Urol Res (1984) 12:275–277

Urological Research

Prophylactic Antibiotics in Transurethral Prostatectomy

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Accepted: February 3, 1984

Summary. The study included 88 patients with sterile urine prior to transurethral prostatectomy. Forty-five received a preoperative dose of 2 g of cefotaxime (Claforan®) and the remaining 43 were given 10 ml of 0.9% NaCl. The two groups did not differ in frequency of postoperative urinary infection ($>10^5$ colonies per ml urine); 6 patients (13.3%) in the cefotaxime group had postoperative infections during hospital stay as compared to 8 patients (18.6%) in the control group ($0.5 > p > 0.3$). Those in the cefotaxime group who had infections were tested for resistance. They were all fully sensitive to cefotaxime except one, who was infected with enterococci. There was no growth of bacteria from either venous blood or bladder irrigating fluid taken during the operations. Nor were any serious complications observed in any of the paitents. In view of the relatively low risk of infection and the few side effects of the infections that did occur, prophylactic treatment with an antibiotic is not indicated for transurethral prostatectomy in patients with sterile urine.

Key words: Prophylactic antibiotics, Transurethral prostatectomy.

Introduction

The question whether systemic antibiotic prophylaxis is advisable for transurethral prostatectomy in patients with sterile urine still seems to be unresolved and open to discussion [1]. The risk of infection involved in this operation is reported to vary between 6 and 62.5% [8].

Cefotaxime has earlier proved effective as a prophylactic with 48 h of postoperative follow-up treatment [4], and another cephalosporine, cefoxitine, has proved an effective treatment until catheter removal [7].

The purpose of the present study was to examine the effect of a preoperative bolus injection of cefotaxime, which is a broad-spectrum cephalosporine, without postoperative follow-up treatment.

Patients and Methods

Eigthy-eight patients with sterile urine ($<10^2$ colonies per ml) admitted for transurethral prostatectomy were included. None of these patients had received antibiotics or had been subjected to transurethral instrumentation for a month before the operation.

Insulin-dependent diabetics, patients with penicillin allergy, those with known neurogenic bladder conditions, and patients who had received steroid treatment were excluded.

After informed consent the patients were randomised to either 2 g of cefotaxime in 10 ml of 0.9% NaCl solution (45 patients) or 10 ml of 0.9% NaCl solution alone (43 patients) for intravenous administration before the operation. Cefotaxime was given on an average 44 min before the operation started. The randomisation was closed to the surgeon.

Anaesthesia was either epidural or general, a Stortz's resectoscope Charrière 24 was used, and a Reuter's trochar was introduced above the pubic area to drain the irrigating fluid (glycine).

After the operation 1% Chlorhexidine-lidocaine gel was applied to the urethra and a foley catheter (Ch. 22–24) was introduced with 40–50 ml 0.9% NaCl in the balloon. Traction of 300 g on the catheter and/or continous irrigation through a suprapubic catheter were used when necessary according to haemorrhage. Normally the catheter was removed 48 h after the operation, and the patient was discharged after another 24 h.

During the operation samples of venous blood and irrigating fluid from the bladder were drawn for culture. Further urine samples were taken at catheter removal, at discharge from hospital, and at the follow-up visit three months after the operation. In case of significant growth in the urine ($>10^5$ colonies per ml) the resistance to cefotaxime was tested.

For statistical analyses the X^2 test and Mann-Whitney's rank sum test for unpaired data were used.

Results

There was no difference in age, weight, haemoglobin, creatinine, histological diagnosis, weight of resected tissue or duration of operation between the two groups (Table 1).

Table 1. Age, weight, creatinine, and Hb in the two groups with indication of the standard error of mean, the average amount of tissue resected, and duration of operation

	Cefotaxime	NaCl
Age (years)	67.5 ± 6.0	69.5 ± 8.5
Weight (kg)	75.6 ± 8.3	75.3 ± 11.0
Creatinine (μmol/l)	104 ± 40	105 ± 24
Hb (mmol/l)	9.0 ± 0.7	8.9 ± 0.7
Resected tissue (g)	20	23
Duration of operation (min)	45	44

Table 2. Number of patients with urinary infection ($> 10^5$ colonies per ml urine) during hospitalisation in the two groups. The figures in brackets are percentages

	Cefotaxime	NaCl
Infected	6 (13.3)	8 (18.6)
Non-infected	39	35
Total	45	43

Table 3. The culture results and the sensitivity to cefotaxime of the 6 patients in the cefotaxime group who had significant bacteriuria during hospitalisation

Number of patients	Bacterial strain	Sensitivity
2	Staph. aureus	a
1	Coag.-neg. staph.	a
2	Enterococci	a
1	Enterococci	0

[a] indicates full sensitivity

Table 4. Frequency of postoperative catheter manipulation and transfusion stated in per cent, and the duration of catherisation in the two groups

	NaCl	Cefotaxime
Traction on catheter	37.2	22.2
Bladder irrigation	16.2	26.6
Catheter change	11.6	11.1
Transfusion	18.6	17.8
Duration of catherisation	2.44 days	2.31 days

Nor was any difference found as to the frequency of significant bacteriuria during hospitalization (Table 2). Eight patients (18.6%) in the placebo group had significant bacteriuria as compared to 6 patients (13.3%) in the cefotaxime group ($0.5 > p > 0.3$).

The results of the positive cultures from the cefotaxime group and the sensitivity to cefotaxime appear in Table 3.

All patients with significant bacteriuria were treated with other antibiotics according to resistance pattern, and none of the patients in the two groups had serious complications. Eleven patients (25.5%) in the placebo group and 8 patients (17.8%) in the cefotaxime group had episodes of temperature increase to above 38 °C ($p > 0.3$). Of the patients with significant bacteriuria in the placebo group only 50% had one or more episodes of temperature increase to above 38 °C as compared to 67% in the cefotaxime group.

Cultures from the blood samples taken during the operations were all negative, and so were the cultures from the samples of bladder irrigating fluid. As regards the use of catheter extension, postoperative bladder irrigation, catheter change, blood transfusion, and duration of catherisation, there was no difference between the two groups (Table 4), and the risk of infection was found to be independant of these factors.

Discussion

A great many regimes of prophylactic treatment with antibiotics have previously been tried in transurethral prostatectomy with varying results, but most of the studies are open to criticism for methodological errors [1].

Some [6] used preoperative administration of canamycine with a 3-week follow-up with cotrimoxazole, which resulted in a significantly lower risk of infection, viz. 4.8% in the therapy group as compared to 24.6% in the placebo group. Others [3], however, found canamycine therapy until catheter removal to make no difference, the risk of infection in the control group being 14% as compared to 11.1% in the therapy group.

Another cephalosporine, cefoxitine, has previously been tried as a prophylactic. Preoperative treatment with follow-up treatment until catheter removal resulted in the risk of infection dropping significantly from 42% to 6.1% on the 7th day after operation [7]. However, some of the patients had been subjected to instrumentation before the operation. A 48 h cefotaxime treatment starting preoperatively likewise resulted in a significant drop in the risk of infection from 27.7% to 10% [4], but some of the patients had either preoperative infections or had been subjected to preoperative instrumentation. The latter study also showed a significant decrease in the number of complications like fever, tachycardia, and other minor problems.

Several teams have cultivated bacteria from prostatic chips in 60–70% of the patients whose urine was sterile [6, 7]; but it has been pointed out that these results may have been due to contaimination since the cases of postoperative urinary infection did not always correspond with the results from the prostatic chip cultures, and growth was found in only 17% when the chips were flushed prior to homogenisation.

If bacteria were present in the prostate without any symptoms, then a preoperative bolus injection of a broad-

spectre antibiotic could be expected to prevent postoperative urinary infection.

Cefotaxime is a so-called third-generation cephalosporine, with a broad spectrum and a serum half-life of well over 1 h [5]. Intravenous administration of 2 g produces a therapeutic serum concentration for the first 3–5 h after injection [2].

However, the preoperative bolus injection had no effect on the risk of infection. Cultures from the infected patients in the cefotaxime group showed growth of fully cefotaxime-sensitive bacteria, except for a single case, and there was negative growth from venous blood and irrigating fluid. This indicates that postoperative infection may principally be due to catherisation and dependent on catheter care, which has previously been suggested [9]. In the material of the present study no special risk factors were demonstrable.

Considering the risk that resistance might develop, the relatively low frequency of infections and the insignificant rate of complications, we conclude that the use of antibiotics is not recommended as a prophylaxis for patients with sterile urine who are referred for transurethral prostatectomy.

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