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Research Article

Kidney Transplantation in the New Hospital Model in Turkey: 3 Years of Experience in Ankara City Hospital

Türkiye'de Yeni Hastane Modelinde Böbrek Nakli: Ankara Şehir Hastanesi'nde 3 Yıllık Deneyim

Mehmet Yilmaz[1], Mehmet Emin Sirin*[2], Mustafa Karaaslan[3], Muhammed Emin Polat[4], Esin Olcucuoglu[5], Erkan Olcucuoglu [4]

[1]Asklepios Klinik Triberg, Urology, Triberg, Germany

[2]University of Health Sciences, Dışkapı Yıldırım Beyazıt Training and Research Hospital, Department of Urology, Ankara,Turkey

[3]Clinic of Urology, Private A life Hospital, Ankara, Turkey

[4]University of Health Sciences, Ankara City Hospital, Department of Urology, Ankara, Turkey

[5]University of Health Sciences, Ankara City Hospital, Department of Radiology, Ankara, Turkey

Abstract

Aim: City hospitals, as a new model hospital, started to serve in approximately 20 different cities in Turkey. In this study, we aimed to present the 3 years experience of Ankara City Hospital kidney transplant unit, which has exceeded 100 cases, as a new hospital model.

Materials and Methods: We retrospectively collected the data of 101 end-stage renal disease patients who underwent live or cadaveric kidney transplantation in the Department of Urology at Ankara City Hospital. The demographic data of the recipient and donor, postoperative complications, patient survival and graft functions were recorded.

Results: Patient and graft survival rates of the recipients were 96% and 98% at 36 months follow-up, respectively. The median serum creatinine level at post-op first day, 1 months, 6 months, 12 months, 18 months, 24 months and 36 months posttransplantion was 1,3 (range, 0,7-5,7) mg/dl, 1,3 (range, 0,8-1,7) mg/dl, 1,3 (range, 0,8-2,5) mg/dl, 1,3 (range, 0,7-2) mg/dl, 1,2 (range, 0,8-1,9) mg/dl, 1,4 (range, 0,8-2,4) mg/dl and 1,4 (range, 1-2,4) mg/dl, respectively. 6 (5,9%) patients with urinoma were treated conservatively with urinary catheterization and percutaneous drainage. Renal artery stenosis was observed in 2 (2%) patients.

Conclusion: Kidney transplantation is still the most important treatment option for ESRD patients in Turkey as in the world. In our center, we observed that graft function results were acceptably good at 36 months follow-up.

Keywords: city hospital, graft function, kidney transplantation

Corresponding Author*: Mehmet Emin Sirin, MD, University of Health Sciences, Dışkapı Yıldırım Beyazıt Training and Research Hospital, Department of Urology, Ankara,Turkey
E-mail: emin_sirin@hotmail.com
ORCID ID: 0000-0003-1186-2856
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Öz

Amaç: Şehir hastaneleri, yeni bir model hastane olarak Türkiye'de yaklaşık 20 farklı ilde hizmet vermeye başlamıştır. Bu çalışmada, Ankara Şehir Hastanesi böbrek nakli ünitesinin 100 vakayı aşan 3 yıllık deneyimini sunmayı amaçladık.

Gereç ve Yöntemler: Ankara Şehir Hastanesi Üroloji Kliniğinde canlı veya kadavradan böbrek nakli yapılan 101 son dönem böbrek (SDBH) hastasının verileri retrospektif olarak toplandı. Alıcı ve vericinin demografik verileri ameliyat sonrası komplikasyonlar, hasta sağkalımı ve greft fonksiyonları kaydedildi.

Bulgular: Hasta ve greft sağkalım oranları sırasıyla %96 ve %98 idi. Post-op ilk gün, 1 ay, 6 ay, 12 ay, 18 ay, 24 ay ve 36 ay sonraki ortanca serum kreatinin düzeyi 1,3 (aralık, 0,7-5,7) mg/dl, 1,3 (aralık, Sırasıyla 0,8-1,7) mg/dl, 1,3 (aralık, 0,8-2,5) mg/dl, 1,3 (aralık, 0,7-2) mg/dl, 1,2 (aralık, 0,8-1,9) mg/dl, 1,4 (aralık, 0,8-2,4) mg/dl ve 1,4 (aralık, 1-2,4) mg/dl olarak bulundu. Ürinomu olan 6 (%5,9) hastalar üriner kateterizasyon ve perkütan drenaj ile konservatif olarak tedavi edildi. Renal arter stenozu 2 (%2) hastada gözlendi.

Sonuçlar: Böbrek nakli, dünyada olduğu gibi Türkiye'de de SDBH hastaları için halen en önemli tedavi seçeneğidir. Merkezimizde 36 aylık takipte greft fonksiyon sonuçlarının kabul edilebilir derecede iyi olduğunu gözlemledik.

Anahtar Kelimeler: böbrek nakli, greft fonksiyonu, şehir hastanesi

Introductıon

Kidney transplantation is the most effective and successful treatment method for end-stage renal disease (ESRD) [1]. Kidney transplantation not only improves the quality of life of patients, but also significantly reduces the loss of workforce compared to hemodialysis [2, 3]. The successful outcomes in kidney transplantation are rising day by day with the increase in knowledge organs and tissues, developments in surgical technique, and new and effective immunosuppressive drugs [4]. An accumulated clinical experience and harmonious teamwork including experienced surgeon, nephrologist and nursing care are important for obtaining of successful outcomes after kidney transplantation.

In 2017, city hospitals, as a new model that firstly executed in Mersin, Yozgat and Isparta, started to serve in approximately 20 different cities. In the city hospital model, many hospitals in that city were brought together under a single roof and a larger and more complex system was established. Ankara City Hospital (ACH) has emerged as a large complex hospital which structure formed by the combination of the Turkey Yüksek İhtisas Training and Research Hospital, Ankara Numune Training and Research Hospital, Ankara Atatürk Training and Research Hospital, Zekai Tahir Burak Women's Health Education and Research Hospital, Physical Therapy and Rehabilitation Hospital, Diskapi Child Health and Hematology Hospital. In addition to the disadvantages of such a structure, which has a bed capacity of approximately 4000 and consists of multiple sub-units, such as difficulty in coordinating, difficulties in working with different echools; it has advantages such as creating synergy arising from the coexistence of differences. In this study, we aimed to present the 3 years experience of xxxx Hospital kidney transplant unit, which has exceeded 100 cases, as a new hospital model.

Material and Methods

This study was conducted in accordance with the Declaration of Helsinki and all patients have given written informed consent. After obtaining approval from the institutional review board (IRB number: E2-22-2076 Date: 06/07/2022), we retrospectively collected the data of 101 ESRD patients who underwent live or cadaveric kidney transplantation in the Department of Urology at xxxxx Hospital. The demographic data of the recipient and donor (age, gender and body mass index-BMI) postoperative complications, patient survival and graft functions were recorded. Recipient serum creatinine levels were recorded at intervals up to 3 years after transplantation. The eGFR was calculated using the Modification of Diet in Renal Disease (MDRD) equation [5]. Immunological suitability assessment of all patients was performed. Contrast-enhanced computer tomography was performed for kidney anatomy of living donors. In addition, 24-hour urine creatinine clearance (≥80 ml/min) and proteinuria (≤150 mg/day) were measured.

All living donors underwent laparoscopic transperitoneal donor nephrectomy. The left kidney was the first choice. The donated kidney was placed in the right iliac fossa of the recipient. Vascular anastomosis was performed to the external iliac artery and vein. Ureteroneocystostomy was performed with a double-J ureteral catheter using the antireflux Lich-Gregoir technique. The mean time for ureteral double-j stent removal was 3 weeks.

For the induction treatment, methylprednisolone and basiliximab/anti-thymocyte globulin-ATG were used as immunosuppression in the recipients. Patients who developed

acute cellular and vascular rejection were treated with pulse methylprednisolone (500 mg × 3/day). Plasmapheresis and IVIG (Intravenous Immunoglobulin) were applied in cases with acute humoral rejection.

Statistical analysis

Statistical Package for Social Sciences (SPSS), version 22.0 (SPSS Inc. Chicago, USA) computer package program was used for statistical analysis of the research data. In the descriptive statistics section, categorical variables are presented as numbers, percentages, and continuous variables are presented with median (smallest-largest value).

Results

Between March 2019 and June 2022, 101 patients with ESRD underwent renal transplantation in xxxxx Hospital. Table 1 shows the demographic and clinics characteristics of the study population. Of the donor kidneys, 76 (75.2%) kidneys were obtained from living donors and 25 (24.8%) kidneys obtained from cadaveric donors. Of 101 donors, 76 had single artery, 18 had 2, and 1 had 3 renal arteries. The median recipient age was 35 years (median, 15 –67 years) and male-to-female ratio of recipients was 68/33. The median donor age 43 was years (range, 19-68 years) and male-to-female of donors ratio was 56/45. The etiology of ESRD consisted of 49 (48.5) systemic disease (hypertension, diabetes mellitus), 12 (11.9%) glomerular disease, and 5 (5%) autosomal dominant polycystic kidney disease, 5 (5%) miscellaneous, 16 (15.8%) other diseases and 14 (13%) patient with unknown etiology.

Table 2 shows the post-operative complications of renal transplant recipients. No surgical complications were observed in the donors. Rejection developed in 12 patients with humoral rejection in 6 (5,9%), cellular in 3 (3%) and acute vascular in 3 (3%) patients. 2 of patients who developed rejection underwent graft nephrectomy. 6 (5,9%) patients with urinoma were treated conservatively with urinary catheterization and percutaneous drainage. Perirenal hematoma occured in 5 (5%) patients, but no surgical intervention was required. Perirenal hematomas resolved spontaneously with conservative follow-up. Seven cases (%6.9) that developed lymphocele were managed with percutaneous drainage. 20 (19,8%) patients who had infections for various reasons (urinary tract infections, wound infections, fever of unknown origin, upper respiratory tract infection and bacteremia) were treated with medical treatment; however, 2 needed peri-renal abscess drainage. Renal artery stenosis was observed in 2 (2%) patients who were conservatively followed. Deep vein thrombosis (DVT) occurred in one patient (1%) which was managed with anticoagulation. In one (1%) patient, ureteroneocystostomy (UNC) stenosis occured 3 months after the transplantation. 4 (4%) recipient deaths occurred after transplantation. 2 of the deaths occurred during the first and fourth month after transplantation due to severe sepsis. 1 patient died in the first week due to bleeding. The last patient died due to myocardial infarction (MI) in the 3rd month of follow-up.

Table 1: Baseline Demographic and Clinical Characteristics of the Study Population

Variables	N=101
Recipient	
Sex	
Male/Female	68/33
Age, yr	35 (15-67)
BMI, kg/m2	23,7 (16,3-42)
Smoking, n(%)	15 (14,9)
ABO, n(%)	
A	35 (34,7)
B	19 (18,8)
O	42 (41,6)
AB	5 (5)
Dialysis time, m	12 (0- 156)
Hospital stay, day	21 (8- 55)
Etiology of ESRD, n (%)	
Systemic disease (diabetes mellitus or arterial hypertension)	49 (48,5)
Autosomal dominant polycystic kidney disease	5 (5)
Glomerular disease	12 (11,9)
Miscellaneous	5 (5)
Other	16 (15,8)
Unknown	14 (13,9)
Donor	
Sex	
Male/Female	56/45
Age, yr	43 (19- 68)
ABO, n(%)	
A	31 (30,7)
B	17 (16,8)
O	51 (50,5)
AB	2 (2)
Number of graft arteries, n (%)	
1	76 (75,2)
2	18 (17,8)
3	1 (1)
Nephrectomy side, n (%)	
Left	74 (73,3)
Right	27 (26,7)
Cadaveric donor, n (%)	25 (24,8)
Warm ischemia time, min	2 (1,5- 5)
HLA mismatch	4 (0-6)

BMI;body mass index, ESRD; end-stage renal disease , HLA; human leukocyte antigen

Table 2: Postoperative Complications	
Complications	n (%)
Humoral rejection	6 (5,9)
Cellular rejection	3 (3)
Acute vascular rejection	3 (3)
Acute tubular necrosis (ATN)	2 (2)
Urinoma	6 (5,9)
Hematoma	5 (5)
Lymphocele	7 (6,9)
Infection	20 (19,8)
UTI	6 (30)
Surgical wound infection	3 (15)
Fever of unknown origin	7 (35)
Upper respiratory tract infection	1 (5)
Bacteremia	1 (5)
Peri-renal abscess	2 (10)
BK virus nephropathy	1 (1)
Arterial stenosis	2 (2)
UNC stenosis	1 (1)
Cardiovascular (ACS and DVT)	2 (2)
Delayed graft function	1 (1)
Graft nephrectomy	2 (2)
Death	4 (4)
UTI; urinary tract infection, UNC; ureteroneocystostomy, ACS; Acute Coronary Syndrome, DVT; Deep Vein Thrombosis	

Table 3 shows the graft functions of the recipients at 36-month follow-up. Patient and graft survival rates of the recipients were 96% and 98%, respectively. The median serum creatinine level at post-op first day, 1 months, 6 months, 12 months, 18 months, 24 months and 36 months posttransplantion was 1,3 (range, 0,7 - 5,7) mg/dl, 1,3 (range, 0,8 - 1,7) mg/dl, 1,3 (range, 0,8 - 2,5) mg/dl, 1,3 (range, 0,7 - 2) mg/dl, 1,2 (range, 0,8 - 1,9) mg/dl, 1,4 (range, 0,8 - 2,4) mg/dl and 1,4 (range, 1 - 2,4) mg/dl, respectively.

Discussion

According to the United States Renal Data System Annual Data Report 2021, Turkey ranked 10th among countries with >50% residual incidence of renal transplantation between 2009 and 2019 [6]. From a historical perspective, the first living kidney transplant from a mother to her 12-year-old child was performed successfully at Hacettepe University Hospital on November 3, 1975 [7]. As it was not legally possible at that time, kidney transplantation from a cadaver using an organ provided by Eurotransplant was performed for the first time in Turkey in 1978 [7]. In 1979, with the preparation of the legal ground, kidney transplantation from a cadaver was performed for the first time [8]. Since then, kidney transplantations have been performed at an increasing rate in many centers in Turkey. As of

Table 3: Serum Creatinine, Glomerular Filtration Rate and Hemoglobin Values During the Follow-Up								
	Pre-op	Post-op first day	1th month	6th month	12th month	18th month	24th month	36th month
Hg (g/dl)	10,5 (6,1- 14,6)	9,2 (8,6- 10,2)						
SCr (mg/dL)	7 (2,8- 15,5)	1,3 (0,7- 5,7)	1,3 (0,8- 1,7)	1,3 (0,8- 2,5)	1,3 (0,7- 2)	1,2 (0,8- 1,9)	1,4 (0,8- 2,4)	1,4 (1- 2,4)
GFR (mL/ min/1.73 m2)	8 (3- 23)	71,5 (9- 104)	60 (47- 91)	58 (33- 101)	59,5 (44- 95)	63 (45- 83)	54,5 (34- 83)	60,5 (33- 67)
SCr; serum creatinine, GFR; glomerular filtration rate, Hg;hemoglobin								

2022, there are 78 kidney transplant centers in Turkey [9].

In 20% of transplantation centers in Turkey, kidney transplantation is performed by urologists [10]. Renal transplantation in Ankara City Hospital is primarily performed by urologists. The first patient with end-stage renal disease admitted to ACH on 07.02.2019 and the first kidney transplant was performed on 04.03.2019 as a living kidney transplant. Since 2019, kidney transplantation at ACH has exceeded 100 cases and is being successfully implemented. As one of the 78 kidney transplant centers in Turkey, in our center, GFR and serum creatinine values of renal transplanted patients at 36 months indicate that graft function is acceptably good in the mid-long term.

Complications after kidney transplantation are still important issues. Especially urologic and vascular complications are the most prominent problems. In studies conducted in the last 30 years, the incidence of urologic complications after renal transplantation ranged between 3.7%-6.0% [11]. The most important urologic complication is urinoma after urinary leakage. Urinary leakage has been reported up to 6% in the literature [11, 12]. Urinoma may compress the graft vascular structures and cause graft dysfunction [11]. In addition, urinoma can become infected and lead to perinephritic abscesses in the kidney recipient, which can endanger the patient's life [13]. In our study, urinoma was detected at a rate of 5.9%, which is consistent with the literature. Infected urinoma was not seen in any patient. Similarly, postoperative lymphocele formation is one of the most common postoperative complications in kidney recipients, with a rate of 12-40% [14]. The management of lymphocele includes the use of sclerotic agents or routine drainage [15]. In the present study, lymphocele occured in 7 (6.9%) patients in accordance with the literature. We preferred

to manage the lymphocele with percutaneous drainage.

Vascular complications are seen in 3-15% of kidney recipients [16]. The most common vascular complications are renal artery stenosis and vein thrombosis in kidney recipients [17]. The incidence of renal artery stenosis in kidney recipients has been reported to vary between 1-23% [18]. In the present study, renal artery stenosis in kidney recipients occured in the rate of 2% at acceptable rates compared to those reported in the literature. Furthermore, we did not observe renal vein thrombosis in any recipient patient. However, DVT occurred in one patient (1%). DVT was managed with anticoagulant therapy.

UNC stenosis can be seen in 2-10% of the patients within 3 months after kidney transplantation [19]. One patient (1%) in the present study who suffered from UNC stenosis managed with long-term double J stent application 3 months after kidney transplantation. UNC stenosis rate in the present study is also acceptable according to literature.

Study limitations

The present study has some limitations to be acknowledged. Our study was designed retrospectively. Furthormore, the study has different donor charachteristics and follow-up was not long-term. It should be noted that living donor kidney transplantation is more common in our center (75%), which leads to better graft outcomes.

Conclusion

Kidney transplantation is still the most important treatment option for ESRD patients in Turkey as in the world. In our center, we observed that graft function results were acceptably good at 36 months follow-up. We believe that the number of patients waiting on the kidney transplant list will decrease with the increase in medical centers that perform kidney transplantation like our center and with experienced transplant surgeons in these centers.

Ethics Committee Approval

Ankara City Hospital Institutional Review Board approved this study (IRB number: E2-22-2076 Date: 06/07/2022).

Conflict of Interest

No conflict of interest was declared by the authors.

Financial Disclosure

The authors declared that this study has received no financial support.

Consent to participate

Informed consent was obtained from all individual participants included in the study.

Authorship Contributions

Concept – MY, MEP, EÖ; Design – MY, MK, MEŞ, EsÖ; Supervision – EÖ, MEŞ; Data collection and/or processing – MEP, MK, EsÖ; Analysis and/or interpretation – MY, MEP, MK; Literature review – MY, MK, MEŞ; Writing – MY, MEP, MK, MEŞ, EsÖ; Critical review – EsÖ, EÖ.

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