

COMPARISON OF SINGLE DOSE VERSUS MULTIPLE DOSES OF ANITIBIOTIC PROPHYLAXIS IN ELECTIVE CAESARIAN SECTION

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Date Received:

February 16, 2013

Date Revised:

September 26, 2013

Date Accepted:

November 13, 2013

ABSTRACT

Objective: To compare the efficacy of single dose versus multiple doses of antibiotic (cefotaxime) in the prophylaxis of postoperative wound infection in elective caesarian section.

Methodology This quasi experimental study was conducted in the Department of Obstetrics & Gynecology, Lady Reading Hospital Peshawar from 1st January to 31st Dec 2007. Hundred patients admitted for elective caesarian section fulfilling selection criteria were included in the study through non probability convenience sampling. These were randomly allocated by card method into 2 groups of 50 each. Patients were operated by specialist registrar and Group A was given single dose of prophylactic antibiotic while group B was given multiple doses. Wound was examined on 2nd and 6th day and then after 6 weeks. The efficacy was measured in terms of febrile morbidity; infection and duration of hospital stay. All data were entered in a semi structured proforma. Statistical analysis was carried out by using Chi Square test.

Results: Febrile morbidity was equal in both groups (n=10, 20%). Superficial wound infection was (n=8, 4%) in both groups. Deep wound infection was (n=2, 1%) in group A and (n=4, 2%) in group B and duration of hospital stay was equal in both groups. Nonsurgical site infection occurred in (n=16, 8%) in group A and (n=12, 6%) in group B. There was no significant difference in outcome between the two groups.

Conclusion: Single dose antibiotic (cefotaxime) is as effective as multiple doses of antibiotics (cefotaxime) in the prophylaxis of postoperative wound infection in elective caesarian section.

Key Words: Caesarian section, Wound infection, Antibiotic prophylaxis.

This article may be cited as: Shaheen S, Akhtar S. Comparison of single dose versus multiple doses of antibiotic prophylaxis in elective caesarian. *J Postgrad Med Inst* 2014; 28(1):83-6.

INTRODUCTION

Surgical site infection is one of the most common postoperative complications, occurring in at least 5% of all patients undergoing surgery and 30-40% of patients undergoing abdominal surgery, depending on the level of contamination^{1,2}. Development of a surgical site infection has a large impact on mortality and morbidity as well as healthcare costs^{1,2}. In the United Kingdom, length of stay in hospital is typically doubled and additional costs per patient have considerably increased with the slight variability depending on the type of surgery and the severity of the infection³.

Risk of infection in developing countries is more than the developed countries due to malnutrition, anemia, poverty and environmental pollution; poor preopera-

tive preparation, wound contamination, poor antibiotic selection, or the inability of an immune-compromised patient to fight against the infection. Contamination of the wound is present to some extent in all incisions thus adding significant morbidity and mortality⁴. Mainstay of management is prophylaxis which can be achieved by a variety of methods including use of antibiotics. Short courses of prophylactic antibiotics are as efficacious as long courses in preventing postoperative infection^{1,2,5}. However over use of prophylactic antibiotics can lead to economic burden on our health system as well as development of resistance to the common organisms. Use of single dose antibiotic has proven to be effective in preventing wound infection⁶⁻⁹. The aim of this study was to compare the single versus multiple doses of cefotaxime in preventing infection in patients undergoing elective caesarean sections. Cefotaxime was chosen for

this purpose because it was easily available in the pharmacy of the hospital.

METHODOLOGY

This study was conducted in the Department of Obstetrics and Gynecology, Lady Reading Hospital Peshwar after taking approval from hospital ethical committee of Postgraduate Medical Institute from 1st January to 31st Dec 2007. Study design was interventional quasi experimental and sampling technique was non probability convenience. All the patients admitted for elective caesarean section through OPD were included in the study while patients admitted for emergency cesarean sections and patients admitted for elective cesarean sections with medical disorders and placenta previa were excluded from the study. Sample size was 100 patients who were randomly allocated into 2 groups A and B by simple card method. Informed consent was taken for surgery and anesthesia. Pre-operative preparation was done. Surgery was performed by specialist registrar using standard technique. Suture material was vicryl no 1 (polyglycolic acid) for closing the uterus and black silk no 2-0 for skin closure with interrupted stitches. Post operatively wound was cleaned with pyodine solution and antiseptic dressing was applied. None of the patients had significant blood loss necessitating blood transfusion. Patients were given routine standard post-operative care. Patients in group A were given 1gm of cefotaxime intravenously half an hour before operation and patients in group B were given 3 doses of 1gm of cefotaxime intravenously. 1st dose was given 30 minutes before operation while 2nd and 3rd doses were given after 12 hours' followed by 400mg of Cefurixime oral

dose for next five days. Each patient was observed in the post-operative ward. Four hourly temperatures was taken and patients were kept for 6 days. Fever developing or persisting for 48 hours of $>37^{\circ}\text{C}$ after surgery was included as the febrile morbidity. Wound was examined on 3rd and 6th and after 6 weeks. Wound was inspected for any evidence of superficial or deep infection, pus discharge, abscess formation, wound dehiscence, and hematoma formation. Patients were also assessed for any respiratory, or urinary tract infection (all patients had catheter for 24 hours). Urine examination was done on 3rd post-operative day along with Hemoglobin. checked for all patients; urine culture was done in patients having fever for more than 48 hours or those who developed fever after 48 hours. The outcome measures were febrile morbidity, wound infection, and wound hematoma, UTI, and wound dehiscence. All data including demographic details were entered in a semi structured proforma. Statistical analysis was carried out by using Chi Square test. The results were expressed in percentage for categorical data. Results were tested by chi square test. A p-Value of <0.05 was considered statistically significant. Calculations were done on SPSS 10.0.

RESULTS

In this study, a total of 100 cases of elective caesarean section were recruited. Mean age was 28 yrs \pm 2 SD in group 1 and 29 yrs \pm 2 SD in group 2. Primigravidas were 20% (n=10) in group 1 and 30% (n=15) in group 2. Multigravidas (2-4) were 80% (n=40) in group 1 and 70% (n=35) in group 2. Major indications for caesarean section in group 1 were having previous 2 or more caesarean section and previous 1 caesarean section with

Table 1: Indication for caesarean section

Indications	Group A	Group B
Cephalopelvicdisproportion	6(12%)	5(10%)
Previous 2 or more C/Section	12(24%)	15(30%)
Previous 1 C/Section with breech presentation	12(24%)	08(16%)
Previous 1 C/Section with post dates	10(20%)	12(24%)
Primigravida with breech presentation	10(20%)	10(20%)

Table 2: Causes of febrile morbidity

Causes	Group A		Group B		Statistical Analysis
	Frequency	%age	Frequen- cy	%age	
Wound hematoma	1	2%	1	2%	OR= 1
Superficial Wound infection	4	8%	4	8%	OR=1
Deep wound infection	1	2%	2	4%	OR= 0.49 95% CI(0.043-5.58)
Chest infection	2	4%	2	4%	OR 1
Urinary tract infection	2	4%	1	2%	

breach in 12(24%) in patents each while in group 2, they were previous 2 or more caesarean section in 15(30%) patents and previous one with postdates in 12(24%) patients (Table 1).

Patients with febrile morbidity were 10 (20%) each in group A and B. The causes of febrile morbidity are given in Table 2. Over all there was no statistically significant difference in proportion of post-operative wound infection between the two groups in terms of febrile morbidity (OR=1). Duration of hospital stay was 6 days or less in 45(90%) patients each and more than 6 days in 5(10%) patients each in both the groups.

DISCUSSION

Postoperative wound infection in obstetrics and gynecology is higher as compared to other specialties because 80-90% patients are unbooked and have poor socioeconomic status. Therefore, prevention becomes very important in these patients. For this purpose, prophylactic antibiotics are recommended but over use of antibiotics results not only in the emergence of resistant organisms but also causes great economic burden on the health system^{5, 6}. Many factors can contribute to the development of postoperative wound infection like low hemoglobin level, malnutrition and multi parity^{3, 7}. Source of infection can be patient, theatre staff and theatre environment. Airborne bacteria are present in droplets exhaled by surgical team and on dust particles shed by personnel and surgical drapes. Airborne bacteria are also raised from the floor by movement of operation theatre personnel, movement of trolleys and opening and closing of doors. Laminar flow rooms markedly decrease the number of bacteria in operating room because air is exchanged 3 times each minute⁸. Laminar flow facility is not available in our institution that is why prophylactic antibiotics are used.

Prophylactic antibiotics have been recommended by many research workers¹⁰. This is achieved by giving broad spectrum intravenous antibiotics preoperatively and peak serum and tissue concentration is achieved within 20 minutes¹⁰. A recent systematic review by Kelley et al concluded that antibiotic prophylaxis administered prior to the incision decreased the likelihood of neonatal infection¹¹. Administration of antibiotics within 30 to 60 minutes of surgery appears to be optimal in order to maximize tissue and blood concentrations at the surgical site. Several antibiotics have been used in various combinations, single dose, or multiple dose regimens given postoperatively over the course of several days¹². Single dose of antibiotics prophylaxis have been proved to be as effective as multiple doses in prevention of post-operative infection¹². Nelson et al compared one day of antibiotic prophylaxis with seven days of antibiotic prophylaxis and found no statistically significant difference between the two groups in terms

of wound infection¹³. Moreover shortening the duration of therapy reduces the medical cost and prevents the microorganism resistance. A study has shown that the single dose of antibiotic prophylaxis can reduce the antibiotic cost by 75-80%¹⁴. It has also been proved by many studies that single dose of prophylactic antibiotics is more cost effective^{15, 16}.

Postoperative wound infection can be reduced by taking measures like preoperative baths, changing clothes before the shifting the patient to operation theater, disposables gowns etc. Postoperative wound infection can be superficial or deep; superficial occurring above the fascia & deep occurring below the fascia. Postoperative superficial wound infection was 6.5% in a study by Nisa et al while in our study superficial infection rate was 8% in both groups which is comparable to our study¹⁰. The slight increase rate in our study can be due to poor hygiene and nutritional practices in our community. In a study by Amenu et al, wound infection rate was higher than our study because they included patients who presented with prolong rupture of membranes and underwent emergency Caesarean Section¹⁷. Similarly a study by Satyanarayana et al had high prevalence of wound infection as compared to our study as they have included emergency caesarean sections as well¹⁸.

In our study postoperative chest infection was 4% in both groups while urinary tract infection was 4% in group A and 2% in group. Brood et al reported reduction in the number of urinary tract infection in his study with single dose regimen¹².

Hospital stay was almost the same in both groups which means that single dose versus multiple doses of antibiotic does not affect the hospital stay and is related to number of days required for wound healing. This has also been confirmed by Tchabo et al who reported no significant difference in the incidence of postoperative infection and mean duration of hospital stay when compared single dose antibiotic verses multiple dose antibiotics¹⁹.

CONCLUSION

Our study showed that there was no significant difference between the two groups in terms of single dose versus multiple doses of cefotaxime prophylaxis against postoperative wound infection in elective caesarean section.

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CONTRIBUTORS

SS conceived the idea, planned and wrote the manuscript of the study. SA supervised the study. Both the authors contributed significantly to the research that resulted in the submitted manuscript.