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Original Article

Kidney Transplantation at Suratthani Hospital

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Abstract

Background and objective: **Kidney transplantation is associated with improved quality of life and better survival among patients with end-stage renal disease. The aim of this study is to assess the experience of Suratthani Hospital's kidney transplant program which began in 2008.**

Materials and Methods: **The records of 8 pairs of donors and recipients who received kidney transplants over a 5-year period were collected and analyzed. All received kidneys from live donors.**

Results: **The mean donor age was 39.3 ± 8.8 years (range, 28 to 53 years) and the mean recipient age was 32.0 ± 9.3 years (range, 21 to 48 years). There were 4 male donors (50%) and 4 female donors (50%), while the 8 recipients included 6 males (75%) and 2 females (25%). The donors were siblings of the recipients in 3 cases (37.5%), parents in 3 cases (37.5%), a relative in 1 case (12.5%) and a spouse in 1 case (12.5%). No acute graft rejection was seen in all cases. One case had delayed graft function due to CMV infection. Graft survival was 100%. One recipient died three years after transplantation from unknown cause, but the kidneys were working well for the other seven cases. Six recipients developed post transplant infections, including urinary tract infection, varicella, herpes zoster, tuberculosis and CMV infection.**

Conclusion: **Even though the experience with kidney transplantation in Suratthani is limited, the reported results are encouraging and offer a promising option for people with kidney disease on dialysis who live in the upper southern Thailand.**

Keywords: **Kidney transplantation, live donor, graft survival**

INTRODUCTION

Kidney transplantation is the treatment of choice for most patients with end-stage renal disease (ESRD). It improves the quality of life and increases survival rates of all end stage renal disease. Also, it is more cost effective, especially when compared with hemodialysis or peritoneal dialysis, the conventional treatment modality for ESRD.

Current advances in kidney transplantation have resulted in better graft and patient survival, and the improved quality of life has made kidney transplantation a favored option for patients with ESRD. Suratthani Hospital is the medical center covering the upper part of southern Thailand, an area with a reported annual incidence of ESRD of 434 cases per million. There are approximately 578 patients on hemodialysis and 922 patients on peritoneal dialysis (updated data in 2013).

The hospital's kidney transplantation program was begun in March 2008 and in its first five years, eight kidney transplantations were done, all from living-

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related donors. The recipients received cyclosporine-based drugs and steroids, according to the national immu-nosuppressive protocol. The present study aimed to conduct an initial assessment and to report on the experience of kidney transplantation program at Suratthani hospital.

Patients and Methods

Potential donors and recipients were first informed by a nephrologist about risks and advantages of the procedure for living donor kidney transplantation. The donor evaluation included blood group compatibility and cross matching. Subsequently, potential donors had medical and psychological evaluation. Kidney function was measured by testing serum creatinine levels, GFR, 24-hour urine collection for creatinine clearance and protein excretion, and urinalysis. When proteinuria and/or microscopic hematuria were present, the donor was rejected. All donors and recipients underwent screening for hepatitis B and C viruses. The potential donor underwent routine Computed Tomography Angiography (CTA) to determine their kidney's vascular and ureteric anatomy.

Donors with no vascular abnormalities detected by kidney angiograms underwent left nephrectomy, the kidney of choice internationally. In those with vascular anomalies in their left kidney, a right nephrectomy was performed. Left-to-right or right-to-left transplantation was the routine, as was the case internationally. At our center, both donor nephrectomy and kidney transplantation are performed by experienced urologists and general surgeons well-trained in vascular surgery. The donors and recipients were operated on in separate operating rooms. The incisions of each donor and the recipient were made at the same time. Warm and cold ischemic times were recorded. The anastomosis of each donor's renal artery was performed end to side to the recipients' external iliac artery. The renal vein anastomosis was end to side to the external iliac vein. A neo-ureterocystostomy was performed by the urologist.

All donors were monitored postoperatively for five to seven days before discharge and were followed-up regularly, according to hospital protocol.

All recipients received Basiliximab (IL-2 monoclonal antibody) and immunosuppression maintenance, consisting of steroids, cyclosporine and mycyphenolate mofetil (MMF), i.e., the triple therapy. Delayed graft function was defined as a transplanted kidney requiring dialysis initially posttransplantation. The cyclosporine level was monitored and kept within the range 150 to 250 ng/ml.

Quantitative variables were expressed as mean values + standard deviation. The student *T* test was used to compare donor and recipient characteristics before and after transplantation.

Results

A total of eight living related kidney transplantation were performed between August 2008 and August 2013. The mean age ± SD of the donors was 39.3 ± 8.8 years (range, 28 to 53 years). The age distribution of the donors showed the highest frequency in the age group 36 to 40 years, which was 37.5% of the whole group. The mean age ± SD of recipients was 32.0 ± 9.3 (range, 21-48 years).

Half the donors were male but there was a gender difference in the recipient group, with 6 male recipients (75%) and 2 female recipients (25%). Half the donors and recipients had blood group O+. This was followed in frequency by blood groups A+ and B+ (25%), and lastly B+ and AB+ (12.5%). Among the eight pairs, three donors were siblings of the recipients, three were parents of the recipients, one was the recipient's spouse, and the other was a relative of the recipient.

The main cause of ESRD in the present series was glomerulonephritis with hypertension, seen in five cases, one was due to reflux nephropathy and two had unknown causes. The mean duration of hospital stay for recipients was 27.4 ± 6.7 days (range, 20 to 41 days). Among the recipients, 7 of 8 cases (87.5%) had left to right kidney transplant, while 1 case (12.5%) had right to left kidney transplant because the donor's left kidney had some abnormalities. The average duration of cold ischemic time was 24.6 ± 5.3 min (range, 15 to 31 min) and the mean operative time was 3.36 ± 0.25 hour (range, 3.05 to 4.20 hours) (Table 1).

There was no early or late surgical mortality in the first year after transplantation. A donor had early complications after the nephectomy with fluid collection at the operative site and was successfully treated with antibiotics and drainage. None of the donors had increased serum creatinine or blood

Table 1 Glomerular filtration rate (GFR) before and after Kidney transplantation, cold ischemic time (CIT), and operative time

No.	Donor-Recipient	CIT (min)	Operative time (hour)	Hospital stay (day)	Age (year)	GFR-Before	GFR-After Kidney Transplantation							
							1 month	3 months	6 months	1 year	2 years	3 years	4 years	5 years
1	R1.M	20	3.45	22	26	4.22	77.79	61.06	57.47	77.19	76.62	76.08	76.50	75.56
	D1.M				28	96.80	87.46	86.53	72.43	81.30	83.24	98.94	94.82	82.45
2	R2.M	27	3.30	22	48	4.46	60.01	59.05	56.20	48.49	44.60	44.50	39.76	
	D2.M				32	92.04	57.80	58.09	58.09	60.05	56.94	66.77	66.39	
3	R3.M	26	3.50	26	34	3.43	117.61	124.79	117.61	94.16	94.12	90.91		
	D3.M				36	106.95	73.52	72.81	72.12	63.21	62.87	65.32		
4	R4.F	29	4.20	20	21	2.89	71.10	70.09	70.01	61.45				
	D4.F				40	66.03	77.68	66.03	74.66	73.34	72.98	72.63		
5	R5.M	22	3.15	41	22	5.29	116.12	118.19	73.37	99.87	87.41			
	D5.M				51	80.02	43.61	49.03	48.68	52.23	52.03			
6	R6.M	15	3.05	29	40	3.62	43.52	32.03	30.55	43.50	35.41			
	D6.F				40	86.94	70.10	73.71	73.71	73.34	72.98			
7	R7.M	31	3.10	30	36	5.45	101.60	80.50	66.39					
	D7.F				34	87.27	67.46	67.46	67.46					
8	R8.F	27	3.55	29	29	3.46	66.60	51.47	18.88					
	D8.F				53	79.75	61.64	55.22	49.95					

pressure after the nephrectomies.

During the early period of follow up (three months posttransplantation), a recipient had fluid leakage from their operative wound, which was a suspected lymphocele. The patient was taken back to the operating room and a peritoneal window was made. However, he later developed seizures and severe headache, which on MRI proved to be due to posterior leukoencephalopathy. He was treated with antihypertensive, anticonvulsion medications, and his cyclosporine dosage was reduced.

After three months, the most common complication after transplantation in our hospital was infection. There were six infections. Two recipients developed upper urinary tract infections, one recipient had a varicella infection, and the other had herpes zoster infection and tuberculous pleuritis. All were males and all recovered completely after treatment with appropriate antibiotics and supportive treatment. A female recipient developed a CMV infection that caused her GFR to drop to 18.88 mL/min by 6 months, but she had no major posttransplant surgical complications. Other non-infective complications were bone and metabolic complications with one recipient developing avascular necrosis and required left total hip arthroplasty.

The immunosuppression regimen included methylprednisolone, mycophenolate mofetil (MMF) and cyclosporine, while maintenance therapy comprised of cyclosporine and MMF. Acute graft rejection was not seen in any of the eight recipients, but delayed graft function occurred in one case because of CMV infection. The overall graft survival at 6 months was 100 % while recipient survival at 36 months was also 100%. One recipient died three years after transplantation, of unknown causes. The average hospital stay for the donors was 7 days and for the recipients, 27.4 days (see Table 1). Recipient and donor kidney functions at the time of discharge were all acceptable. At last follow-up, all donors were in excellent health.

Discussion

The first successful kidney transplantation in the human was performed using the recipient's identical twin as a donor in 1954[1,2]. With the advances in immunosuppressive drugs such as prednisone and azathioprine, the use of kidney transplantation became widespread[3,4]. More than 50% of ESRD patients are on chronic hemodialysis world-wide[5]. A significant portion of health care costs is used for these patients.

In the United States, since Medicare bears much of this cost, data analyses were performed during the

1988-1995 period and suggestions made to decrease this economic burden. In one analysis, kidney transplantation was projected to save US$42,000 per patient over a period of 10 years[6]. The quality of life is improved after kidney transplantation compared to dialysis, and the majority of dialysis patients preferred a kidney transplant[7].

In the USA, from 1988 to 1995, the median waiting time for a kidney transplant increased from 400 days to 842 days[8]. This severe shortage of organs has led to exploring ways to increase the donor pool, including using marginal kidneys, allowing for higher donor age, using non-heart-beating donors, and developing more effective immunosuppression drugs. Living organ donation is the favored option due to the excellent graft and patient survival rates[5,6,8,9-12].

Data from the United Network of Organ Sharing (UNOS) reported in the US that 1 year patient and graft survival rates of living-related kidney transplants were 97.5% and 95.7% respectively[10]. The establishment of Suratthani Hospital's kidney transplant program is relatively recent but has provided the opportunity for many patients from all parts of upper southern Thailand to seek treatment at this center. In the past, patients in the upper south of Thailand who needed a kidney transplant had to travel to medical centers in Bangkok or abroad to seek such treatment. During the five years at Suratthani Hospital, the general attitude towards kidney transplantation has changed considerably, with more family members willing to donate organs for relatives on dialysis. There has been a steady increase in the number of patients requiring dialysis and a further steady increase is expected over the following years.

The one delayed graft function in the present study was due to CMV infection six months after renal transplantation. There was no acute rejection, and a graft survival rate of 100% in three years after surgery is comparable to that of studies from other countries[2-4]. Kim et al[14] in 1999 reported the benefit of MMF, cyclosporine and prednisolone-based triple-therapy in reducing the incidence of acute rejection after living donor renal transplantation, and this regimen was used at our center. The reported one-year graft survival among groups receiving similar immunosuppressive protocol to ours was as high as 92% to 100%[15]. There was no vascular complication at our center, probably due to improved surgical technique.

The introduction of cyclosporine has revolutionized the practice of solid organ transplantation. Cyclosporine-based regimen was used in our transplant patients, since it was associated with improved early and long-term graft and patient survival[16].

The long-term renal consequences of kidney donation by living donors are attracting increased interest. A number of studies have suggested that living kidney donors have similar survival rates to that of non-donors and that their risk of ESRD is not increased. Most donors have normal glomerular filtration rate, normal albumin excretion, and an excellent quality of life. However, some studies have observed that the quality of life of donors may be lower than usual and may be at risk of experiencing more stressful life events. Therefore, medical care should continue for donors for some time to compensate for mental and psychosocial problems[17].

Cytomegalovirus is considered the most important infectious cause of mortality and morbidity in organ transplant recipients. A recipient who is negative for the anti-cytomegalovirus IgG antibody and receives an allograft from a positive donor, has a greater chance of developing cytomegalovirus disease and poorer survival. At our center, a case of cytomegalovirus-positive recipient had delayed graft function six months after renal transplantation

At our center, none of the donors developed any renal disease post-nephrectomy. Some studies reported a small incidence (0.5%) of minor complication[18]. We routinely follow the serum creatinine and urine analysis of donors for six months, and have found no significant health problems.

Conclusions

Our experience with living renal transplantation has been similar to that of other centers. The success of our renal transplantation program was due to the combined efforts of general surgeons, urologists, nephrologist, and transplant coordinators. Most of medical centers have the facility to run such a program. Being well-trained will be key to the success of these transplantation programs.

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