A SIMPLE METHOD OF REDUCING BACTERIURIA AFTER OUT-PATIENT CYSTOSCOPY

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SYNOPSIS

There is always a risk of bacteriuria associated with urethral instrumentation as pathogens from the anterior urethera are carried on the tip of the instrument into the bladder. Two consective trials, Trial A and Trial B, both randomised and controlled, were conducted to assess the incidence of bacteriuria following out-patient cystoscopy and the effectiveness of two courses of co-trimoxazole in reducing this incidence.

It was found that the risk of bacteriuria following cystoscopy was high : 30.6% all bacteriuria, 18.9% significant bacteriuria in Trial A and 17.8% all bacteriuria, 11.5% significant bacteriuria in Trial B; and that both, standard co-trimoxazole two tablets given twice daily for two days and double-dose co-trimoxazole given as a single tablet significantly reduced the incidence of bacteriuria. The role of co-trimozazole in urethral instrumentation is discussed.

INTRODUCTION

Urethral instrumentation is always associated with a risk of urinary tract infection. Pathogens from the anterior urethra can be introduced in the tip of the instrument into the bladder (1). Majority of these cases of bacteriuria thus acquired are asymptomatic and transient as pathogens are cleared by the "bladder defence mechanism" which involves vesical emptying and an antibacterial action of the bladder (2). Nevertheless, there are patients who have been shown to be at a greater risk of developing infection following instrumentation. They are the female patients (3), the obstetic patients (4), the patients with retained bladder papillomata and the patients with damaged urinary tracts(5). The incidence of significant bacteriuria following instrumentation reported in the literature, therefore, varies between 1% and 29% (5,6).

Prophylactic antibiotics like demethylchlortetracycline (5) and sulphonomides (7) have been found to be ineffective in minimising the risk of significant bacteriuria. Similarly an antiseptic like chlohexidine used as an irrigation fluid in cystoscopy was also found to be not efficacious (3). In contrast, in obstetric patients sulphonomides were found to reduce significant bacteriuria induced by catheterisation from 29% to 11% (8).

The recent discovery of a number of cases of bacteriuria and urinary tract infection cystoscopy in this unit prompted this study to assess the incidence of post-cystoscopic bacteriuria, and the influence upon this incidence of short-course co-trimoxazole.

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MATERIAL AND METHOD

Two consecutive trials were undertaken involving patients attending this unit for day-case cystoscopy. In both trials patients were randomly allocated into a control group and a study group. In Trial A the study group took a standard preparation of co-trimoxazole, two tablets each containing trimethoprim 80 mg and sulphamethoxazole 400 mg twice daily for two days post-cystoscopy. In Trial B the study group took a double-dose preparation of co-trimoxazole, one tablet only, containing trimethoprim 160 mg and sulphamethoxazole 800 mg, taken after the cystoscopy but before leaving the unit. The majority of the patients in the trials were attending for check cystoscopy for previous bladder neoplasms, or for primary investigation of haematuria. All cystoscopies were performed under general anaesthasia with full aseptic technique.

Urine samples were taken at cystoscopy, and mid-stream samples were provided by the patients five days later. All samples were sent to the laboratory immediately. Aliquots of 10 ml of urine were centrifuged for white cell counts. A standard loop was used to plate the urine an a blood agar plate and a MacConkey plate following the same pattern of plating an each occasion. The plates were then incubated at 37°C for 24 hours and colony counts were preformed. The bacterial count (in organisms per ml) was then calculated.

All stamples exhibiting bacteriuria were recorded and designated as "all bacteriuria". Those samples with a count of greater than 100,000 organisms per ml were further designated as "significant bacteriuria". A count of greater than 100,000 organisms per ml was regarded as indicative of infection (9).

The results were statistically assessed by the Chi-square test.

RESULTS

A total of 420 patients entered both trials. 31 patients found to have bacteriuria present at cystoscopy were excluded from the analysis as shown in Table 1.

A total of 204 patients completed Trial A and 185 patients completed Trial B. Both control and study groups were well matched for sex and age (mean age control 66.5 years SD ± 15.64, study 63.2 years S.D. 14.43).

The organisms isolated throughout both trials followed the expected pattern : **Escherichia coli 24, Proteus** 15, Streptococcus faecalis 12, **Staphylococcus albus** 12, **Klebsiella** 4, B **haemolytic streptococcus** 2, **Pseudomonas aeruginosa** 1 and **Staphylococcus aureus** 1. One patient from the control group developed **E coli** septicaemia.

The 31 patients excluded because of presence of bacteriuria at cystoscopy represent a bacteriuria on presentation rate of 7.4% (3% with $> 10^5$ organisms/ml). 19 patients were in the control groups and 10 of these had $> 10^5$ organisms/ml. Five days later 16 still had bacteriuria and the same 10 had $> 10^5$ organisms/ml. In the two study groups, 12 had bacteriuria at cystoscopy (three with $> 10^5$ organisms/ml), but five days later only one patient had bacteriuria and this was at a concentration of 10,000 organisms per ml.

DISCUSSION

All our cystoscopies were done under general anaesthesia. For medico-legal reason, the co-trimoxazole was given after the cystoscopic examination. The principle behind antibiotic prophylaxis is to establish a high blood and tissue-fluid levels of the particular effective antibiotic at the time of operative procedure to cover the shower of bacteria released by the procedure (10). If the cystoscopy were done under local anaesthesia or regional anaesthesia with a caudal block it would be preferable to administer the antibiotic prophylactically one hour prior to the instrumentation. This would be more in keeping with antibiotic prophylaxis used in biliary surgery (11) and appendicectomy (12). Nevertheless, single dose co-trimoxazole had been shown to be highly effective in the treatment of cystitis and the elimination of bacteriuria (13, 14). Our aim was to establish the incidence of bacteriuria in our unit and to evaluate a simple method of reducing the incidence. Therefore, co-trimoxazole used in these two dosages were chosen.

In Trial A, an attempt was made to correlate the incidence of dysuria, offensive urine and frequency of micturition following cystoscopy to the microscopic and bacteriological findings on the urine. A questionnaire was issued to each patient after cystoscopy, to be returned with the midstream urine specimen five days later. However, no correlation was found, and these results were excluded from the final analysis. The questionnaire was dropped from Trial B. Most cases of dysuria following cystoscopy was probably due to the trauma of the instrumentation rather than the induced infection.

Our results showed a higher incidence of bacteriuria following cystoscopy than previously reported (3, 6), both for all bacteriuria (30.6% in Trial A, 17.8% in Trial B) and for significant bacteriuria (18.9% in Trial A, 11.5% in Trial B). The combined controls in our series would be 24% for all bacteriuria and 16% for significant bacteriuria. In the study of Richards and Bastable (3), the infection rate was 6.5% for the controls. They defined injection as $> 10^5$ organisms per ml and at least 10 white cells. If we were to adopt this definition, the infection rate in our combined controls would be 2.8% and nil in the treated groups. It could be argued that this is a "better" reflection of the clinical situation as most cases of post-cystoscopic bacteriuria were completely asymptomatic. With such a low infection rate, a blanket antibiotic administration would be unjustifiable, whether its given prophylactically or after cystoscopy. Yet undoubtedly the risk of clinical infection and even septicaemia following urethral instrumentation is real.

Our study showed conclusively that both co-trimoxazole regimes used could significantly reduce the incidence of bacteriuria after cystoscopy. Trial B dosage of one double-dose tablet of co-trimoxazole is preferable because of the simplicity of its administration. Previous studies have identified groups of patients who are at a greater risk of developing infection following urethral instrumentation. They are the female patients (3), the obstetric patients (4, 15, 16), the patients with indwelling catheters (17), the diabetic patients (18), the patients with retained bladder papillomata and the patients with damaged urinary tracts (5). It would be advisable to administer co-trimoxazole to such patients to minimise the risk associated with urethral instrumentation.

There was a significant difference in the incidence of bacteriuria in our two controls, 34 (30.6%) and 21 (18.9%) in Trial A and 17 (17.8%) and 11 (11.5%) in Trial B. It is difficult to account for this difference as the spectrum of patients was similar and the instruments used and the method of sterilising them were identical. The different operators involved in the two trials could be a factor. However, the results of the Study Groups in both trials were similar, 5 (5.3%) and 3 (3.2%) in Trial A and 5 (5.5%) and 2 (2.2%) in Trial B.

Out of the 420 patients in the trials, only one developed E. coli septicaemia, an incidence of 0.2%. This patient was from the Trial B control group with no existing bacteriuria. He was admitted two days after his cystoscopy with a high temperature and a low blood pressure. He was successfully treated with instravenous fluids and gentamicin.

The 31 patients with bacteriuria at the time of cystoscopy were completely asymptomatic. They represented a

bacteriuria on presentation rate of 7.4% (3% with $> 10^5$ orgamisms per ml). It is generally accepted that this is a group most at risk to post-cystoscopy septicaemia. There is no reliable clinical criteria to pre-select this subgroup of patients unless all patients for cystoscopy or other urethral instrumentation precedures are subjected to urine examination a few days prior to the precedures. In a busy urological unit, that would make an unreasonable demand on an already busy bacteriology laboratory. Although the number of this subgroup of patients was not large enough to show whether co-trimoxazole has a statistically significant influence on those patients, it did show a reduction in the incidence of bacteriuria in the treated group compared with the controls. It would be worth while to identify this subgroup of patients in a larger survey to evaluate the role of antibiotic prophylaxis.

TABLE 1
POST-CYSTOSCOPY BACTERIURIA

	TRIAL A		TRIAL B	
	CONTROL	CO-TRIMOXAZOLE (Standard)	CONTROL	CO-TRIMOXAZOLE (double-dose)
NO. OF PATIENTS	111	93	95	90
ALL BACTERIURIA	34 (30.6%)	5(5.3%) P<0.05	17 (17.8%)	5 (5.5%) P<0.05
$>10^5$ ORGANISMS/ML	21 (18.9%)	3 (3.2%) P<0.05	11 (11.5%)	2 (2.2%) P<0.05

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