

## A Study on Pattern of Using Prophylactic Antibiotics in Caesarean Section

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**Abstract:** An estimated 40-60% of SSI are preventable with appropriate use of prophylactic antibiotics. The major infectious complications of caesarean delivery are fever, wound infection, endometritis and urinary tract infection. Prevention of surgical site infection is the major goal of antibiotic prophylaxis. Postoperative surgical site infection remains a major source of illness and a less frequent cause of death in the surgical patient. The administration of prophylactic antibiotics with in specific interval has been shown to reduce the burden of surgical site infection, but adherence to proper timing guidelines remains problematic. Judicious use of antibiotics in the hospital through effective antibiotic policy and guideline development is then essential.

**Keywords:** Cesarean section, Post Caesarean infectious complication, Prophylactic antibiotics, Surgical antibiotic prophylaxis, Surgical antimicrobial prophylaxis.

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### I. INTRODUCTION

Antibiotics administered prior to the contamination of previously sterile tissues or fluids are deemed 'prophylactic antibiotics'. Prevention of surgical site infection is the major goal of antibiotic prophylaxis.<sup>1</sup> An estimated 40-60% of SSI are preventable with appropriate use of prophylactic antibiotics<sup>1</sup>.

The development of clinical infection is dependent on a complex balance between host defence mechanisms and bacterial virulence factors. Cesarean delivery alters this balance so as to predispose the patient to infection. During labor and abdominal delivery, the endometrium and peritoneal cavity invariably are contaminated with large numbers of highly pathogenic aerobic and anaerobic bacteria<sup>2</sup>.

**Type of antimicrobials:** Since the time chemotherapeutic drugs and antibiotics are available, they have been administered following clean surgery to reduce infectious morbidity<sup>3</sup>. The surgeon is faced with a bewildering array of antimicrobials. But a few antimicrobials are frequently used by the surgeon.

**Penicillin's:** This class represents one of the most important groups of anti-infective agents. They are bactericidal and act by interfering with the synthesis of bacterial peptidoglycan cell wall. The broad use of penicillin's has been eclipsed by other drugs because of the emergence of resistance in microorganisms that produce penicillinase as well as emergence of methicillin resistant staphylococcus. Penicillin's are effective

against gram positive organisms and neisseria gonorrhoeae. The aminopenicillin (ampicillin, amoxicillin) also has got limited gram negative activity. Penicillinase resistant penicillin's are useful against resistant staphylococci. Penicillin's have allergic reactions ranging from rashes to anaphylaxis<sup>4</sup>.

**Cephalosporin's:** Cephalosporium acremonium, the first source of the cephalosporin's was isolated in 1948 by Brotzu. Cephalosporin's are bactericidal and by inhibition of cell wall synthesis.

They are classified as follows:

- (1) First generation : eg. Cefadroxyl, Cephalexin, Cephalothin, Cefazolin
- (2) Second generation : eg. Cefaclor, Cefamandole, Cefoxitin, Cefuroxime, Cefotetan
- (3) Third generation : eg. Cefotaxime, Ceftriaxone, Cefixime, Cefoperazone
- (4) Fourth generation : eg. Cefepime, Cefpirone

First generations have good activity against a wide spectrum of gram positive bacteria including penicillinase producing but not methicillin resistant staphylococci. Enterococci are however resistant. Activity against gram negative is modest.

They are available in both oral and parenteral forms. In this group, Cefazolin has widely used as a prophylactic drug in high risk elective operations. The major advantages of second generation cephalosporin's are improved activity against important gram negative organisms. Unique feature is its activity against Haemophilus influenzae including strains producing beta lactamases. Not active against Pseudomonas, proteus and enterococci<sup>4</sup>.

Third generation cephalosporin's are active against gram-positive and gram -negative microorganisms. It is stable to beta-lactamase produced by many organisms, and has good activity against beta-lactamase producing organisms. Some of the drugs in this class have been suggested as primary single therapy for infections such as nosocomial pneumonia and peritonitis. The major advantage of these drugs over combination of aminoglycosides with earlier generation cephalosporin for infections is lack of toxicity and elimination of need to monitor drug levels. Toxic side effects are unusual. Fourth generations have a very broad spectrum of activity<sup>4</sup>.

**Aminoglycosides:** Aminoglycosides are bactericidal antibiotics interfering with bacterial protein synthesis. They have post antibiotic effect ie antibacterial activities persisting after concentrations have dropped below minimum inhibitory concentrations. Toxicity is the major drawback, involving renal insufficiency and ototoxicity .Gentamicin, Tobramycin and Amikacin belong to this group of antimicrobial drugs. These drugs are given parenterally because of poor intestinal absorption. Adjustments of amino glycoside doses are frequently necessary because of inadequate levels or poor clinical response<sup>4</sup>.

**Metronidazole:** *Metronidazole* is an antiprotozoal and antibacterial drug used in the treatment of bacterial infections caused by anaerobic microorganisms. Metronidazole is also used for prophylaxis against post-operative infections<sup>4</sup>.

## **II. OBJECTIVES OF THE STUDY**

- ❖ To study the pattern of using antibiotic prophylaxis in Caesarean section.
- ❖ To study the effect of prophylactic antibiotics on maternal and neonatal infectious complications.
- ❖ Monitor any adverse drug reactions occurring during hospital stay.
- ❖ To evaluate the cost of therapy.

### **Considering the aims, the study was structured in the following manner:**

Design of a structured data collection form.

Getting Ethical Committee clearance to conduct this study.

Screening of patients admitted to the Hospital, using the selection criteria.

Recording the clinical data of prophylactic antibiotic therapy of the patients selected after getting a written consent from the patient.

Evaluating the effect of antibiotic prophylaxis on maternal infectious complications, monitoring of adverse drug reaction and cost evaluation.

Recording the data's associated prophylactic therapy.

Statistical analysis of data.

Interpretation of results.

## **RESEARCH DESIGN AND METHODOLOGY**

### **A. Study setting:**

The study was conducted in the inpatient department of the obstetrics and gynecology of the Hospital.

### **B. Period of study:**

6 Months (From June 2014 to November 2014)

### **C. Design of study:**

Prospective observational study.

### **D. Study population:**

100 patients admitted and delivered by Caesarean section & Meeting all the inclusion criteria during the study period.

### **E. Selection criteria:**

#### **Inclusion criteria:**

- Patients who are in the age group of 18-40 years.
- Patients who are admitted for Caesarean deliveries.

#### **Exclusion criteria:**

- Patients who are already on antibiotic therapy for any infections.
- Patients whose data is insufficient.

**F. Research study approval and consent:**

The study was approved by the Human Ethical Committee. All patients participating in the study provided consent. Confidentiality of all patient information was strictly maintained.

G. Statistical analysis: The data were entered in Microsoft Excel format and the statistical analysis were done using SPSS for Windows version 21.0.

**Data Collection:**

Those cases which met study criteria were identified from the wards. Information on patients admitted for Caesarean delivery was collected and recorded in a standard proforma by reviewing their medical records after getting a written consent from the patient. Additional information was collected by interviewing the patient or the bystanders. The patient's condition was monitored daily till the day of discharge from the hospital. Confidentiality of the patient information was maintained strictly. Human Ethical Committee clearance was obtained for the study

**IV. RESULTS AND DISCUSSION:**

Total of 100 patients between age group 18 to 40 were considered for the study.

**Data on nature of surgery:**

**Categorization of patients based on nature of surgery:(Table – 1)**

	No. of patients	%
Elective	73	73.0%
Emergency	27	27.0%

Majority of the patients were undergoing elective Caesarean section (73%).

**Data on surgery period:**

**Categorization of patients based on period of surgery:**

**(Table – 2)**

	No of patients	%
45 minutes	80	20.0%
45 minutes to 1 hour	20	62.0%

From analysis it was found that 80% cesarean section takes 45 minutes and 20% takes 45 minutes to one hour in our study.

**Data on commonly used antibiotics for prophylaxis:**

**Categorization of patients based on usage of antibiotics: (Table – 3)**

	No. of patients	%
Amoxicillin	99	99.0%
Azithromycin	1	1.0%
Cefotaxime	100	100.0%

In our study Cefotaxime was the commonly used antibiotic (100%) and the second most drug used was amoxicillin (99%) .Azithromycin was used for only one patient.

**Data on timing of prophylaxis:**

**Categorization of patients based on timing of prophylaxis: (Table – 4)**

	No. of patients	%
1/2 hour before	80	80
1/2 to 1 hour before	20	20

From total of 100 patient’s majority of patients receives ½ hour before surgery (80%).

**Data on no of days of post op antibiotics:**

From analysis all the patients received post operative antibiotic for 10 days.5 days IV and remaining 5 days orally.

**Data on early switch from iv to oral antibiotics:**

For all the patients IV to Oral switch therapy was in 5<sup>th</sup> day of therapy.

**Data on Adverse drug reactions:**

In our study there were no adverse reactions reported in both groups.

**Data on Drug allergy:**

There were no cases of drug allergy reported.

**Trade Name Vs Generic Name:**

All the prescriptions were in generic name.

**Maternal Complications:**

**Categorization of patients based on maternal infections after cesarean delivery:**

**(Table – 5)**

	No. of patients	%
Fever	0	0
Wound infection	0	0
Endometritis	0	0
UTI	0	0

In the analysis there were no infectious complications reported after Caesarean section.

**Cost evaluation:**

There were no costs incurred from patients because they all were registered in Janani Sisu Suraksha Karyakram (JSSK) and Janani Suraksha Yojana (JSY) Scheme sponsored by Central government for mother and child care and also for minimizing home delivery. So all patients underwent Cesarean delivery was free of cost.

**V SUMMARY:**

The use of antibiotic prophylaxis before surgery has evolved greatly in the last 20 years. Improvements in the timing of initial administration, the appropriate choice of antibiotic agents, shorter duration have defined more clearly the value of this technique in reducing postoperative wound infections. Women taking antibiotics just before, during or just after their cesarean section operation are much less likely to have infection of their womb & wound. The study population consisted of 100 patients delivered by cesarean section during the period June-November 2014. Their condition was monitored till the day of discharge & outcomes were recorded.

The salient findings of this study were:

- Majority of the patients were undergoing elective Caesarean section (73%).
- Mean surgery period is ½-1hour.
- All the patients received cefotaxime for surgical prophylaxis.
- Majority of patients take antibiotics 1/2hour before surgery.
- All the patients take postoperative antibiotics for 10 days.
- Patients switched over to oral therapy in the 5<sup>th</sup> day.
- There were no adverse reactions reported in our study.
- There were no cases of drug allergy reported.
- Prescriptions were in generic form.
- The antibiotic prophylaxis effectively reduced the rate of postpartum infections like fever, endometritis, wound infections, urinary tract infections etc. There were no infectious complications found in our study.
- There were no costs incurred from patients for Caesarean delivery.

**VI CONCLUSION:**

The antimicrobial should be safe for the patient and economical for the hospital. The concept of clinical pharmacy is being advocated in health care practice to promote rational drug use. Clinical pharmacists will have to consider the clinician's choice of drugs to provide the most cost effective therapy. A concentrated effort should be made in areas of clinical surgery where the value of antibiotic prophylaxis has not been proven.

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