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The incidence of infectious diseases after renal transplantation: a single-centre experience

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Abstract

This single-centre study was designed to investigate the incidence of infections and their causative pathogens during the first three months after renal transplantation (RTx) in patients who had undergone the procedure in 2005 ($n = 174$). We compared this group of patients with a previous one (1998–2000, $n = 437$). In 2005, infection was diagnosed in 82 patients (47%). Symptomatic lower urinary tract infection (UTI) was present in 43 patients (25%), pyelonephritis in 15 (8.6%), and urosepsis in 7 (4%). Wound infection developed in 21 patients (12%), cytomegalovirus (CMV) disease in 15 (8.6%), and pneumonia in 5 (3%). The most frequent pathogens in UTI were *Klebsiella pneumoniae* and *Enterococcus faecalis*. Pathogens of wound infection included *Staphylococcus coagulase* negative and *K. pneumoniae*. Pneumonia was frequently caused by *Mycoplasma pneumophila*. Compared with the previous group, we noted decreases in the total number of infections (77.7 vs. 47%, $P < 0.001$), pneumonia (8.5 vs. 3%, $P < 0.02$) and UTI (33.3 vs. 24.7%, $P < 0.05$). We observed an increased incidence of multiresistant *Klebsiella*. Based on these results, we have changed our scheme of antibiotic prophylaxis and the algorithms of antibiotic treatment. We reduced the use of antibiotics with an adverse epidemiological effect (quinolones, third-generation cephalosporins) and increased the use of relatively safe antibiotics (penicillins, aminopenicillins, with and without beta-lactam inhibitors).

Keywords: Urinary tract infection; *Klebsiella pneumonia*; Antibiotic prophylaxis

1. 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.

Our single-centre study was designed to investigate the incidence of infections and their causative pathogens during the first three months after RTx in patients undergoing the procedure in 2005 ($n = 174$). We compared this group of patients with our previous group (1998–2000; $n = 437$).

2. Methods

This was a retrospective study of renal allograft recipients who had undergone transplantation in our centre from 1 January 2005 to 31 December 2005 and were followed for three months after RTx. All patients started on mycophenolate mofetil (MMF) 2 g/day. Methylprednisolone 500 mg IV was given intraoperatively, followed by a dose of 500 mg on the next day, oral prednisone 20 mg over the first month, 10 mg at three months, and 5 to 7.5 mg at 6–12 months. Eighty-one percent of our patients received tacrolimus (target trough level was 10–20 ng/mL in the first month, 5–15 ng/mL thereafter) and 15% cyclosporin A (CsA) (target trough level was 200–300 ng/mL, 150–250 ng/mL). The remaining patients (7; 4%) received sirolimus (SRL, 4–8 ng/mL).

Antibiotic prophylaxis in RTx patients was based on cefuroxime, a second-generation cephalosporin. This agent was chosen because the procedure involved intra-abdominal surgery and manipulation within the urinary tract and,

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Table 1
Patients characteristics ($N = 174$)

Mean age of donors (min–max) years	47.6 (3–76)
Recipients	
Cadaveric (%)	89
Related (%)	11
Mean age of recipients (min–max) (years)	38.7 (18–80)
Recipients – male (*N*/%)	104/60%
PRA max (%)	14 (0–98)
PRA current (%)	7.9 (0–98)
HLA-A mismatch (average)	1.2
HLA-B mismatch (average)	1.3
HLA-DR mismatch (average)	0.6
Duration of dialysis therapy before Tx – median (min–max) (days)	672 (0–3287)
Cold ischaemia (min–max) (hours)	18.3 (0.5–29.1)
ATG or Zenapax – induction	27/15.5%
Immunosuppressive therapy – maintenance	
Tacrolimus	139/81%
CsA	26/15%

Tx, transplantation; ATG, antithymocyte globulin; CsA, cyclosporin A.

hence, a potential risk of the presence of Gram-negative microflora. In these cases, the commonly used first-generation cephalosporin could prove to be inadequately effective. The first dose of cefuroxime (750 mg) is given intravenously immediately before transplantation and every 12 h for 48 h post-RTX. Prophylaxis is administered for 48 h because of the potential of complications requiring revision or a 'second-look operation' in the early post-transplant period. Prophylaxis of *Pneumocysta carinii* infection by trimethoprim/sulfamethoxazole was started on Day 3 and continued for 4 months. Antibiotic-based prophylaxis using piperacillin/tazobactam in one-shot intravenous infusion was initiated 1 h before subsequent invasive examinations (e.g., insertion or removal of external–internal urinary tract drainage or JJ stent). CMV prophylaxis by IV ganciclovir during hospitalisation and oral valganciclovir after discharge was based on CMV serostatus between donor (D) and recipient (R). CMV prophylaxis was instituted in 65 patients (29%; 25 patients [14.2%] with D+/R− mismatch, 20 patients [38%] receiving antithymocyte globulin [ATG] prophylaxis, and in 10 patients [19.2%] on ATG or plasmapheresis therapy). This prophylaxis was administered for 100 days. Characteristics of our patients are shown in Table 1.

In our study, asymptomatic UTI was defined as bacteriuria with a concentration of at least 10^5 organisms per millilitre of urine without pyuria or clinical signs. This was not treated.

Our definition of symptomatic UTI was a positive urine culture with $\geq 10^5$ microorganisms/mL, pyuria, and clinical signs. This infection was treated.

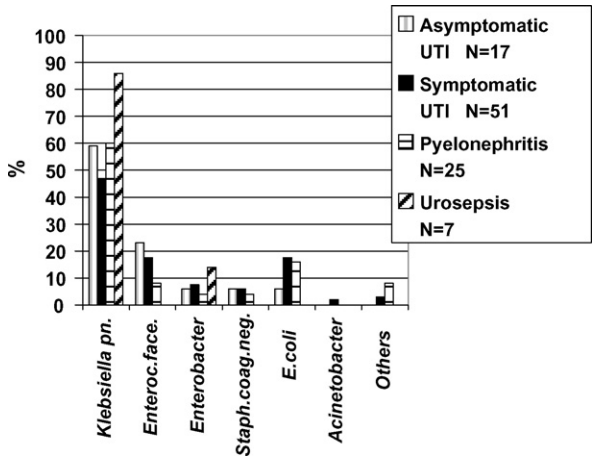

Fig. 1. Pathogens of urinary tract infections (UTI) in 2005. N = number of episodes.

Patients with urosepsis had positive blood cultures and were in a serious clinical condition.

Wound infection was characterized by a purulent discharge from the incision, presence of pathogens, and features of infection.

Pneumonia was diagnosed by chest radiograph and/or by bronchoalveolar lavage.

Patients with CMV disease had positive antigenaemia and clinical signs or symptoms (fever, leucopenia, abnormal liver tests, gastroenteritis and renal graft dysfunction).

Our data were statistically evaluated using the t-test, χ^2-test with a level of statistical significance of $P < 0.05$.

3. Results

From 1 January 2005 to 31 December 2005, a total of 174 RTx procedures were performed in our centre. One hundred and thirty-four infection episodes were diagnosed in 82 patients (47%).

The majority of infections was caused by bacterial agents (83%), fewer by viral ones (16%) or, rarely, by fungi (1%).

Table 2 shows the types and incidence of infectious complications. The most frequent infection was UTI. Seventeen cases of asymptomatic bacteriuria in 13 patients were not treated (*Klebsiella pneumoniae* in 10 cases, *Enterococcus faecalis* in 4, *Enterobacter, E. coli* and *Staphylococcus coagulase negative* in one case each).

Symptomatic lower UTI (51 episodes in 43 patients) were always treated and were very often caused by *Klebsiella*

Table 2
Incidence of different infectious complications in 2005 ($N = 174$)

Asymptomatic bacteriuria	Symptomatic lower UTI	Pyelonephritis	Urosepsis	Pneumonia	CMV disease
13/7.5%	43/25%	15/8.6%	7/4%	5/3%	15/8.6

UTI, urinary tract infection; CMV, cytomegalovirus.