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EARLY AND LONG-TERM OUTCOMES OF DECEASED-DONOR KIDNEY TRANSPLANT IN RECIPIENTS 70 YEARS OF AGE AND OLDER

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Introduction. The high prevalence of chronic kidney disease (CKD) has a negative impact on the length and quality of life of patients, especially in the older age group. Renal replacement therapy is required when the disease progresses to end-stage renal failure. In elderly patients with comorbidities, dialysis therapy has its own peculiarities and challenges, often prolonging life for a short period. The increase in the number of patients aged ≥70 years requesting to be placed in the kidney transplant waitlist (KTWL) at Sklifosovsky Research Institute of Emergency Care has led to the need to evaluate kidney transplant (KT) outcomes in this patient cohort. **Objective.** To analyze the early and long-term outcomes of deceased-donor KT in recipients aged ≥70 years. **Materials and methods.** The retrospective study included 23 kidney recipients aged ≥70 years who underwent a deceased-donor KT in the period from 2014 to 2023 at the Kidney and Pancreas Transplantation Department, Sklifosovsky Research Institute of Emergency Care. Recipient survival was computed using the Kaplan–Meier estimate. **Results.** Sixteen recipients (69.6%) had primary function and 7 (30.4%) had delayed function. Nineteen recipients (82.6%) showed a drop in blood creatinine below 200 μmol/L after KT. Hospital, 1- and 3-year survival were 96% (n = 22), 84.8% [95% CI 72–95] and 79% [95% CI 65–92], respectively; 1- and 3-year graft survival were 84.8 [95% CI 72–95] and 73% [95% CI 59–87], respectively. **Conclusion.** KT for patients aged ≥70 is a feasible treatment option for CKD stage 5.

Keywords: kidney transplantation, kidney recipients aged ≥70, recipient survival, kidney graft survival, kidney transplant outcomes.

INTRODUCTION

Over the past 20 years, there has been an increase in the number of patients aged ≥70 years with stage 4–5 chronic kidney disease (CKD). According to the 2019 World Health Organization report, kidney diseases have become one of the world's top 10 leading causes of death, rising from 18th to the 10th position over a nine-year period, with mortality increasing from 813,000 to 1.3 million [1, 2]. The rise in CKD mortality is most common among individuals aged ≥70 years [2]. Patients can now receive renal replacement therapy (RRT) and save their lives all thanks to improved CKD detection, higher-quality medical care, and the establishment of new dialysis facilities nationwide. Kidney transplantation (KT) is known to be associated with lower mortality and higher quality of life compared to dialysis-based RRT. It is also more cost-effective [3].

In elderly patients, the choice between dialysis and KT may be difficult due to possible adverse outcomes and the heterogeneity of this group in terms of associated geriatric syndromes [4, 5]. Over the last decade, we have seen a rise in the number of potential recipients who are 70 years of age or older in our waiting list. The world is showing a similar trend. In Europe, for instance, the average age of kidney recipients has increased by 10 years over the past two decades, while the proportion of patients aged 65–74 years on the waiting list in the United States rose from 2% in the 1990s to over 10% in 2012 [6]. The number of KTs done on the elderly is increasing because of the aging population [7].

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There is currently no consensus among specialists regarding early and long-term outcomes of KT in patients of this age group, and there are still questions about whether transplantation is necessary when there is comorbid pathology present, which increases the risk of an adverse outcome. A meta-analysis by Artiles et al. revealed lower 5-year survival rates for allogeneic kidney transplant (AKT) recipients aged ≥70 years at any point during the postoperative period [8].

Based on an analysis of the outcomes of 10,651 KTs performed in Australia and New Zealand from 2000 to 2015, of which 279 (2.6%) were KTs to elderly adults (older than 70 years), Doucet et al. reported a lower 5-year survival for age-matched recipients. However, the authors noted that this cohort of patients received AKT predominantly from elderly donors and expanded criteria donors [9]. Greg A Knoll stated in a publication that despite lower survival with KT in the group of patients over 65 years of age when compared with survival in the 30–49-year-old recipient group (61% vs. 75%, respectively), older kidney recipients had survival rates 40–60% higher than those of patients who received dialysis-based RRT [10]. Similar data have been reported by nephrologists from Spain [11].

In our country, there are reports of rare cases of KT in patients older than 70 years old. Therefore, it was decided to evaluate KT outcomes in patients of this age group at the Sklifosovsky Research Institute of Emergency Care.

Objective: to analyze the early and long-term outcomes of deceased-donor KT in recipients aged ≥70 years.

MATERIALS AND METHODS

The study is based on a retrospective review of the outcomes of 23 KT procedures performed at Sklifosovsky Research Institute of Emergency Care from 2014 to 2023 in recipients aged ≥70 years. Inclusion criteria were primary KT from a deceased donor and recipient age 70 years and above. Exclusion criteria were recipient age less than 70 years, KT from a living related donor, KT combined with other organs. The patients were followed up from the moment of KT until graft loss or recipient death.

Study

To assess recipient and AKT survival rates, we used data from the medical records and case histories of patients at the kidney transplant of Sklifosovsky Research Institute of Emergency Care, and outpatient charts of AKT recipients at the Moscow Applied Research Center of Transplanted Kidney Nephrology and Pathology.

Recipients

The study group consisted of 23 kidney recipients. The median age was 72 [70–77] years. Gender distribution: 13 (57%) men and 10 (43%) women. The diseases that led to stage 5 CKD were chronic glomerulonephritis (9, 39.1%), hypertensive nephroangiosclerosis (7, 30.4%), chronic pyelonephritis (3, 13%), polycystic disease (2, 8.7%), urolithiasis (1, 4.4%), and type 2 diabetes mellitus (1 4.4%). Most patients (20 people, 87%) were receiving RRT dialysis at the time of KT, of whom 17 patients (73.9%) through dialysis, three recipients (13%) through hemodialysis, and 3 (13%) patients with a glomerular filtration rate (GFR) <15 mL/min were scheduled to commence dialysis therapy.

Donors

Donor median age was 60 [48–68] years. Gender distribution: 12 (52%) men and 11 (48%) women. All KT were from donors with confirmed brain death resulting from acute stroke (18, 78.3%) and head injury (5, 22%). Donors' median blood creatinine and urea levels at the time of graft procurement were 101.6 [53–214] μmol/L and 7.7 [2.7–14.4] mmol/L, respectively. Bacteriological examination of donor kidney perfusate was negative at all KTs.

Transplantation

AKT was allocated to a specific KTWL patient, determined by the Moscow Coordinating Centre for Organ Donation, taking into account blood group, number of matches for A, B, Dr antigens of the major histocompatibility complex in the donor-recipient pair and negative lymphocytotoxic test. There were mismatches for 5 HLA antigens in 10 donor-recipient pairs (43%), for 4 HLA antigens in 9 pairs (39%), and for 3 HLA antigens in 3 pairs (13%).

KT was performed according to the standard technique: the AKT was placed in the iliac region, its vessels were anastomosed with the recipient's external iliac artery and vein, and the AKT ureter was anastomosed with the recipient's bladder. Median AKT preservation time was 15 [14–17] hours.

Immunosuppressive therapy

In order to prevent graft rejection, 18 recipients (78%) received induction immunosuppressive therapy (IST) – monoclonal antibodies in 15 recipients (65%) and polyclonal antibodies in 3 (13%). Basic triple-medication immunosuppressive therapy, consisting of calcineurin inhibitors, inosine monophosphate dehydrogenase or proliferative signaling inhibitors, and corticosteroids, was administered to all patients. So, 14 recipients (61%) received cyclosporine as the primary IST medication, and 9 (39%) received tacrolimus. Twenty recipients

(87%) received mycophenolic acid as the second IST medication, while three (13%) received everolimus.

Initial kidney transplant function was considered primary if there was diuresis and no dialysis was required within the first 7 days following KT; it was considered delayed if RRT dialysis was needed within the first 7 days after the procedure.

The software program Statistica for Windows v.12.0, developed by StatSoft Inc. (USA), was used to conduct a statistical analysis of data obtained. Nominal data were described with median (Me) and 95% confidence interval. The Kaplan–Meier estimate was used for survival analysis. Survival confidence intervals were considered by Weibull's method. Survival curves were computed starting on the day of surgery.

RESULTS

Sixteen recipients (69.6%) had primary initial AKT function, while 7 (30.4%) had delayed AKT function. At the time of hospital discharge, creatinine levels ranged from 84 to 133 μmol/L in 7 recipients, 134 to 200 μmol/L in 9 recipients, above 200 μmol/L in 6 recipients, and above 600 μmol/L in 1 recipient. In 16 recipients, blood creatinine levels decreased to less than 200 μmol/L throughout a range of 1 to 25 days, with a median of 7 (3–15) days. The levels took two to five months to return to normal in three patients (13%); in another three patients, blood creatinine dropped to 350 μmol/l.

In-hospital recipient survival was 96% (n = 22). In one case (4%), the recipient died from severe sepsis and multiorgan failure on the background of spontaneous colon perforation. One-year and 3-year survival rates were 84.8% [95% CI 72–95] and 79% [95% CI 65–92], respectively (Fig. 1).

There were 3 deaths in the late postoperative period (three-year period). Renal graft was adequately functioning at the time of their death. The causes of death were oncologic complications (n = 1), intestinal obstruction (n = 1), and pneumonia (n = 1). It should be noted that patient deaths occurred within the first year after transplantation.

One-year and 3-year AKT survival rates were 84.8% [95% CI 72–95] and 73% [95% CI 59–87], respectively (Fig. 2).

Long-term survival of both recipients and grafts is currently difficult to assess, as most recipients underwent KT after 2019. To date, there are two observations of 7-year survival in recipients over 70 years of age with functioning AKT.

DISCUSSION

Dialysis-based RRT methods significantly reduce the quality of life of patients with stage 4–5 CKD who endure persistent mental and physical discomfort [12–14]. Even with advancements in RRT dialysis, death rates are still high, particularly among elderly patients. The quality of life of hemodialysis patients is closely linked to a higher risk of death [15]. These considerations unquestionably help to expand the options for transplant treatment for CKD.

Our initial KT outcomes in patients aged ≥70 years are optimistic. In-hospital, 1- and 3-year recipient survival rates were 96%, 84.8% and 79%, respectively; AKT survival rates were 96%, 84.8% and 73%, respectively. It should be noted that patients were carefully selected for the KTWL, and if concomitant comorbid pathology was detected, it was corrected provided that patients were highly committed to therapy and strictly followed

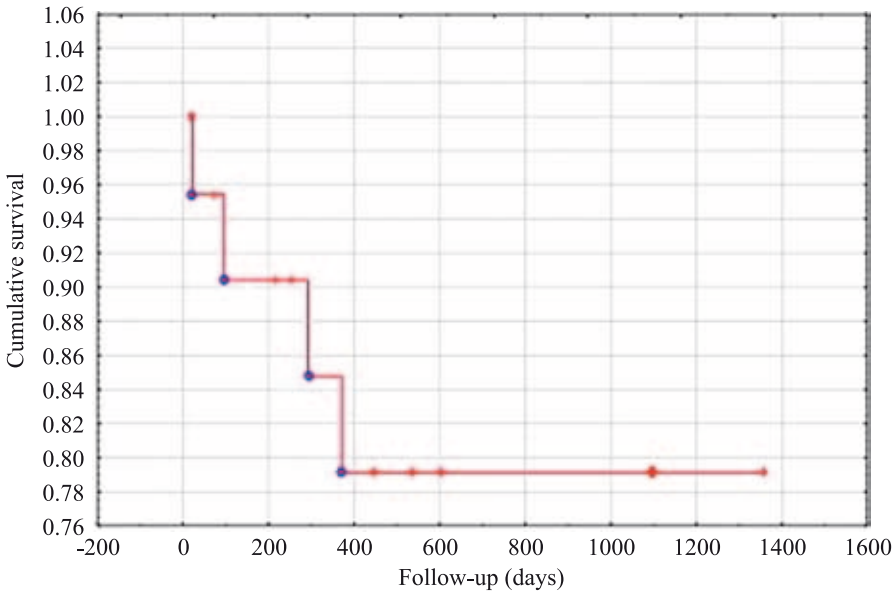

Fig. 1. Survival markers: completed follow-up (blue circle), censoring (red cutoff)

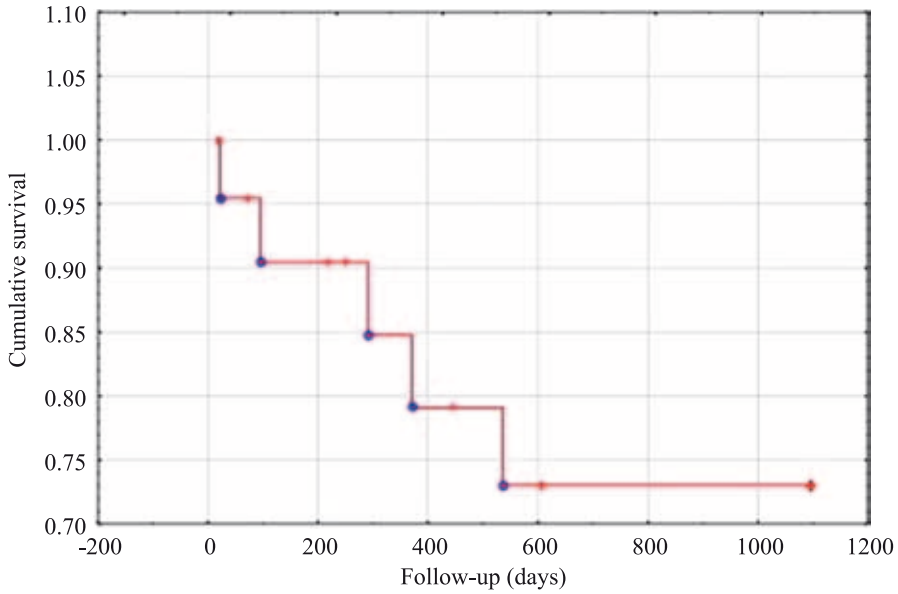

Fig. 2. Kidney graft survival. Survival markers: completed follow-up (blue circle), censoring (red cutoff)

guidelines. Given the significant risk of death in the first year following transplantation, a careless attitude to KT among patients aged 70 and older may lower their survival rate. For example, all deaths in the late postoperative period occurred within the first year after transplantation. A French study based on the REIN registry reported the importance of early referral of age-matched patients to a nephrologist, since nephrological 1-year follow-up before dialysis is linked to better survival and a higher likelihood of KT [16].

CONCLUSION

With a balanced approach and careful screening of potential AKT recipients for placement in the KTWL, KT is a viable and effective treatment modality for stage 4–5 CKD in individuals aged 70 years and above.

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