

## INFECTIONS IN IMMUNOSUPPRESSED PATIENTS

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### Summary

A review of 52 patients receiving renal transplants showed 78 infections episodes occurred during a follow-up period averaging 12 months. 21.1% (11 patients) were completely free of infection. 19.2% of all infections occurred during the first month.

Coagulase positive staphylococcus was the most common organism isolated. Urinary tract infection was the most common infection encountered. Four out of the 11 deaths were due to infection. Complications due to infections are an important cause of morbidity and mortality in renal transplant patients.

Recipients of renal transplants are more prone to infection because of factors such as uremia, anemia and the effects of steroids and other immunosuppressive therapy. These cause severe impairment of humoral and cellular insufficiency, and increase susceptibility to organisms not normally considered pathogenic. The variety, frequency and severity of infections in these patients has been well documented.<sup>1,2</sup> In the early days of renal transplantation, death due to sepsis in the first three months were common, and Anderson *et al*,<sup>3</sup> reviewing their experience up to 1968 showed that 82% of all infections were sufficiently severe to cause death, occurring in patients receiving transplants prior to 1966. This Colorado experience was similar to that reported elsewhere.<sup>4,5</sup> The reduced incidence of severe infections causing deaths were due to increasing experience and aggressive approach to diagnosis and treatment of infections and to the lower dosage of steroids used. We review our own experience with renal transplantation and describe the spectrum of infection in our hospital.

### MATERIALS AND METHODS

Fifty-two patients treated between November 1975 and August 1980 form the basis of this report. All recipients and living related donors were free of infection at the time of operation. Potential recipients with calculous disease or gross vesicoureteric reflux underwent bilateral nephrectomy prior to receiving a transplant. Prophylactic antibiotics were not used. Prednisolone and azathioprine therapy were started before operation.

Bacterial and fungal infections were diagnosed when two or more of the following were observed:

1. Positive culture of pathogenic organisms.

2. X-Ray or physical findings suggestive of infection.
3. Oral temperature exceeding 38°C.
4. Clinical notes indicating the presence of infection in the progress note.

Viral infection was diagnosed by a typical clinical picture or by serology.

Multiple organisms found at one site or one organism at several sites were considered as one infection. Recurrent urinary tract infection where the same organism was isolated was considered as one infection. Pneumonia and urinary tract infection in the immediate post-operative period were not included.

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## RESULTS

There were 52 patients (44 males, 8 females) ages ranging between 16 and 44. They were followed up for at least two months, up to 54 months (mean 12 months).

78 infections were documented in the 52 patients and the site and relative frequencies are shown in Table 1. Urinary tract infections was the most common infection, occurring in 37% of the patients, septicaemia, lung infections and wound infections occurred in about 10% of patients.

19.2% of all infections occurred during the first month (Table 2). 21.1% of all patients (11 patients) were completely free of infection.

The causes of infections are shown in Table 3. Coagulase positive staphylococcus was the most common organism identified, followed by the *Klebsiella-Enterobacter* group and *E. coli*. These 3 organisms accounted for 53.8% of all infections and 71.2% of all bacterial infections. Viral infections were diagnosed in 13 patients and *Candida* in 1 patient. In 6 patients no organisms were isolated and the causes of the infections were unknown.

### Urinary Tract Infections

The *Klebsiella-Enterobacter* group was the commonest isolated. *E. coli*, *Proteus* and *Pseudomonas* were also isolated. One patient died of sepsis following uncontrolled urinary infection with a bladder leak, and *Proteus rettgeri* was repeatedly isolated. Urinary tract infection was recurrent in 8 patients.

### Lung Infection

Eight patients developed lung infection, 2 of whom were found to have pulmonary tuberculosis.

### Blood

Septicaemia was diagnosed in 8 patients but no organisms were isolated in 3 cases. Four patients were leukopenic (Wbc less than 1000/ $\mu$ l). One patient with known aortic incompetence died of acute staphylococcal endocarditis.

### Viral Infections

Six patients showed rising cytomegalovirus antibody titres. Herpes zoster occurred in 3

patients while the other 3 patients developed hepatitis B, one of whom died of liver failure.

### Fatal Infections

Four out of the 11 deaths in the series were due to infection. One patient died of staphylococcal endocarditis and 2 died of septicaemia following urinary tract infection in one and lung infection in the other. The other patient died of liver failure following hepatitis B infection. All these deaths occurred at least ten weeks after transplantation.

## DISCUSSION

Our infection rate of 1.5 per renal transplant recipient is similar to other reports ranging from 1.17 to 1.79.<sup>6</sup> A mortality rate of 36.4% related to infection is lower than other reports of 61% to 67%.<sup>6</sup> All the deaths occurred in the third to thirteenth months, and this is consistent with other reports, that deaths occurring in the first month are usually due to non-infectious causes.<sup>2,6</sup>

The most common cause of infection was bacterial, and Gram-negative organisms were commonly isolated. Coagulase positive staphylococcus was the single most frequent organism isolated, and the *Klebsiella-Enterobacter* group and *E. coli* were the commonest Gram-negative bacilli isolated.

Although bacteriuria related to indwelling catheters in the immediate post-operative period was excluded, urinary tract infection was the most common infection and the spectrum of organisms was similar to that reported by others. Septicaemia was seen in only 10.3% of the patients, and similarly 10.3% of the patients had pneumonia, a rate lower than that reported by Murphy.<sup>6</sup>

Our experience is similar to that of others reporting a reduced incidence of infections compared to the days of renal transplantation in the early sixties. However, complications due to infections remain an important cause of morbidity and mortality in our transplant patients.

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TABLE 1  
SITE OF INFECTIONS

Site	No. of Infections	No. of Patients	% of Patients
Blood	8	8	10.3
UTI	29	25	37.1
Lung	8	8	10.3
Wound	7	7	9
Soft tissue	7	7	9
Liver	3	3	3.8
Arterio-venous Shunt site	5	5	6.4
Skin	4	4	5.4
Orchitis	1	1	1.3

TABLE 2  
INFECTIONS IN THE FIRST MONTH

UTI	9
Lung	2
Abscess	2
Septicaemia	2
Total	15 (19.2%)

TABLE 3  
CAUSES OF INFECTION

	UTI	Lung	Blood	Sepsis	Shunt
<i>Staphylococcus coagulase</i> positive			2	12	5
<i>Escherichia coli</i>	9		1		
<i>Klebsiella/Enterobacter</i>	12	1			
<i>Pseudomonas</i>	2	2	1		
<i>Proteus</i>	3			2	
<i>Salmonella</i>			2		
<i>Citrobacter</i>	1				
<i>Acinetobacter</i>	1				
Acid-fast bacilli		2			
<i>Candida</i>	1				
Cytomegalovirus	6				
Herpes zoster	3				
Herpes simplex	1				
Hepatitis B	3				
Unknown	6				
Epididymo-orchitis	1				

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