



## Prophylactic Antibiotics during Emergency Cesarean Section

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### Introduction

Antimicrobial prophylaxis is the limited administration of an antimicrobial agent or agents before or immediately after exposure to an infectious agent, with the intent of preventing an infection. Prevention is always preferred, provided the means are available and the risk- benefit and cost -benefit ratios are acceptable.

Factors influencing effective prophylaxis

- 1) single versus multiple potential pathogens
- 2) source of pathogen
- 3) severity of the disease to be prevented
- 4) targeted organs that could become infected
- 5) spectrum of activity of the antimicrobial agent
- 6) pharmacokinetics and the pharmacodynamics of the selected agent
- 7) duration of chemoprophylaxis
- 8) cost, toxicity, side effects, and acceptability of the agent
- 9) likelihood and consequences of emerging resistance<sup>(1)</sup>

The goal of prophylactic administration of antibiotics prior and/ or during surgery is to reduce or eliminate post operative morbidity, shorten hospitalisation, and reduce the overall costs attributable to infection.

Wounds can be classified as clean, clean-contaminated, contaminated, and dirty. The ones that are made during Cesarean section are clean contaminated wounds.

The antibiotic prophylaxis as suggested by treatment Guidelines Medical Letter is cefazolin 1-2 gm IV as the common pathogens that are encountered are enteric gram negative bacilli, anaerobes, Group B streptococci, enterococci. These antibiotics should begun as a single IV dose within 60 minutes before the procedure.<sup>(2)</sup> If procedure is prolonged that is more than 3 hrs than the next dose should be given at intervals 1-2 times the half life of the drug that is 4 hrs for cefazolin

An effective prophylactic regimen should be directed against the most likely infecting organisms but need not eradicate every potential pathogens.<sup>(3)</sup>

Postpartum infections are among the leading causes of maternal mortality world-wide, particularly in under resourced countries.

As suggested by Wilson, that a pregnancy is a paradoxical immune state where foreign tissue is not only tolerated but nurtured which leads to a successful pregnancy and survival of species.<sup>(4)</sup>

Pregnancy has traditionally been viewed as an immunocompromised state arising as a result of

the necessity not to reject the foetus immunologically, and therefore placing the mother at increased risk of infectious diseases. However, evidence now suggests a modified form of immune state which has different responses to different infections depending upon the stage of pregnancy.<sup>(5,6)</sup>

Postpartum endometritis incidence following vaginal delivery is 1-3% and following cesarean section is 5-35%. cases per year in US.<sup>(7)</sup>

Prophylactic antibiotics are highly effective in preventing post- cesarean delivery endometritis and wound infection. They should be administered before the surgical incision in all cesarean deliveries.<sup>(8)</sup>

Women who deliver by cesarean route have a 6-18% incidence of metritis versus 0.9-3.9% with vaginal deliveries.<sup>(9,10)</sup>

Bacteremia after vaginal delivery was believed to be uncommon, with a reported frequency of 1-5%, for this reason antibiotic prophylaxis was not recommended in the 1998 ACC/AHA practice guidelines for uncomplicated vaginal or abdominal delivery, unless bacteremia or active infection is suspected.<sup>(11,12,13)</sup>

Recent reports suggest that there is higher rate of bacteremia following labour and delivery ranging from 14-19%.<sup>(14,15)</sup>

A recent survey of maternal and fetal medicine physicians in the USA revealed that 84% of those who responded (the response rate was 25 %) used preoperative administration of antibiotic in cesarean deliveries.<sup>(16)</sup>

Effective concentrations of antibiotics throughout the operative period must be there for effectiveness of prophylactic antibiotics. Administration of prophylactic antibiotic within 2 hours preoperatively has been associated with the lowest surgical wound infection rate.<sup>(17)</sup>

A systematic review by Cochrane Database in 2010 supports the recommendation that prophylactic antibiotics should be routinely administered to all women undergoing cesarean section to prevent infection as it considerably decreases the incidence of wound infection,

endometritis and serious infection complications by 60-70%.<sup>(18)</sup>

## Methods

An observational study was conducted in the department of OBGYN of CSM Hospital run by Thane Municipal corporation in Mumbai Maharashtra in which 100 patients undergoing emergency cesarean section were enrolled. Patients were randomly allocated into two arms. One study group received prophylactic IV antibiotic Inj Cefazolin 1 gm IV half hour prior to skin incision and second group received same antibiotic after skin incision. They were followed up to 10 days post operatively and the primary outcome of postoperative infection was evaluated. Patients with a high risk of infection as unregistered unimmunized patients, and those who presented with leaking per vaginum more than 6 hrs and those with a pre-existing septic foci were excluded from the study. Strict asepsis was followed with minimal p.v. examinations, antiseptics, painting and draping, minimal handling and proper tissue handling while suturing.

## Results

The parity was comparable in both groups which was 1.92 in group A (those received IV antibiotic half hour prior to skin incision) and 1.86 in group A (those who received IV antibiotic after skin incision).

In group A one patient had post operative fever on day 3 and two patients had serous discharge from wound on day 4 dressing which was managed on local antiseptic ointment and daily dressing. However group B had 3 patients with post operative fever on day 2 and day 3 with 3 patients developing serous discharge from wound with erythema and in duration on day 4 dressing and were managed with additional oral antibiotics (Tab Metronidazole and Cap Amoxicillin)after sending wound swab for culture. However the cultures were found to be sterile.

Relative risk when comparing both groups was 0.6667 (95% CI: 0.1163-3.8202, Z Statistic:0.455; NNT :50;p= 0.6489) which shows that there is not much difference whether the antibiotic is administered half hour prior or after skin incision which is in contrast to study by Dlamini et al<sup>(19)</sup>.

### Conclusion

Single Prophylactic antibiotic administration within half hour of cesarean section reduces chances of postoperative infections and is economical.

### References

1. Overturf GD. Antimicrobial Prophylaxis. Feigin and Cherry's Textbook of Pediatric Infectious Diseases, Chapter 236,3242-3257.e3
2. Antimicrobial Prophylaxis for Surgery Med Lett 2012;10:73-77
3. Bratzler DW et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. Am J Health Syst Pharm.2013 ;70(3):195-283
4. Wilson RC. Immune problems in pregnancy. In Russell I.F., and Lyons G. (eds): Clinical problems in obstetric anaesthesia. London: Chapman and Hall Medical,1997,103-122.
5. Mor G et al. The immune system in pregnancy: a unique complexity. Am J Reprod Immunol 2010;63:425-433
6. Mor G et al. Inflammation and pregnancy: the role of the immune system at the implantation site. Ann N Y Acad Sci 2011;1221:80-87
7. Postpartum endometritis. First consult. 2012. Elsevier BV Duff P, Birsner M. Maternal and Perinatal Infection in Pregnancy: Bacterial, Obst-etrics: Normal and Problem Pregnancies, 7th ed, Chapter 54, 1130-1146
8. Burrows LJ et al. Maternal morbidity associated with vaginal versus cesarean delivery. Obstet Gynecol 2004;103:907-912
9. Tharpe N. Post pregnancy genital tract and wound infections. J Midwifery Womens Health 2008;53:236-246
10. Elkayam U et al. Valvular heart disease and pregnancy part I:native valves. J Am Coll Cardiol 2005;46:223-230
11. Sugrue D et al. Antibiotic prophylaxis against infective endocarditis after normal delivery-is it necessary? Br Heart J 1980;44:499-502
12. Bonow RO et al. ACC/AHA guidelines for the management of patients with valvular heart disease: executive summary. A report of the American College of Cardiology/ American Heart Association Task Force on Practice Guidelines (Committee on management of patients with valvular heart disease). J Heart Valve Dis 1998;7:672-707
13. Boggess KA et al. Bacteremia shortly after placental separation during cesarean delivery. Obstet Gynecol 1996;87:779-784
14. Furman B et al. Clinical significance and outcome of preterm pre labour rupture of membranes :population - based study. Eur J Obstet Gynecol Reprod Biol 2000;92:209-216
15. Doss AE et al. Antibiotic prophylaxis for cesarean delivery: survey of maternal - fetal medicine physicians in the US. J Matern Fetal Neonatal Med 2012;25, 1264-6.
16. Classen D et al. The timing of prophylactic administration of antibiotics and the risk of surgical wound infection. N Engl J Med 1992;326:281-6
17. Smaill FM, Grivell RM. Antibiotic prophylaxis versus no prophylaxis for preventing infection after cesarean section. Cochrane Database Syst Rev. 2014 Oct 28;(10):CD007482.doi: 10.1002/14651858.CD007482. pub 3. Review. PubMed PMID: 25350672.

18. Dlamini LD et al. Antibiotic prophylaxis for cesarean section at a Ugandan hospital: a randomised clinical trial evaluating the effect of administration time on the incidence of postoperative infections. BMC Pregnancy Childbirth. 2015 Apr 12;15:91. doi: 10.1186/s12884-015-0514-3.