

ORIGINAL ARTICLE

BACTERAEamia FOLLOWING ENDOSCOPIC AND ENDOUROLOGICAL PROCEDURES IN A TERTIARY CARE HOSPITAL

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ABSTRACT:

A total of 250 consecutive patients attending the Urology department of a tertiary care hospital of Punjab were studied to investigate the incidence, microbial causes, duration and risk factors of bacteraemia following various endoscopic and endourological procedures. Bacteraemia was observed in 30.4% (76/250) of patients. Although, it was observed after minor procedures like catheterisation and cystoscopy, but it was most common after prostatic surgery TUR-P (42.8%). It occurred within one hour of procedure in most of the patients and had a transitory life of few hours. No case developed symptomatic blood stream infection. Pre-operative bacteriuria was present in 47.2% of patients and 39.5% had similar organisms in blood and urine. Statistical concordance between the blood and urine isolates was insignificant ($p=0.14$). Most common organism causing bacteraemia was coagulase negative staphylococci followed by *Esch. coli* and *pseudomonas*. All these organisms showed resistance to all the first line drugs.

Keywords: endoscopic and endourological procedures; TUR-P; bacteraemia; bacteriuria

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INTRODUCTION

Urosepsis in all its manifestations of severity viz. transient bacteraemia, localized sepsis (cystitis, prostatitis), septicaemia and generalized sepsis is known to occur following all endoscopic and endourological procedures. It has been reported that septicaemia occur in approximately 1.5% of men undergoing transurethral resection of prostate (TURP) while the reported rates of bacteraemia following the TURP varies between 0-31%¹. The severity of such urosepsis is also known to differ depending on many factors such as pre-existing infection, the infecting organisms present, their antibiotic susceptibility, duration of the procedure, indwelling catheters and drainage tubes put in post-operatively. Diabetic, immunocompromised and patients in ICU are more prone to develop urosepsis². The factors are again known to differ from institute to institute and from surgeon to surgeon within the same institute. Therefore the present study was carried to assess the relevant frequency and the nature (microbial causes and

their antimicrobial susceptibility pattern) of infection (bacteraemia) following endoscopic and endourological procedures in a tertiary care hospital to design effective preventive and treatment strategies.

MATERIALS AND METHODS

A total of 250 consecutive patients undergoing various urological procedures (Catheterisation – 55 (22%); Cystoscopy – 75 (30%)³; TURP – 21 (8.4%) ; TUR-BT – 62(24.8 %); Uretero-rensoscopy(URS) – 21(8.4%); Visual internal urethrotomy (VIU)- 16 (6.4%) in a tertiary care hospital of Punjab (North India) were included in the study. Patients were selected irrespective of age, sex and the urological procedures undertaken. The Patients having fever, signs of pyelonephritis or renal failure were excluded from the study. All the Patients gave written consent to participate in the study. Standard of care antibiotic prophylaxis (Amikacin 500 ml) was given prior to the procedure to all the patients.

Blood Sampling

Blood was collected 4 to 5 times for culture as shown in table 1.

Approximately 10 ml of venous blood was collected using all the aseptic precautions from all the patients :

- a. Before the procedure
- b. Immediately after the procedure
- c. 1 hour, 4 hour and 24 hours after the procedure
- d. During bacteraemic crisis if any

The blood samples were inoculated into 50 ml of brain-heart infusion broth and incubated at 37 C. Subcultures were done on blood agar and MacConkey agar plates on alternate days upto 10 days. Any bacterial growth obtained was identified by the standard guidelines³.

Urine Sampling

Midstream specimen of urine collected preoperatively and during bacteraemic crises if any were cultured on blood and CLED agar media and incubated at 37 C for 24 hours. Bacterial growth obtained on agar plates was identified and the antibiogram of all the bacterial isolates from blood and urine samples was studied by Kirby Bauer disc diffusion method³

RESULTS

In the present study, bacteraemia was detected in 76 of 250 patients which gave an incidence of bacteraemia as 30.4 % in patients undergoing endoscopic and endourological procedures. Although, bacteraemia was observed after minor procedures like catheterization (2/52 =3.8%) and cystoscopy (2/70=2.8 %), it was most common after prostatic surgery TURP (9/21=42.8 %) Of the 76 Patients who had bacteraemia, in 67 (88.2%) it occurred within one hour of the procedure. And in 61 of them (91.04%) it subsided within 4 hours while in rest of 6 patients the culture became negative after 24 hours. In 9 (9/76) patients, bacteraemia developed after 1 hour of procedure and in 6 of these 9 patients, it subsided within 24 hours. In the remaining three patients it subsided after 48 hours of procedure. No case developed symptomatic blood stream infection

Pre-operative bacteriuria was present in 118 (47.2%) of patients. Statistical concordance between the blood and urine isolates was insignificant (p=0.14). Analysis of the isolated organisms in blood and urine revealed that out of 76 cases of bacteraemia, 30(39.5%) had similar organisms in blood and urine, 7(9.2%) had dissimilar organisms and in 43(51.3%) blood culture was positive but urine was sterile. It was further observed that in 40(52.6%) bacteraemic patients, there was growth of gram negative organisms in blood while 36(47.4%) showed the growth of gram positive organisms. Coagulase negative staphylococci were isolates in maximum number (25) followed by Esch.coli (23), Pseudomonas (14), Enterococci (6), Coagulase positive staphylococci (5) and Acinetobacter (3). Most of the gram negative isolates were found to be sensitive to Amikacin, Piperacillin/ tazobactam and Imipenem but were highly resistant to Ampicillin, 3rd generation cephalosporins and Ciprofloxacin. Gram positive organisms showed maximum susceptibility to Amikacin, Linezolid and Vancomycin and maximum resistance to Ampicillin, Erythromycin and Ciprofloxacin.

DISCUSSION

Bacteraemia following endoscopic and endourological procedures is a universal finding and has been reported to vary between 0.58 % to 48.8 %.⁴⁻⁶ Ives et al observed it in 12% and Mohee et al in 23 % in their studies.^{7,8} In the present study, bacteraemia was detected in 76 of 250 cases, which gave an incident of 30.4%, with the highest incidence of 42.8% following prostatic surgery which is similar to the findings of Satyanand et al.⁵ Bacteraemia was also observed after minor procedures like catheterisation, cystoscopy and urethral dilatation as reported by Marshall⁶. It is widely known that incidence of bacteraemia is minimal in urethral catheterisation if a catheter of smallest possible caliber which will serve the purpose is used. Contrarily, the larger size of the instrument (resectoscope) used in the TUR-P and the time taken in completing the procedure seems to account for high incidence of bacteremia following this procedure.

Table 1: Pattern of bacteraemia

Time of occurrence of bacteraemia	No. of cases	Time when bacteraemia subside			
		After 1 hour	After 4 hours	After 24 hours	After 48 hours
At the end of procedure	76	67	61	6	---
After 1 hour	9	---	---	6	3
After 4 hours	---	----	----	----	----
After 24 hours	---	----	----	----	----

In majority of the 76 cases who developed bacteraemia in this study, it was found to be of immediate occurrence and transitory nature of a few hours. Similar findings have been reported by other authors too^{5,7-9}. This may be responsible for absence of clinical manifestations in most of the cases of bacteraemia following endoscopic and endourological procedures and the reason for this could be that almost all the patients are put on reasonably strong antibiotics preoperatively as well as postoperatively- (admittedly or otherwise).

Preoperatively, bacteriuria was present in 47.2% of patients of our study. These patients were first treated for the infection with appropriate antibiotics and then taken for surgery. We observed that there was no statistically significant difference (p=0.04%) between the number of patients who developed bacteraemia in this group and those who had sterile urine preoperatively. Mohee et al made similar observations in a study conducted in United Kingdom (2016)⁸. It is now a universal standard practice that even asymptomatic bacteriuria must be treated before urological surgery and so are pregnant females.

Almost 40 %(39.5%) patients who developed bacteraemia in our study, had similar infecting organisms in their blood and urine. This shows that bacteraemia in these patients had been caused by organisms of pre-existing urinary tract infection. Mohee et al observed poor correlation between preoperative urine culture results and the organisms found in the blood of bacteraemic patients following prostatic surgery (TURP) and speculated that the source of bacteraemia might be prostate itself⁸. Bacteraemic patients who had infection with dissimilar organisms or had preoperative sterile urine in the present study, could have been infected due to cross infection in the hospital. Inhabiting bacteria of the hospital environment that colonize skin, urethral flora, prostatic secretions and contaminated bladder irrigation solution have been reported as some of the sources of infection in these patients.^{5,8,9}

There is variability in the reported isolation rates of gram positive and gram negative organisms from cases of bacteraemia in different studies.^{5,8,9} We observed slightly higher rate of isolation of gram negative organisms (52.4%) than that of gram positive organisms (47.6%). Gram-negative bacilli, especially, Esch.coli has been reported as commonest organism responsible for bacteremia by some authors.^{4,5} However, Jindal et al observed predominance of gram-positive organisms from blood cultures in their study.⁹

Change in the spectrum of bacterial flora time-to-time from the same or different places could be due to the prevalence of selective strains of hospital infection. In our study, gram negative organisms showed maximum susceptibility to amikacin, piperacillin/Tazobactam and Imipenem and gram positive to vancomycin and linezolid. High frequency of resistance to various antimicrobial agents could be due to their widespread and indiscriminate use as first line drugs in the hospitals.

It can thus be concluded from the present study that bacteraemia following various endoscopic and endourological procedures is a common finding and preoperative infected urine predisposes to bacteraemia. Therefore urine should always be made sterile prior to endoscopic and endourological procedures by giving appropriate antibiotic agents after testing their antimicrobial sensitivity. This would discourage the indiscriminate use of the antibiotics and would be helpful in the proper treatment of the patients.

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