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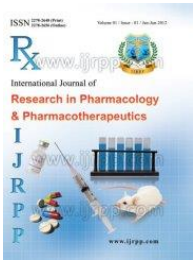

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Pattern of surgical chemoprophylaxis in cesarean section and hysterectomy patients: an observational prospective study at tertiary care teaching hospital

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ABSTRACT

Background

Cesarean section and hysterectomy are the clean contaminated type of surgeries. Most of the developed countries have developed guidelines for appropriate and rational use of prophylactic antibiotics to reduce post-operative infectious complications.

Objective

To analyze patterns of antibiotic use as surgical prophylaxis in patients operated for cesarean section and hysterectomy.

Method

Longitudinal observational study was carried out in patients undergoing cesarean section and hysterectomy at a tertiary care teaching hospital between December 2012 and November 2013.A specially designed proforma was used to collect the data of pre-operative patients. The data was analyzed by SPSS software.

Results

Out of 270 patients enrolled in the study, 209 patients were operated for cesarean section, with most common presenting age group 19-24 years while 61 patients were operated for hysterectomy with common age group of 41-45 years. The most frequently used prophylaxis was injection cefotaxime in more than 80% of cases. Out of 270 patients, 10 developed surgical site infection (SSI). Six patients developed SSI in patients operated for cesarean section while four cases of SSI were found among patients operated for abdominal hysterectomy.

Conclusion

Single dose of injection cefotaxime was most frequently used surgical prophylaxis in cesarean section and hysterectomy patients pre-operatively. Prophylactic antibiotics were not prescribed according to standard guidelines.

Keywords: Cesarean section, Hysterectomy, Prophylactic antibiotics, Surgical prophylaxis.

INTRODUCTION

Postoperative infection as a complication of surgical procedures in Obstetrics and Gynecology has long been a focus of clinical concern. In the last century surgical skills and procedures have advanced markedly, leading to decrease in infection rate and sepsis. A surgical site infection (SSI) is an infection that occurs after surgery within 30 days (or within a year in the case of implants) in the part of the body where the surgery took place. [1] SSI is the most common surgical complication that occurs in up to 5% of patients undergoing operative procedures. Around 40%– 60% of SSIs can be prevented with the use of proper antibiotic prophylaxis. [2] Prophylactic antibiotic treatment is defined as the use of antibiotics before, during, or after a diagnostic, therapeutic, or surgical procedure to prevent infectious complications. [3]

Decreased rates of postoperative infections have clearly led to the decrease in the morbidity, shorter hospital stay and long term decrease in the health care burden. [4] Guidelines for SSI prevention have been developed by WHO [5] and also by countries like United States of America, Canada and Scotland. Choice of antibiotic for cesarean section (CS) should be a single dose of a first generation cephalosporin. If the patient has a penicillin allergy, clindamycin or erythromycin or clindamycin with gentamicin can be used. The choice of antibiotic for hysterectomy should be a single dose of a first generation cephalosporin. If patients are allergic to cephalosporin, then clindamycin, erythromycin, or metronidazole, should be used. [3, 6, 7]

A single dose of first-generation cephalosporin is as effective as multiple doses of broad-spectrum agents. [8] Classen found that administration of prophylactic antibiotics within a 2-hour period preoperatively was associated with the lowest surgical wound infection rate. [9]

High-level evidence randomized controlled trials show high efficacy of prophylactic single dose antibiotic before procedure (30-60 minutes before incision) to prevent SSI in patients undergoing hysterectomy. [3]

Despite the availability of these guidelines, there is considerable evidence that antibiotics are used excessively and inappropriately for the prevention of SSIs. [10, 11] In the absence of any policy or guidelines from the government, antibiotics are not always used rationally for surgical chemoprophylaxis in India.

Paucity of Indian literature for surgical chemoprophylaxis in CS and hysterectomy encouraged us to analyze the prescribing patterns and to check the rationality of prophylactic antimicrobials in patients operated for such surgeries.

MATERIALS AND METHODS

Study design

A prospective, observational, longitudinal, non-interventional study was carried out in the Obstetrics and Gynaecology department of Sheth V. S. General Hospital, a tertiary care teaching hospital in Ahmedabad city of Gujarat state from December 2012 to November 2013.

Inclusion criteria

All patients admitted in Obstetrics and Gynecology wards for CS and/or hysterectomy were enrolled in the study after taking their written informed consent for participation in the study.

Study method

Protocol of the study procedure was designed together with the Case Record Form (CRF), Patient Information Sheet (PIS) and Informed Consent Form (ICF). The study began after obtaining the approval of the study and the related documents from Institutional Ethics Committee.

Data was collected prospectively in CRF. The CRF included demographic details, chief complaints, provisional diagnosis, obstetric history, type of surgery, pre-operative antibiotic therapy and post-operative complication particularly SSI.

Rationality of surgical antibiotic prophylaxis was assessed based on standard guidelines. (American Society of Health-System Pharmacists 2013, Society

of Obstetricians and Gynaecologists of Canada 2012, Society of Obstetricians and Gynaecologists of Canada 2010)

Data were entered in Microsoft Excel 2010 and analyzed by Statistical Package for the Social Sciences (SPSS) version 20.0.

RESULTS

A total of 270 patients admitted to the Obstetrics and Gynaecology wards for CS and/or hysterectomy were enrolled in the study during a period of 1 year (December 2012 to November 2013).

Out of 270 patients enrolled in the study, 209 patients were operated for CS while 61 patients were operated for hysterectomy. Most common age group operated for cesarean section was 19- 24 years (50.71%) followed by 25-30 years (41.62%). For hysterectomy, most commonly operated age group was 41-45(31.14%) years followed by 46-50(19.67%) years and 36-40 years (18.03%).The most common diagnosis for CS was fetal distress-78(37.32%)followed by repeat CS-38(18.18%)and failed induction-26(12.44%).The most common diagnosis for hysterectomy was fibroid uterus in 28 cases (45.90%) followed by prolapse of uterus in 11(18%) cases. **(**Table 1)

Table 1: Patient Characteristics (n=270)

	Cesarean Section(n=209)	**Hysterectomy(n=61)**
Age Group(Years)	**No. (%)**	**No. (%)**
19-24	106(50.71)	0
25-30	87(41.62)	0
31-35	16(7.65)	06(9.83)
36-40	0	11(18.03)
41-45	0	19(31.14)
46-50	0	12(19.67)
51-55	0	07(11.47)
56-60	0	03(4.91)
61-65	0	02(3.27)
66-70	0	01(1.63)
Symptoms	Fetal Distress-78(37.3%) Repeat CS-38(18.2%) Failed Induction-26(12.5%) Malpresentaion-21(10 %) Cord Prolapse-18(8.6%) Miscellaneous-28(13.4%)	Menorrhagia -33(54.1%) Something coming out of vagina-10(16.4%) Not noted- 18 (29.5%)
Type Of Surgery	Elective -78(37.32 %)	Abdominal - 43 (70.50 %)
	Emergency-131(62.68 %)	Vaginal-18(29.50 %)
Surgical Site Infection(SSI)	6	4

The most frequently prescribed preoperative antibiotic was injection cefotaxime in 247 (91.48%) cases. Single dose of injection cefotaxime was given in 218 (80.74%) cases pre operatively. Single dose of injection cefotaxime with injection gentamicin was given in 29 (10.74%) cases. In remaining cases injection ceftriaxone, injection amikacin, injection tinidazole, injection ceftriaxone+sulbactam, injection ampicillin+cloxacillin were given. (Figure 1)

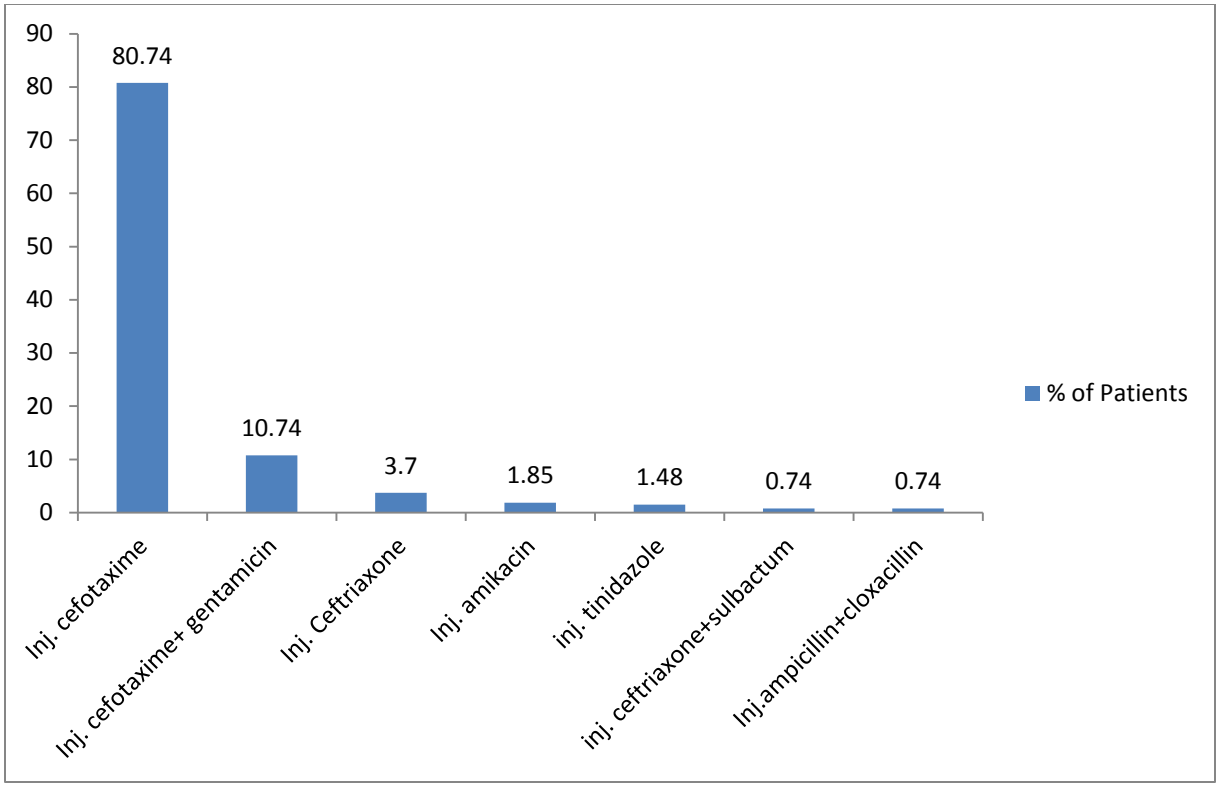

Figure 1 . Preoperative Prophylactic antimicrobials(n= 270)

Out of 270 patients, 10 developed SSI. Six cases of SSI were diagnosed in patients operated for CS while 4 cases of SSI were found among abdominal hysterectomy patients. Out of 10 cases, 8 cases were given pre-operative single dose of antibiotic injection cefotaxime, 2 cases were admitted one day before and they were given intravenous injection ceftriaxone + sulbactam 12 hourly.

DISCUSSION

Infectious complications following gynaecologic surgical procedures are a significant source of morbidity and potential mortality. Much work has been done to study the effect of prophylactic antibiotics in reducing infectious morbidity. There is evidence to support the use of prophylactic antibiotics for a number of procedures in Obstetrics and Gyneacology. [6, 12] Antibiotic prophylaxis is recommended for all patients undergoing cesarean delivery and hysterectomy. [7]

A large meta-analysis of both elective and non-elective cesarean delivery found that antimicrobial prophylaxis was associated with a significant reduction in risk of fever, endometritis, SSI, urinary tract infection, and serious infection. [13] Another meta-analysis demonstrated the efficacy of antimicrobial prophylaxis, including first and second generation cephalosporins and metronidazole, in the prevention of infections after abdominal hysterectomy. [14]

In the present study a total of 270 patients were enrolled out of which 209 patients underwent cesarean section and 61 hysterectomies. In a similar study from India, 182 cases of cesarean section were enrolled and 61 cases of hysterectomy. [15]

In this study the most common indication for hysterectomy was uterine fibroid (45.90%) followed by prolapse of uterus (18%) and adenomyomatosis (19.67%). A surveillance study in the United States suggested that uterine fibroid tumors account for 40% of all pre-surgical diagnoses leading to hysterectomy. [16]

In this study the most frequently prescribed preoperative antibiotic was injection cefotaxime. A clinical trial of surgical chemoprophylaxis from India reported that amoxicillin-clavulanic acid was not superior to cefazolin in the prevention of postoperative infection when given as prophylaxis in hysterectomy and CS. [15] A randomized controlled trial showed that a single dose of prophylactic

amoxicillin–clavulanic acid and cefotaxime have similar efficacy in reducing maternal postoperative infectious morbidity in caesarean section. [17] However, all the guidelines suggest a single dose of first generation cefazolin for surgical chemoprophylaxis in CS and hysterectomy. [6, 7, 12] A systemic review concluded that the use of either cefazolin alone prior to surgical incision or an extended-spectrum regimen after cord clamp appears to be associated with a reduction in post caesarean maternal infection. [18]

First generation cephalosporin, cefazolin has good agents for skin and soft tissue infections owing to S. pyogenes and methicillin susceptible S. aureus. gram positive bacteria and relatively modest activity against gram negative microorganisms. Cefotaxime, a third generation cephalosporin is less active than cefazolin against gram positive bacteria but it is more active against the *Enterobacteriaceae* and other gram negative and anaerobes. Moreover resistance to cefotaxime may be induced rapidly by de–repression of bacterial chromosomal beta lactamases, which destroy it. [19] Hence the use of third generation cephalosporin should be preserved for the treatment purpose and should not be used for prophylaxis. In the present study, cefotaxime (80.74%) was used as a single pre-operative prophylactic antibiotic. The reason for use of injection cefotaxime could be its availability free from hospital stores. Indian studies also report use of third generation cephalosporins most frequently pre-operatively. [20, 21]

A total of 10 cases (3.7%) developed SSI. Out of 10 cases of SSI 6 cases (2.87%) were of CS and 4 cases (6.55%) were of abdominal hysterectomy. Indian studies report SSI; post CS and post hysterectomy patient was 5.5%. [15] In Nigerian Study, SSI rate among post CS patient was 9.1% which is higher than present study. [22] While the study at Oman showed 2.66% of SSI consistent with our findings. [23] The reported SSI rates between January 2006 and December 2008 in the United States were 1.46-3.82 per 100 patients undergone CS, 0.73–1.16 per 100 procedures for vaginal hysterectomy and 1.10–4.05 per 100 procedures for abdominal hysterectomay. [24]

In this study, prophylactic antimicrobials were not prescribed as per standard guidelines [5, 6, 7, 12] in the patients undergoing CS and hysterectomy. Hence, there is a need for national and/or hospital guidelines for appropriate use of antibiotic prophylaxis in CS and hysterectomy which can reduce microbial resistance against third generation cephalosporin.

Limitation of our study was it was carried out at a single tertiary care teaching hospital with relatively small sample size so the results of the study cannot be generalized.

CONCLUSION

Single dose of injection cefotaxime, a third generation cephalosporin was used as surgical prophylaxis in majority of cesarean section and hysterectomy patients.Prophylactic antibiotics were not prescribed according to standard guidelines for use of antibiotic prophylaxis in Obstetric and Gynaecological surgeries.The most important strategy which promotes the rational use of medicines is the availability of standard treatment guidelines locally.

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