Original Article

Antibiotic Prophylaxis during Extracorporeal Shock Wave Lithotripsy in the Prevention of Urinary Tract Infections in Patients with Sterile Urine before the Procedure

Pharmacology Section

BEHROUZ GHAZIMOGHADDAM, HAMIDREZA TAJARI, MAHNAZ GHOLIPOOR, MORTEZA BALMEHD

ABSTRACT

Introduction: There are controversies in the literature regarding the need and the duration of antibiotic prophylaxis in patients with extracorporeal shock wave lithotripsy (ESWL), who had a negative urine culture before the operation.

This study was performed to evaluate the efficacy of the antibiotic prophylaxis in patients with proven sterile urine before they underwent ESWL.

Materials and Methods: In this clinical trial, 150 patients with renal or urethral stones and sterile urine were examined for bacteriuria (positive urine culture) following ESWL. These patients were classified into 3 groups which received either a single dose of oral co-trimoxazole (Tab, 400/80 mg)- group A, a single dose of nitrofurantoin (Tab:100mg) -group B and no treatment- group C. Patients were followed with urine analysis and urine culture after two weeks.

Results: The occurrence of post-ESWL urinary infections (positive urine culture) was 14% in group A, 10% in group B and 14% in group C. The complications among the groups were not statistically significant.

Conclusion: The incidence of urinary tract infections after ESWL is extremely low, provided that in patients who had sterile urine before ESWL, prophylaxis antibiotics do not seem to be necessary.

Key Words: ESWL, Antibiotic, UTI, Prophylaxis, nephrolithiasis

INTRODUCTION

Extracorporeal Shock Wave Lithotripsy (ESWL) is a minimally invasive procedure which is done with intravenous sedation and so in many cases with small renal stones, the urologists and the patients consider it as the preferred management option. Besides, the method safety, low side effects and its availability in most of the hospitals play a role in its popularity [1].

However; urosepsis can result from shock wave lithotripsy when bacteria are released from the calculi. The incidence of this complication is 0.1–1.5%. Pyelonephritis and cystitis may also result from shock wave lithotripsy .The role of antibiotics for low risk patients without the evidence of infection is controversial in the literature. It was reported in randomized controlled trials that 2% of the prophylactically treated patients and 7% of the untreated patients developed a urinary tract infection after ESWL. It has been suggested that antibiotic prophylaxis is effective in preventing post-ESWL UTIs [2]. Prezioso suggested that antibiotic prophylaxis for the prevention of postsurgical infections is a common practice in urological surgery as well as in endourological procedures, both in at- risk patients (local or systemic risk factors: age, immunological status, metabolic disorders, poor general conditions) or in those with a positive urine culture and also in patients with urine which was previously sterile [3]. But, Bierkens and his colleagues concluded that patients whose urine samples were sterile before ESWL did not need antimicrobial prophylaxis (4).Because of these controversies; this study was performed in order to evaluate the efficacy of antibiotic prophylaxis prior to ESWL in patients with proven sterile urine.

MATERIALS AND METHODS

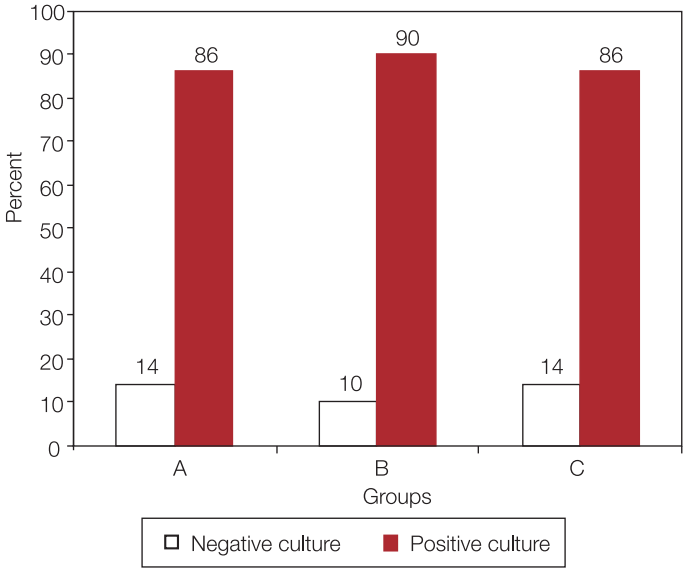
This clinical trial was carried out on patients with renal and urethral stones and sterile urine, who were referred to 5-Azar hospital, the central academic hospital in the Golestan Province in the Northeast of Iran; from 2004-2006. A complete history was taken and patients underwent physical examination. Patients with clinical signs of urinary tract infection, evidence of infectious stones or a positive urine culture, recurrent bacteriuria and recent endourological manipulations were excluded. Before ESWL, antibiotics were discontinued for longer than one week. A total of 150 patients were consecutively randomized into three groups (A, B and C). Each group consisted of 50 patients who received either a single dose of oral Co-Trimoxazole 400/80 mg (group A), a single dose of Nitrofurantoin 100 mg (group B) and no treatment (group C). The patients were followed up with urinalysis and urine culture after two weeks. If the bacterial count of the urine was 10^4 or more per ml, the diagnosis of UTI was confirmed. χ^2 tests was used to analyze the data.

RESULTS

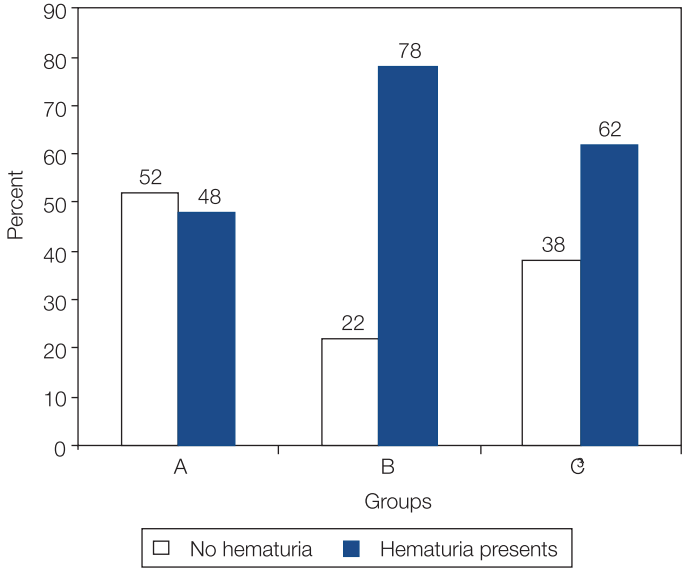
The mean age of the cases was 40.6±12.9 (years ± SD). The male to female ratio was 1:1. No significant relationship was seen between the groups with respect to the stone site and the size.

No significant differences were seen between the groups with respect to haematuria, bacteriuria and pyoria.

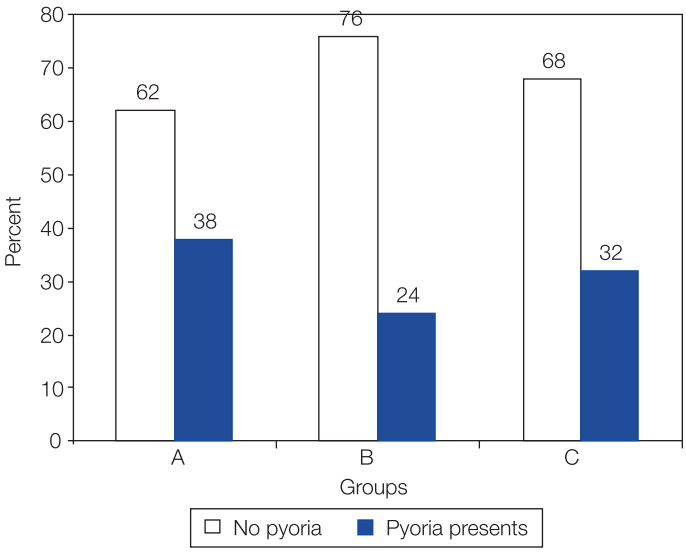
The occurrence of post-ESWL urinary infections (positive urine cultures) was 14% in group A, 10% in group B and 14% in group C. (Table/Fig: 1-3). There was no statistically significant difference



[Table/Fig-1]: Results of urine cultures in therapeutic groups of patients underwent ESWL (P-value>0.05)



[Table/Fig-2]: Distribution of hematuria in therapeutic groups of patients underwent ESWL (P-value>0.05)



[Table/Fig-3]: Distribution of pyoria in therapeutic groups of patients underwent ESWL (P-value>0.05)

among the groups regards to the bacteriuria, haematuria and pyoria (P-value>0.05).

DISCUSSION

The results of this investigation showed no significant effectiveness of the antibiotics on the prevention of the positive urine cultures and other complications after ESWL and the occurrence of post-ESWL urinary infections (positive urine cultures) was 14% globally.

In other investigations, it has been shown that the incidence of urinary tract infections which resulted from ESWL in patients with sterile urine before the procedure was low (8.4%). No major differences between the antibiotics which were used in prophylaxis were detected, keeping into account the limited size of the study sample which was defined by the endourological procedures [4], [3].

Islam et al, from Bangladesh, had shown that in the antibiotic prophylactic group, 6.4% had post ESWL urine culture positivity, while in the without prophylaxis group, 8.8% had positive urine cultures. The incidence of urinary tract infections after ESWL is extremely low, provided that the patients had sterile urine before the procedure [5].

Takahashi et al designed a retrospective study to establish a standard protocol for surgical antimicrobial agents for patients who received transurethral ureterolithotripsy (TUL). The results of that study showed that the single antimicrobial prophylaxis was effective for patients who received a TUL operation [6].

This was lower than that which was reported in our study. Maybe it was the result of the differences between the antibiotics which were used in various studies. A perspective randomized trial with a larger sample size will be needed with the use of various types of antibiotics.

Therefore, in patients with recurrent UTIs, positive urine cultures before ESWL, several large stones, a past history of infectious stones and urological manipulation; it has been recommended to use antibiotic prophylaxis due to the higher risk of UTIs. In other cases, there has been controversies and these require more trials.

CONCLUSION

Since its introduction in 1982, ESWL has revolutionized the treatment of urinary calculi and it has been described as one of the most important developments in medicine in the twentieth century [7]. The complications of ESWL have been extensively investigated. Bacteriuria following the ESWL of infectious stones has also been described. But the value of antibiotic prophylaxis during ESWL has not been approved as yet.

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AUTHOR(S):

1. Dr. Behrouz Ghazimoghadam
2. Dr. Hamidreza Tajari
3. Dr. Mahnaz Gholipoor
4. Dr. Morteza Balmeh

PARTICULARS OF CONTRIBUTORS:

1. Corresponding Author
2. Urologist, Assistant professor of Golestan University of Medical Sciences
3. Medical Doctor
4. Medical Doctor

NAME, ADDRESS, TELEPHONE, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr Behrouz Ghazimoghadam
Assistant professor of Golestan University of Medical Sciences
Urology department, 5 Azar Hospital, 5 Azar boulevard,
Gorgan, Golestan province, Iran
Telephone: 0098-171-2220561-3
E-mail: behrouzgm@yahoo.com

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