


Figure 6. Late post-op complications.

The most common late complications were transplant renal artery stenosis (11.9%), followed by bacterial infection (10.3%) and other complications (9.5% such as incisional hernia, lower gastrointestinal hemorrhage, urinary tract calculi) (Figure 6).

The most common cause of death in transplant recipients was bacterial septic shock (50%: urinary tract infection 33.33%, pneumonia 16.67%), followed by fungal septic shock (16.67%), acute coronary syndrome (16.67%), and cancer (16.67%) (Figure 7).

Discussion

Kidney transplantation is a surgical procedure to place a healthy kidney from a living or deceased donor into a person whose kidneys no longer function properly^{1,2}.

The kidney transplant in Thailand has a long history and was first successfully performed in 1972. However, Thailand is a developing and resource limited country. The number of kidney transplants performed each year is much lower than the number of patients on the waiting list as there were approximately 5,500 ESRD patients waiting for a deceased donor kidney in 2015³.

The most common cause of ESRD in transplant recipients in Thailand is diabetic nephropathy, followed by hypertensive nephropathy and obstructive

nephropathy^{3,4}. The most common cause of brain death among deceased donors is traffic accident (49.7%), followed by cerebrovascular accident (11.2%) and other causes (13.9%)⁵.

Several studies have reported on survival outcome following kidney transplants. In our study, the graft and patient survival rates are comparable to other registries.

Noppakun K and colleagues conducted a retrospective study on kidney transplant activity and survival data from 1987 to 2012 in the Thai Transplant Registry. They reported that patient survival at 1 and 5 years were respectively, 98.6% and 96.6% in living donor transplants, and 96.3% and 93.1% in deceased donor transplants. Delayed graft function (DGF) developed in 11.2% of the recipients who had received a living donor transplant and 32.4% among the recipients of deceased donor transplants. The most common cause of death in transplant recipients was infection (52.0%), followed by cardiovascular disease (17.5%)⁵.

In their retrospective cohort study of 30,207 patients who underwent kidney transplant from 1990 to 2011, McAdams-DeMarco MA and colleagues found that the patient survival rate of the kidney transplant recipients at 1, 3, and 5 years were 93, 90, and 85% in living donor transplants and 94, 82, and 67% in deceased donor transplants, respectively⁶.

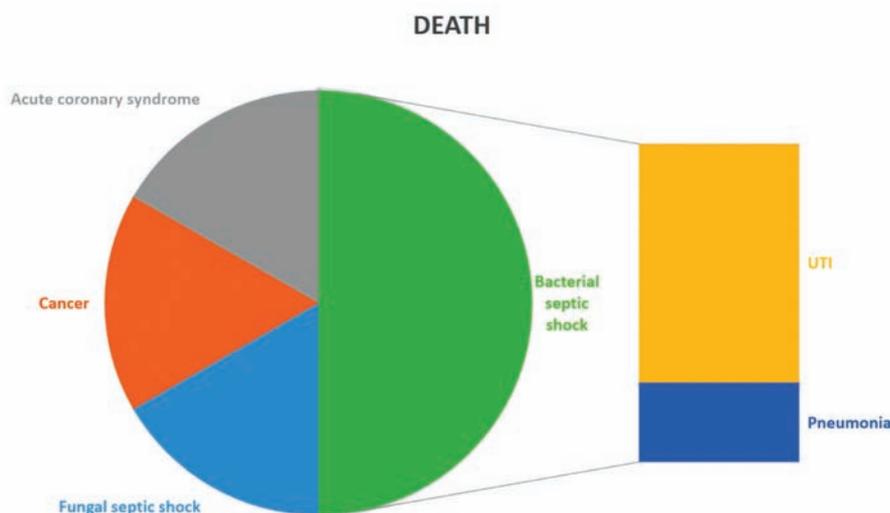


Figure 7.
Causes of death.



Van Arendonk KJ and colleagues have reported the patient survival of the kidney transplant recipients under 18 years old from the Scientific Registry of Transplant Recipients in the United States of America, 1987 to 2012 at 1, 5, and 10 years were 97, 77.9, and 60.2%, respectively⁷.

With regard to transplant-associated complications, in our study delayed graft function was found in 38.1%, compared to 2.3% in living donor transplants and 31% in deceased donor transplants from the Annual Report 2018 Organ Transplantation in Thailand⁴. Lohéac C, et al. have reported that the most common cause of graft loss was antibody-mediated rejection (31.69%), followed by thrombosis (25.55%), and medical intercurrent disease (14.62%)⁸. Similarly, Ingsathit A, et al. found that the most common cause of graft loss was chronic allograft nephropathy (53%), followed by acute rejection (15%), and transplant renal artery diseases (7%)⁹.

There are some limitations in this study. First, it comprised only a small number of patients. Second, the missing data could have introduced significant bias. We should be careful when attempting to interpret data where there is missing information. Third, there was no systematic audition system for the data collection.

Conclusion

We have reported the number of kidney transplants performed in Thailand. The graft and patient survival rates are comparable to other registries and have improved significantly. Hypertensive nephropathy is the most common cause of ESRD and bacterial infection is the most common cause of death in transplant recipients.

For the future direction of the registry, we are planning on reporting long-term patient outcomes, including cardiovascular and metabolic complications, and malignancy.

Conflict of Interest

The authors declare no conflict of interest.

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