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Benefits of early transplantation in patients with chronic renal failure undergoing coronary revascularization

Amil Huseynov[1]*, Sabri Tekin[2], Sevim Kuslu Cicek[2], Murat Tuncer[1]

1 Medicana Hospital, Department of Transplantation, Istanbul, TR
2 Biruni University, School of Medicine, Department of General Surgery, Istanbul, TR

*** Corresponding Author**: Amil Huseynov **E-mail:** atu-boy@hotmail.com

ABSTRACT

Objective: This study aimed to evaluate the effectiveness of post-revascularization surgery in reducing future cardiac events among kidney transplant candidates. Additionally, the role of non-invasive diagnostic techniques and the use of coronary angiography in determining the prognosis of patients scheduled for kidney transplantation were examined.

Material and Methods: A retrospective analysis was conducted on 202 renal transplant recipients who underwent their first coronary revascularization procedure after initiating renal replacement therapy between January 2021 and December 2021. Demographic data collected included patient age, sex, race, duration of prior end-stage renal disease, and primary renal diagnosis.

Results: The study population consisted of 120 men and 82 women, with a mean age of 56.9 years. Diabetes mellitus (DM) and hypertension (HT) were present in 58.4% and 89.6% of the patients, respectively. Coronary angiography was performed in 30% of patients considered at risk. The median graft rejection time was 145 days according to Kaplan-Meier analysis.

Discussion: Coronary artery disease (CAD) has a significant negative impact on the pre-, intra-, and post-transplant survival of patients with chronic kidney disease. Myocardial revascularization is recommended in selected patients with unstable cardiac symptoms or chronic kidney disease, providing long-term survival benefits. Collaborative decision-making between cardiologists and nephrologists is crucial to provide optimal care for this high-risk patient population. Lifestyle modifications, risk factor control, and careful patient selection for myocardial revascularization are key in managing coronary artery disease in chronic kidney disease patients.

Conclusion: Managing coronary artery disease in chronic kidney disease patients, especially those who are candidates for kidney transplantation, requires a comprehensive approach. Optimal treatment strategies should consider the intricate relationship between cardiovascular and renal factors. Collaborative care involving cardiologists, nephrologists, and transplant specialists, as well as a focus on both myocardial revascularization and medical therapy, can lead to improved outcomes. Further research is needed to refine treatment guidelines and strategies for this high-risk patient population.

Keywords: Transplantation, cardiac dysfunction, Renal Failure

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INTRODUCTION

Cardiovascular disease (CVD) represents a major cause of morbidity and mortality among kidney transplant candidates on the waiting list and the leading cause of death in transplant recipients (1). Therefore, conducting comprehensive CVD screening before transplantation in clinical settings is crucial to mitigate potential risks and enhance long-term outcomes. In asymptomatic patients with chronic kidney disease, coronary artery disease (CAD) is frequently detected, with prevalence estimates of 37-53% for stenosis in at least one coronary artery (2, 3).

Given this context, our study aims to systematically evaluate the effectiveness of post-revascularization surgery in reducing future cardiac events among kidney transplant candidates. Additionally, we will examine the role of non-invasive diagnostic techniques and coronary angiography in determining the prognosis of patients scheduled for kidney transplantation. By providing insights into the impact of these interventions on the overall management and outcomes of kidney transplant candidates, our research seeks to inform best practices in the clinical management of this high-risk population.

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MATERIAL and METHODS

In this retrospective study, we analyzed the outcomes of 202 renal transplant recipients who underwent their first coronary revascularization procedure (excluding concomitant valvular surgery) after initiating renal replacement therapy between January 2021 and December 2021. The study protocol was in accordance with the Declaration of Helsinki and was approved by the Institutional Review Board (approval number: 2022/21). Demographic data collected included patient age, sex, race (excluding separate identification of Hispanic patients), duration of prior end-stage renal disease (ESRD), and primary renal diagnosis.

RESULTS

From January 1, 2021, to December 31, 2021, a total of 202 chronic kidney failure (CRF) patients were referred for routine cardiology evaluation without undergoing transplantation at our hospital. The study population consisted of 120 (59.4%) men and 82 (40.5%) women with a mean age of 56.9 ± 8.4 years (range, 34-71 years). Diabetes mellitus (DM) and hypertension (HT) were present in 58.4% and 89.6% of the patients, respectively (Table 1). Two patients received a second kidney transplant, and one received a third one. Coronary angiography was performed in 61 (30%) at-risk patients after the evaluation. Eighteen patients in the risk group underwent stenting after the procedure, while bypass surgery was decided for 11%. In 7 patients with accompanying bypass, transplantation was performed under anticoagulation therapy, and two patients required reoperation due to hematoma causing pressure on the kidney secondary to the use of intensive anticoagulants (Fig. 1). The mean red blood cell (RBC) and fresh-frozen plasma (FFP) transfusion rates were 3.6 ± 0.7 and 2.1 ± 0.7 units, respectively. Patients were followed up for six months, and the median graft rejection time was 145 days according to Kaplan-Meier analysis (Fig. 2).

Table 1. Demographic Characteristics

Variable	Total (N = 202)
Age (mean ± SD)	56.9 ± 8.4
Sex	**n (%)**
Male	120 (59.4%)
Female	82 (40.5%)
DM (%)	58.4%
HT (%)	89.6%
Etiology	**n (%)**
DM	109 (53.9)
Unknown	54 (26.7)
DM + HT	25 (12.3)
HT	6 (2.9)
EF (mean ± SD)	58.4 ± 13.7

DM, diabetes mellitus; EF, ejection fraction; HT, hypertension; SD, standard deviation.

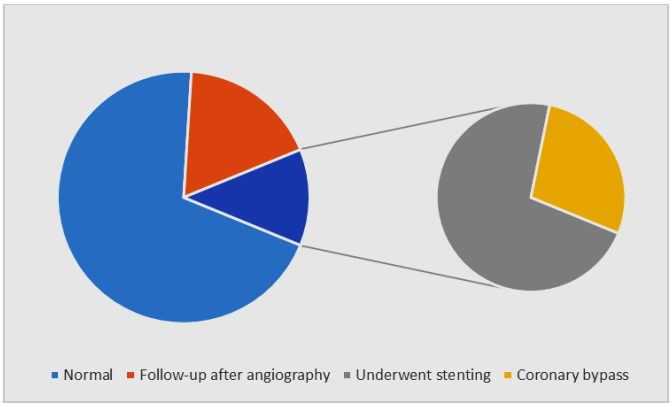

Figure 1: Cardiac risk chart, 141 patients were normal after control. 36 patients decided follow-up after angiography, 18 underwent stenting, and 7 underwent coronary bypass surgery.

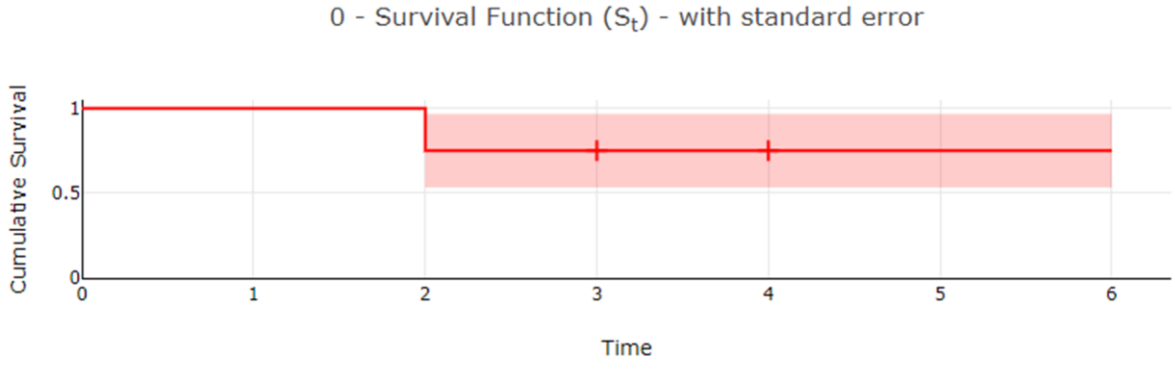

Figure 2: Kaplan-Meier analysis showing graft rejection time after kidney transplant (median, 145 [range, 0-180] days).

DISCUSSION

CAD significantly negatively impacts the pre-, intra- and post-transplant survival of patients with chronic kidney disease (4). Myocardial revascularization is recommended, as in the general population, in patients with unstable cardiac symptoms or chronic kidney disease for whom coronary intervention provides a long-term survival benefit (5,6). Preventive coronary intervention should not be indicated solely based on the possibility of future transplantation (1). While both options are equally relevant according to current guidelines, the question of whether preventive myocardial revascularization is preferable to medical therapy can be answered by a prospective randomized trial, which is not yet available (7). Such a study would likely demonstrate that coronary intervention should be offered to some chronic kidney disease patients whose appropriateness is considered uncertain by currently available guidelines (10). Surgical angioplasty offers longer survival in patients compared to stenting (8). Modern medical therapy provides adequate protection in selected chronic kidney patients with significant coronary artery disease (2,8). Although some of the relative survival advantages in renal transplant recipients (compared to dialysis patients) is likely due to the selection of "healthier" patients with ESRD for transplantation, our preliminary data suggest that kidney transplant recipients have improved survival time (9).

The importance of a heart-kidney team-based approach for managing coronary artery disease in chronic kidney disease patients has been emphasized in recent studies (10). Collaborative decision-making between cardiologists and nephrologists is crucial to provide optimal care for this high-risk patient population. Furthermore, addressing modifiable risk factors like diabetes, hypertension, and dyslipidemia can help slow the progression of coronary artery disease and improve outcomes in chronic kidney disease patients (11, 12).

In addition to medical therapy, lifestyle modifications, and risk factor control, the management of coronary artery disease in chronic kidney disease patients should consider the unique challenges posed by renal dysfunction, including the higher prevalence of calcified and complex coronary lesions and increased risk of contrast-induced nephropathy (13). Careful patient selection for myocardial revascularization, considering the potential benefits and risks of the intervention, is crucial for improving outcomes in this population.

CONCLUSION

In conclusion, managing coronary artery disease in chronic kidney disease patients, especially those who are candidates for kidney transplantation, necessitates a comprehensive approach that considers the intricate relationship between cardiovascular and renal factors. Optimal treatment strategies require collaboration between cardiologists, nephrologists, and transplant specialists, with a focus on both myocardial revascularization and medical therapy. Performing kidney transplantation in experienced centers under anticoagulation for patients who have undergone coronary revascularization can lead to better outcomes. Further research is needed to refine treatment guidelines and strategies for this high-risk patient population.

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Author Contributions: AH, ST, SKC, MT: Data Collection, design of the study**, AH:** manuscript preparation, revisions. All the authors have read, and confirm that they meet, ICMJE criteria for authorship.

Ethical approval: All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and/or with the Helsinki Declaration of 1964 and later versions.

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