



Incidence of Infections in Renal Allograft Recipients and Their Outcomes in a Tertiary Care Center in Northeast India

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ABSTRACT

Introduction: The advent of modern potent immunosuppression has significantly reduced the occurrence of rejection in renal allograft recipients but has increased the risk of infection, which remains the major cause of death in these patients.

Materials and methods: This single-center retrospective observational study was conducted at a tertiary care center in India. Data were collected from medical records of renal allograft recipients admitted for infection-related complications over a 10-year duration.

Results and conclusion: Out of 238 admissions, 63 (26.47%) were due to infection-related complications involving 59 unique patients. The most common infections were urinary tract infections (UTIs) ($n = 24$) and pneumonia ($n = 19$). Of the two patients requiring multiple admissions, one patient had two episodes of pneumonia and one episode of UTI, and the other patient needed three admissions for diabetic foot. Six patients succumbed to their illness, resulting in a mortality rate of 10.16%, with sepsis due to UTI being the most common cause of death.

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INTRODUCTION

Patients with end-stage kidney disease (ESKD) have various treatment options, including hemodialysis (HD), peritoneal dialysis (PD), and renal transplantation. Kidney transplant patients generally experience a better quality of life compared to those on dialysis.¹ However, the use of potent immunosuppressive drugs, while reducing rejection rates, increases the risk of infections in renal allograft recipients. Infection remains the leading cause of death both in the early and late post-transplant period.² Diagnosing infections in these patients can be challenging due to atypical presentations, potentially increasing morbidity and mortality.³

Infections are highly prevalent in the post-transplant period. For instance, a study conducted in Chandigarh found that 68.4% of patients experienced at least one infection episode within the first 6 months post-transplant.⁴ Kumar et al. also identified urinary tract infections (UTIs) as the most common infection among Indian renal transplant recipients.¹ This study aims to provide further insights into infection profiles in renal allograft recipients.

AIMS AND OBJECTIVES

- To estimate the incidence of infection in renal allograft recipients.
- To estimate the pattern of infection in renal allograft recipients.
- To estimate the outcome of infection in renal allograft recipients.

MATERIALS AND METHODS

This retrospective descriptive study was conducted at a tertiary care center in India. Medical records of renal allograft recipients admitted over a 10-year duration were reviewed, focusing on admissions due to infection-related complications. Baseline characteristics, including age and sex, were recorded, along with infection sources, etiological agents, comorbid conditions, and outcomes.

RESULTS

During the study period, there were a total of 238 admissions of renal allograft recipients. After adjusting for multiple admissions, the actual number of patients was 218, comprising 187 males and 31 females, resulting in a male-to-female ratio of 6.03:1. Among these patients, 63 admissions were due to infection-related complications, accounting for 26.47% of the total admissions. Two patients required multiple admissions, leading to a total of 59 individual patients, with 52 males and 7 females, reflecting a male-to-female ratio of 7.42:1 (Table 1).

Among the patients with multiple admissions, one had two episodes of

pneumonia and one episode of UTI, while the other patient required three admissions due to diabetic foot complications. The most common infection necessitating hospitalization was UTI, with 24 cases, followed by pneumonia, with 19 cases (Table 2). Urine cultures from UTI patients most frequently isolated *E. coli*, with 11 isolates (45.83%), followed by *K. pneumoniae*, with 7 isolates (29.16%) (Table 3).

Table 2: The profile of infections and the frequency of occurrence

Infection	Frequency (%)
UTI	24 (36.92)
Pneumonia	19 (29.23)
Cellulitis	7 (10.77)
Tuberculosis	4 (6.15)
CMV (2 Pneumonia)	4 (6.15)
Diabetic foot	3 (4.61)
CSOM with Meningitis	1 (1.54)
Perinephric abscess	1 (1.54)
BK virus (1 had concomitant pneumonia)	2 (3.07)
Esophageal candidiasis	1 (1.54)
Varicella	1 (1.54)
Total	65

Table 3: Organisms causing UTI

Organism	Frequency (%)
<i>E. coli</i>	11 (45.83)
<i>K. pneumoniae</i>	7 (29.16)
<i>Staphylococcus</i>	2 (8.33)
<i>Candida albicans</i>	1 (4.16)
Culture-negative	3 (12.5)

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The spectrum of infections in these patients was diverse. There were four patients diagnosed with tuberculosis, each presenting with a different form of the disease: one with pulmonary TB, one with pleural TB, one with TB meningitis, and one with spinal TB. This highlights the varied clinical presentations of tuberculosis in immunocompromised patients, such as those who have received renal allografts.

Additionally, four patients tested positive for cytomegalovirus (CMV). Of these, two had lung involvement, manifesting as CMV pneumonia, one had gastrointestinal tract involvement, and one had viremia accompanied by a UTI. The presence of CMV in these patients underscores the importance of monitoring for viral infections in post-transplant care, as they can significantly impact patient outcomes.

Post-transplant diabetes mellitus (PTDM) was observed in four patients, indicating a significant post-transplant complication. Among these patients, one presented with pneumonia and three with UTIs. This suggests that PTDM patients may be at increased risk for certain infections. Additionally, among patients with type 2 diabetes mellitus (T2DM), two were admitted for pneumonia, one for a UTI, and one for diabetic foot. This data indicates that diabetic patients, whether PTDM or T2DM, have a higher susceptibility to infections that require hospitalization.

Leukopenia, associated with infection, was noted in three patients. Of these, two had pneumonia, and one had cellulitis. Leukopenia can further complicate the clinical course of infections, making management more challenging.

Out of the 59 patients admitted for infections, 6 succumbed to their illness, resulting in a mortality rate of 10.16%. The leading cause of death was sepsis secondary to UTI (Table 4). This high mortality rate underscores the severe impact that infections can have on renal

Table 4: Causes of sepsis causing death

Cause of sepsis	Frequency
UTI	2
Pneumonia	1
Meningitis with CSOM	1
CMV of GI tract	1
Cellulitis	1
Total	6

allograft recipients, emphasizing the need for vigilant infection control and prompt treatment protocols in this vulnerable population.

DISCUSSION AND CONCLUSION

In this single-center study on infectious complications in renal transplant patients, the incidence of infection was found to be 26.47%. This rate is slightly lower than a previous study, which reported that 72.5% of patients experienced at least one major infectious episode after their transplant.⁵ Tuberculosis was found in 6.15% of the patients in our study, a figure slightly lower than the 17.8% incidence reported in a study on renal allograft recipients in India.¹

The most common infection in our study was UTI, affecting 36.92% of patients, followed by pneumonia at 29.23%. This finding aligns with the study by Kumar et al.,¹ where UTI was also the most common infection among postrenal transplant recipients. Similarly, another study conducted in South India reported UTI as the most prevalent infection in renal allograft recipients.⁵

In our study, the most common causative organisms were Gram-negative bacteria, with *E. coli* and *K. pneumoniae* being the predominant pathogens, accounting for 45.38% and 29.16% of infections, respectively. This is consistent with the findings of Halim et al.,⁶ who reported that *E. coli* and *K. pneumoniae* were responsible for 42% and 39% of UTIs, respectively. Mukherjee et al.⁷ also found gram-negative organisms to

be the leading cause of infections, with *E. coli* isolated in 72% of cases.

The most common cause of infection-related death in our study was UTI, which contrasts with the findings of Washer et al.,² where pneumonia was the leading cause of infection-related mortality.

Renal allograft recipients are chronically immunosuppressed, placing them at an increased risk of various infections. These infections are associated with significant morbidity and mortality. Therefore, it is essential to implement robust preventive measures and ensure early, aggressive treatment to enhance outcomes for these patients. Overall, these findings underscore the urgent need for comprehensive infection surveillance and management strategies to improve the prognosis for renal allograft recipients.

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