

## Urinary Tract Infections in Renal Transplantation Patient

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**Abstract:** Urinary Tract Infection (UTI) can be associated with significant morbidity after renal transplantation. While, the use of postoperative antibiotic prophylaxis has dramatically reduced the incidence of UTI after renal transplantation over the past decades, rates of serious complications associated with UTI, such as bacterial septicemia, remain high for post transplantation patients even in the modern era. However, late post transplantation UTI has been widely considered as benign based on relatively small studies. The majority of transplant centers administers prophylactic antibiotics post transplantation, but most generally stop antibiotic prophylaxis 6 months after transplantation. However, emerging concepts from recent studies suggest that UTI, even if late after renal transplantation, has definite risks, suggesting that this clinical entity may not be as “benign” as previously supposed. A total of 185 midstream urine samples were collected in sterile containers from patient with kidney transplantation. With standard calibrated loop delivering 0.01 mL of urine was inoculated on Blood agar and EMB agar and incubated aerobically at 37°C for 24-48 h. Urinary tract infection was diagnosed by growth of at least 100000 colony-forming units of a urinary tract pathogen per milliliter in a culture of a midstream urine sample. Any specimen containing high colony counts with more than one species of bacteria in asymptomatic patient was considered contamination. Identification of bacterial pathogens was made on the basis of gram reactions, morphology and biochemical characteristics. Total 185 kidney transplantation patient studied, of whom 52 (28.10%) were identified to have asymptomatic bacteriuria. In present study, the most common isolate was *E. coli* 33 (56.89%), followed by *Klebsiella pneumoniae* 13 (22.41%), *Pseudomonas aeruginosa* 5 (8.62%), *Proteus mirabilis* 3 (5.17%), *Citrobacter freundii* 3 (5.17%) and *Staphylococcus aureus* 1 (1.72%). UTIs are a frequent problem after kidney transplantation. In the long-term, UTIs should be considered as a potential risk for poorer graft outcomes. In this study, the incidence of UTIs was 31.35% among renal transplant recipients, with *E coli* as the most common cause. While ureteral double-J catheter and female gender were the risk factors for UTI, female gender was the only independent risk factor.

**Key words:** Urinary tract infections, renal transplantation

### INTRODUCTION

Renal transplant (RTx) recipients are exposed to fairly aggressive immunosuppressive regimens and, as a result, they show an increased incidence of infectious complications. Most of the infection-related syndromes occur during the first months post-transplant. One of the most frequently occurring infections is Urinary Tract Infection (UTI). Less often, life-threatening infections as for instance pneumonia, line-related bacteraemia or bacteraemia associated with the use of a urinary tract catheter or nephrostomy, are observed (Valera *et al.*, 2006; Charfeddine *et al.*, 2005; Dantas *et al.*, 2006; Chuang *et al.*, 2005; Takai *et al.*, 1998; Zeighami *et al.*, 2008).

Urinary Tract Infections (UTIs) are the most common bacterial infections in renal transplant recipients (Chuang *et al.*, 2005).

The higher rate of infectious complications in these patients is due to intense immunosuppressive regimens, surgical procedure and exposure to nosocomial pathogens (Rabkin *et al.*, 1998; Alangaden *et al.*, 2006; Brumfitt and Hamilyon-Miller, 1998; Oguz *et al.*, 2002; Maraha *et al.*, 2001).

The most common causes of UTI in this patient group include *Escherichia coli*, *Enterococcus* species, *Staphylococcus* species, *Klebsiella* species and *Pseudomonas* sp. 2-4 *E coli* is the most common bacteria with a resistance pattern varying among regions and countries (Brumfitt and Hamilton-Miller, 1998; Oguz *et al.*, 2002). The bacteria leading to UTIs in renal transplant recipients are similar to those causing UTIs in the general population. The aims of this study were to determine the causative agents of UTIs among renal transplant recipients and to compare the antibiotic susceptibilities of *E coli* strains isolated from renal transplant recipients

and complicated community-acquired UTIs from nontransplant patients (Alangaden *et al.*, 2006; Chuang *et al.*, 2005; Brown, 2002; Revilla *et al.*, 1999; Takai *et al.*, 1998; Midtvedt *et al.*, 1998; Oguz *et al.*, 1996; Ghasemian *et al.*, 1996).

The majority of transplant centers administers prophylactic antibiotics post transplantation, but most generally stop antibiotic prophylaxis 6 months after transplantation. However, emerging concepts from recent studies suggest that UTI, even if late after renal transplantation, has definite risks, suggesting that this clinical entity may not be as “benign” as previously supposed.

### MATERIALS AND METHODS

A total of 185 midstream urine samples were collected in sterile containers from patient with kidney transplantation. With standard calibrated loop delivering 0.01 mL of urine was inoculated on Blood agar and EMB agar and incubated aerobically at 37°C for 24-48 h. Urinary tract infection was diagnosed by growth of at least 100000 colony-forming units of a urinary tract pathogen per milliliter in a culture of a midstream urine sample. Any specimen containing high colony counts with more than one species of bacteria in asymptomatic patient was considered contamination. Identification of bacterial pathogens was made on the basis of gram reactions, morphology and biochemical characteristics.

### RESULTS

Total 185 kidney transplantation patient studied, of whom 52 (28.10%) were identified to have asymptomatic bacteriuria. In present study, the most common isolate was *E.coli* 33 (56.89%), followed by *Klebsiella pneumoniae* 13 (22.41%), *Pseudomonas aeruginosa* 5 (8.62%), *Proteus mirabilis* 3 (5.17%), *Citrobacter freundii* 3 (5.17%) and *Staphylococcus aureus* 1(1.72%). UTIs are a frequent problem after kidney transplantation. In the long-term, UTIs should be considered as a potential risk for poorer graft outcomes. In this study, the incidence of UTIs was 31.35% among renal transplant recipients, with *E coli* as the most common cause. While ureteral double-J catheter and female gender were the risk factors for UTI, female gender was the only independent risk factor.

### DISCUSSION

*E.coli* was the most frequently isolated organism from UTIs in renal transplant recipients, consistent with

prior studies. UTIs are common in the early posttransplantation period.<sup>6,7</sup> We have observed that the majority of the UTIs occurred beyond the 6th month after transplantation, probably due to the fact that prophylactic TMP-SMX treatment in renal transplant recipients provides some protection against UTIs.

Nearly 80% of renal transplant recipients suffer at least one episode of infection during the first year after transplantation. UTIs are the most common infectious complication posttransplantation. The incidence of UTIs varies from 35-79% in various series and approximately 60% of bacteremias originated from this site. Chuang *et al.* (2005) reported that 43% of their renal transplant recipients had at least one UTI over a mean follow-up period of 42 months after transplantation (Chuang *et al.*, 2005) Takai *et al.* (1998) reported that 26% of 363 renal transplant patients followed over a mean period of 4 years developed at least one UTI (Alangaden *et al.*, 2006; Brown, 2002; Chuang *et al.*, 2005; Revilla *et al.*, 1999; Takai *et al.*, 1998; Midtvedt *et al.*, 1998, Oguz *et al.*, 2002; Ghasemian *et al.*, 2002).

The reported risk factors for UTIs were female gender, age, reflux disease, deceased donor and azathioprine in the study of Chuang *et al.* (2005). They also observed that UTIs were associated with an increased mortality risk, while there was no association between UTIs and graft loss. In another study, Rabkin *et al.* (1998) showed that early urethral catheter removal decreased the incidence of UTIs among renal transplant recipients. However, such a decrease was not shown in other studies. In one study, while pretransplant diabetes mellitus was the only significant risk factor for UTIs, a ureteral stent was found to be significantly associated with increased risk of UTIs, as we have observed herein. In our study, we found that female gender increased the risk to develop a UTI among renal transplant recipients. The cause of higher UTIs in female patients is presumably the shorter urethra and proximity of the urethral opening to the vagina and anus.

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