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RESEARCH ARTICLE

Comparison of Metronidazole and Ceftizoxime in Prophylaxis of Post-Hysterectomy Infections

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ABSTRACT

Ceftizoxime is a common agent used in prophylaxis of infections after abdominal hysterectomy. Metronidazole could be used instead of ceftizoxime for this matter. To compare these two drugs, in a randomized clinical trial, 30 patients received metronidazole suppositories (1g) and 33 patients received intravenous ceftizoxime (1g) before surgery. There were not any significant demographic (age, weight, parity, hospitalization duration, pre-operation hemoglobin) differences between two groups. Also, the incision type and post-operation bleeding were the same in two groups. The complications after abdominal hysterectomy such as febrile morbidity, urinary tract infections and wound infections were not significantly different between two treatment groups. These results indicate that a single dose metronidazole has the same effect as ceftizoxime in infection prophylaxis of post-hysterectomy infection.

Keywords: *Ceftizoxime, Metronidazole, Abdominal hysterectomy, Prophylaxis, Wound infection*

Hysterectomy is performed primarily as a treatment of cervical carcinoma of the uterus [1]. The two most common complications after this operation are febrile and infectious morbidities. Post-operative infections occur more frequently in the urinary tract and the rest are infections of the vaginal cuff, pelvic organs and surgical incisions. The risk factors include increased patient's age, diabetes mellitus, anemia, prolonged operation time and operations without use of pre-operative prophylactic antibiotics [2-5].

The prophylactic use of antibiotics for surgical procedures has become a standard practice [6]. Hysterectomy is not an exception. Post-hysterectomy infections complications commonly develop within a few weeks of the procedure. Bacteria, which are probably members of the skin or cervico-vaginal flora, are readily isolated from the pelvic operative site during abdominal hysterectomy [6-7]. Prophylactic antibiotics are selected based on the type of bacteria present in the operation site and the concentration of drug before the time of possible bacterial contamination. Studies have shown that the incidence of infection complications following abdominal and vaginal hysterectomy decreases with adequate prophylaxis to as low as 12-32% of the rate expected without perioperative antibiotic therapy [8].

Among various antibiotics, cefuroxime, piperacillin and metronidazole are recommended for pre-hysterectomy prophylaxis [9-12]. Aslo, ceftizoxime has been introduced as an appropriate antibiotic for this matter [13-15]. Vaginal suppository of metronidazole is a safe antibiotic for post-hysterectomy infection prevention. The object of this study is to compare the efficacy and safety of local metronidazole with those of intravenous infusion of ceftizoxime in the prevention of infections after hysterectomy.

MATERIAL AND METHODS

A total of 63 women who were scheduled for abdominal hysterectomy at Mirza-Koochak-Khan Hospital were randomly assigned to receive a vaginal suppository of metronidazole (1gr) 2 hours before operation or intravenous infusion of ceftizoxime (1gr) at the time of anesthesia induction. Exclusion criteria were menopausal women, antibiotic use within the week preceding surgery, diabetes mellitus, urinary infection and vaginitis. Patients receiving corticosteroids or estrogen were also excluded from the study. Of 63 women, 30 were randomized to treatment with metronidazole and 33 to treatment with cefozoxime.

Routine care included daily examination and recording of vital signs and body temperature every 8 hours. Urine samples for cultures were taken from all patients preoperatively, on the 3rd postoperative day, at the removal of the bladder catheter and at discharge from the hospital. In the case of body temperature

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Table 1. Demographic data for two treatment groups

Variable	Metronidazole group n = 30	Ceftizoxime group n = 33	Significance level
Age (years)	43.1 ± 4.9	44.5 ± 4.7	NS*
Parity	6.1 ± 2.5	5.9 ± 2.3	NS
Preoperation hospital stay (day)	4.3 ± 3.4	4.8 ± 3.3	NS
Preoperation hemoglobin level (mg/dL)	13.04 ± 1.2	12.57 ± 1.5	NS
Weight ≥ 75 Kg	21%	10%	NS

*NS: not significant (p value > 0.05)

Table 2.. Comparison of variables during abdominal hysterectomy between two treatment group

Variable	Metronidazole group n = 30	Ceftizoxime group n = 33	Significance level
Incision type			
Maylard	6.7%	9.3%	NS*
Longitudenal	10%	9%	NS
Pfannentiel	83.3%	81.6%	NS
Adnexa removal			
Bilateral	30%	32.4%	NS
Unilateral	20%	22.1%	NS
No removal	50%	45.5%	NS
Bleeding volume (ml)	359 ± 183.9	380.6 ± 186.86	NS
Operation duration (min.)	120.5 ± 26.63	120.9 ± 25.73	NS

*NS: not significacant (p value > 0.05)

higher than 38.5°C, blood culture was performed. Also, in case of constant wound discharging, a culture of wound material was carried out.

Statistical analysis: The data were presented as mean ± standard error. Student's t test was used for comparisons.

RESULTS

There were no significant differences in the demographic factors between two treatment groups, i.e. those on metronidazole compared with those on ceftizoxime (Table 1). Also, as shown in Table 2, there was no significant difference in incision type, way of adnexa removal, duration of surgery and volume of bleeding.

To evaluate the efficacy of two treatment group, post-operation hospital stay, febrile morbidity, urinary infection, and wound infection were compared. There were no significant differences between two treatment groups (Table 3).

DISCUSSION

Antibiotics prophylaxis is used in surgical procedures which are known to have a high risk of infectious complications and/or in procedures in which the consequences of infections may be serious and costly. Use of prophylactic antibiotics decreases the infection morbidity rate and length of hospital stay associated with vaginal hysterectomy. Although the current rate of operative site infection after abdominal hysterectomy has declined, infection remains the most common complication associated with abdominal hysterectomy. Antibiotic prophylaxis is used in surgery to reduce the frequencies of post-operative bacterial infections by reducing the number of microorganisms in the surgical field and the dissemination of bacteria in tissues. Bacteria which cause postoperative infections are more often endogenous (from the patient's normal or acquired flora) than exogenous (from hospital staff, air, etc.). Hysterectomy is among surgical procedures for which prophylaxis has been documented and indicated. A number of studies have shown that the frequency of infections following total hysterectomy when prophylactic antibiotics is not used is significantly higher than after antibiotic use [3,12,15]. In women who are undergoing total abdominal hysterectomy, prophylaxis is especially recommended if they have bacterial vaginosis, if they are markedly obese, or they are immunocompromised [3]. Bacteria involved are mostly aerobic and anaerobic vaginal flora, gram-negative enteric bacteria and S. auerus [1616]. The recommended prophylactic antibiotics are cefuroxime, ceftizoxime, piperacillin or metronidazole [9-12, 17]. As metronidazole vaginal suppository is convenient to use for patients, in this study, we compared vaginal suppository of metronidazole with intravenous infusion of ceftizoxime. Despite the different in vitro antimicrobial profiles for metronidazole and ceftizoxime, results were not significantly different

Table 1. Comparison of variables after abdominal hysterectomy between two treatment group

Variable	Metronidazole group n = 30	Ceftizoxime group n = 33	Significance level
Post-operation hospital stay (days)	4.03 ± 1.37	4.24 ± 3.12	NS*
Febrile morbidity	3%	3.4%	NS
Urinary infection	30.03%	33.3%	NS
Wound infection	3.3%	6%	NS

*NS: not significacant (p value > 0.05

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when each of these two drugs was used. Treatment with oral metronidazole is known to cause nausea. Vaginal administration of metronidazole instead of its oral use minimizes this side effect. Also, vaginal use causes the high concentration of the drug in the vagina, the place for accumulation of bacteria infecting operation site.

In conclusion, metronidazole vaginal suppository has the same efficacy as ceftizoxime in the prevention of infection after abdominal hysterectomy, meanwhile metronidazole vaginal suppositories are more convenient in use than ceftizoxime injection.

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