



## **USE OF PROPHYLACTIC ANTIBIOTICS IN LABOR AND DELIVERY: REVIEW ARTICLE**

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### **ABSTRACT**

Bacterial infections are a common complication in obstetrics. Some infections may be life-threatening to the mother or the fetus or both. The use of antibiotics to prevent infections during the antepartum, intrapartum, and postpartum periods is different than the use of antibiotics to treat established infections. For many years, the use of prophylactic antibiotics was thought to have few adverse consequences. Concerns about the emergence of resistant strains of common bacteria, in addition to the emergence of strains with increased virulence, have resulted in increased scrutiny of the use of antibiotics, particularly in the hospital setting. Awareness of the potential adverse effects of resistant bacterial infections on neonates has been growing. Attention has been focused on the effect of mode of delivery or early antibiotic exposure on the neonatal oral and gut microbiome, which is essential for immune development. Finally, cost is a consideration in the use and choice of prophylactic agents.

**Key words:** antepartum, intrapartum, postpartum, micri biome, prophylactic agents.

## INTRODUCTION

Infectious complications following obstetric surgical procedures are a significant source of morbidity and potential mortality. They include urinary tract infection, endometritis, wound infection, perineal infection, and sepsis, which lead to prolonged hospital stays and increased health care costs. There is evidence to support the use of prophylactic antibiotics for a number of procedures in obstetrics. Unfortunately, few comparative trials have been conducted, leaving the clinician with uncertainty as to which regimen is superior. Incomplete courses of antibiotic therapies and the unnecessary use of broader spectrum regimens play a role. [1] Adherence to both treatment and prophylaxis guidelines likely assists in reducing infection and antibiotic resistance. Physician adherence to antibiotic prophylaxis guidelines is variable and usually at odds with published guidelines. [2]

In addition to antibiotic prophylaxis, it is essential to review all factors that affect infectious risk reduction in obstetrical care. [3] The use of prophylactic antibiotics in obstetric and gynaecological surgery is an important part of conventional practice. Many institutions and jurisdictions have their own established protocols which should take into consideration the advice of the Therapeutic Guidelines: Antibiotic. Where these exist, and provided they are consistent with accepted national guidelines, they should be followed. Patients should be selected for prophylaxis if the medical condition or the surgical procedure is associated with a considerable risk of infection or if a postoperative infection would pose a serious hazard to the patient's recovery and well-being. [4]

### **Principles of antibiotics prophylaxis:**

The purpose of antibiotic prophylaxis in surgical procedures is not to sterilize tissues but to reduce the colonization pressure of microorganisms introduced at the time of operation to a level that the patient's immune system is able to overcome. [5] Before an agent can be considered for use as a prophylactic antibiotic, there must be evidence that it reduces postoperative infection. It must also be safe and inexpensive, and it must be effective against organisms likely to be encountered in the surgical procedure. If prophylactic antibiotics are to be given, they should be administered shortly prior to or at bacterial inoculation. [6] The majority of studies suggest that a single dose is effective, but for lengthy procedures (> 3 hours) the dose should be repeated at intervals 1 or 2 times the half-life of the drug. It has also been suggested that with large blood loss (> 1500 mL), a second dose should be given. [7]

### **Use of antibiotic prophylaxis in obstetrics:**

#### **1. Caesarean section:**

The single most important risk factor for postpartum maternal infection is Caesarean section. [8] Women having Caesarean section have a 5- to 20-fold greater risk of infection than women having vaginal delivery. Rates of wound infection and serious infectious complications can be as high as 25%. [9] Traditionally, antibiotics at caesarean section have been given after cord clamping, due to several potential concerns;

- ❖ Exposure of the fetus to antibiotics could mask newborn positive bacterial culture results;

- ❖ Fetal antibiotic exposure could lead to an increase in colonization or infection with antibiotic-resistant organisms, and
- ❖ To avoid the risk of severe fetal compromise in the rare event of maternal anaphylaxis.

A recent meta-analysis supports the use of prophylactic antibiotics prior to Caesarean incision to prevent total infectious morbidity (RR 50; 95% CI 0.33 to 0.78, P = 0.002). Neonatal outcomes were not affected. [10] Trials have shown that broader spectrum antibiotics for Caesarean section do reduce infectious morbidity. Superiority trials with cefazolin have not been conducted. Given the potential for antibiotic resistance in both mother and neonate, recommendations for the use of broader spectrum antibiotics require further study. [11]

## **2. Operative Vaginal Delivery:**

A 2004 Cochrane review investigated the use of prophylactic antibiotics for operative vaginal delivery, with either forceps or vacuum assisted deliveries, to determine if prophylaxis reduces the incidence of postpartum infections. [12] The review identified only one trial of 393 women, and only 2 of 9 outcomes deemed appropriate by the reviewers were assessed in this study: endometritis and length of hospital stay. These did not differ between those who received prophylaxis and those who received no treatment. The review concluded there were insufficient data on which to base recommendations for practice and that further research is needed. No additional studies addressing this issue have been published to date.

## **3. Manual Removal of Placenta:**

There is limited information regarding the use of prophylactic antibiotics to reduce the development of postpartum endometritis following manual removal of the placenta. A Cochrane review, updated in April 2009, did not identify any randomized controlled trials. [13] The World Health Organization suggests that prophylaxis should be offered but recognizes that there is no direct evidence of the value of antibiotic prophylaxis after manual removal of the placenta and bases the recommendation on studies involving Caesarean section and abortion and on observational studies of other intrauterine manipulations. [14]

## **4. Postpartum Dilatation and Curettage:**

No studies were identified that investigated the use of prophylactic antibiotics for postpartum dilatation and curettage.

- ❖ **Prophylactic antibiotic recommendations for obstetrical procedures:**

Procedure	Antibiotic	Dosage	Level of evidence
Emergency or elective caesarean section (no labour, no rupture of membranes)	Cefazolin IV 15–60 mins prior to skin incision	1–2 g IV	I-A
If penicillin allergic	Clindamycin OR erythromycin	600 mg IV 500 mg IV	
Operative vaginal delivery	None recommended	N/A	II-1C
Manual removal placenta	None recommended	N/A	III-L
Repair third or fourth degree laceration	Cefotetan Cefoxitin	1 g IV 1 g IV	I-B I-B
Postpartum dilatation and curettage	None recommended	N/A	No evidence
Cerclage	None recommended	N/A	II-3C

### Dosage of Antibiotic Prophylaxis in Obesity:

Increased BMI is associated with higher rates of both obstetric and infectious complications. [15] Controlled trials assessing the required dosage for antibiotic prophylaxis based on patient BMI have not been assessed in our specialty. Expert opinion recommends twice the normal dose of prophylaxis for morbidly obese patients, who have a BMI > 35. Future research in this area is needed.

### Prophylactic antibiotics in gynaecology:

There are no recommendations for routine prophylactic antibiotics for the following gynaecological procedures in healthy women with no risk factors:

- ❖ Insertion of intrauterine contraceptive device (IUCD);
- ❖ Patients undergoing diagnostic laparoscopy;
- ❖ Patients having hysteroscopic surgery;
- ❖ Hysterosalpingography (HSG) without a prior history of pelvic inflammatory disease;
- ❖ Large Loop Excision of Transformation Zone (LLETZ).

However, antibiotic therapy should be instituted in any of the procedures listed above if there is reason to suspect infection risk or if the findings at the procedure indicate risk of infection e.g. dilated fallopian tubes at HSG. Broad spectrum antibiotics should be used during major abdominal, laparoscopic or vaginal procedures. The choice of antibiotics should be guided by local guidelines, recommendations in the Therapeutic Guidelines and also reflect local antimicrobial susceptibilities.

## CONCLUSION

For a number of procedures in obstetrics and gynaecology, the use of prophylactic antibiotics has been shown to reduce infectious morbidity in a safe and cost-effective manner. There remain a number of procedures where the utility of prophylactic antibiotics is either unclear or not well studied. Appropriate

antibiotics used at the correct dose and time and with the appropriate frequency will reduce infectious postoperative complications and minimize the development of antibiotic resistant organisms.

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