

Research Article

# Antibiotic Prophylaxis During Cesarean Section in the Gynecology-Obstetrics Department of the Donka National Hospital, Conakry

Ibrahima Koussy Bah<sup>1,\*</sup>, Alhassane II Sow<sup>1</sup> , Boubacar Alpha Diallo<sup>2</sup>, Julien Tamba Tolno<sup>1</sup>, Laouratou Diallo<sup>1</sup>, Maimouna Balde<sup>1</sup>, Alpha Ibrahima Balde<sup>1</sup>, Kabinet Camara<sup>1</sup>, Abdourahamane Diallo<sup>1</sup>, Telly Sy<sup>1</sup>

<sup>1</sup>Gynecology-Obstetrics Department, Ignace Deen National Hospital, Conakry, Guinea

<sup>2</sup>Gynecology-obstetrics Department, Donka National Hospital, Conakry, Guinea

## Abstract

**Objective:** To evaluate the effectiveness of antibiotic prophylaxis during cesarean section in the Gynecology-Obstetrics department of the Donka national hospital in Conakry. **Methodology:** This was a prospective case-control analytical study lasting 3 months involving 250 patients undergoing cesarean section. The short protocol included 125 patients who received a single dose of 2g of antibiotics intraoperatively after cord clamping while the other 125 patients (long protocol) received antibiotic therapy for 48 hours after the procedure. **Results:** The sociodemographic profile of the patients was the same in both arms. The mean age of the patients was 24 years with extremes of 14 and 42 years; the 20-24 age group was the most represented (31.2% vs 32.8%). Our series was dominated by primiparas (40% vs 42%). The main mode of admission was evacuation (78.4% vs 64%). The main early postoperative complication encountered was fever (8.2% vs 13.2%) followed by surgical site infection (4% vs 12%). Bivariate analysis shows a statistically significant association between the occurrence of postoperative fever and the long antibiotic protocol ( $p = 0.028$ ) and this protocol is a protective factor against surgical site infection ( $p = 0.013$ ). And is more frequently used in the context of emergency cesarean section ( $p = 0.011$ ). **Conclusion:** Antibiotic prophylaxis is as effective as antibiotic therapy and thus represents a significant health saving for our countries.

## Keywords

Antibiotic Prophylaxis, Antibiotic Therapy, Cesarean Section, Conakry

## 1. Introduction

Infection is a permanent risk in surgery and a limiting factor in the development of surgical techniques. Indeed, pathogenic bacteria can be isolated in more than 90% of surgical wounds during closure [1].

The steady increase in the incidence of cesarean section makes it the most commonly performed major surgical procedure [2-4]. Postoperative infectious complications are 5 to 10 times more frequent after cesarean section than after nat-

\*Corresponding author: [ibrahima.koussy@gmail.com](mailto:ibrahima.koussy@gmail.com) (Ibrahima Koussy Bah)

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ural delivery [1, 2, 4, 5]. Infection compromises the surgical procedure and creates an iatrogenic pathology that is not always easy to cure. Thus, it prolongs the length of hospitalization, increases the cost of procedures and sometimes worsens the maternal prognosis. The development in recent years of nosocomial infections resistant to most antibiotics has encouraged the search for new therapeutic approaches including antibiotic prophylaxis. Antibiotic prophylaxis has proven its effectiveness in cesarean sections with a high risk of infection, particularly in highly medicalized countries [3, 5-7].

In caesareans that are a priori "without risk of infection", some North African countries use antibiotic prophylaxis [8, 10]; on the other hand, it is very little practiced in Ivory Coast and in West African countries. In Dakar, antibiotic prophylaxis has been practiced successfully in orthopedic surgery [1, 2].

Antibiotic prophylaxis thus reduces this morbidity and consequently the cost of medical procedures. On the other hand, there is curative antibiotic therapy, the administration of which extends over several days (minimum 7 days of treatment).

However, the debate on the duration of antibiotic prophylaxis at cesarean delivery persists. Despite its advantages, no study on the practice of antibiotic prophylaxis in our department has been carried out, leading us logically to evaluate its effectiveness at cesarean delivery.

## 2. Methodology

### 2.1. Type and Duration of Study

This was a prospective case-control study, carried out over a three-month period (January 1 to June 30, 2013) at the gynecology-obstetrics department of the Donka National Hospital, University Hospital of Conakry.

### 2.2. Study Population

The study involved 125 pregnant women who received a single dose of 2 g of intravenous Ampicillin at cord clamping (cases) versus 125 randomly selected controls who received 2 g of Ampicillin at cord clamping and then 1 g every six hours for 48 hours (controls).

### 2.3. Variables

The variables in this study were: age, occupation, marital status, parity, mode of admission, time to treatment, indications for cesarean section, type of cesarean section and maternal complications.

### 2.4. Data Analysis

The analysis was carried out using SPSS software in its

version 20.0.

The tests used were Pearson chi-square and Fisher exact with a significance threshold of 5% or a p-value equal to 0.05.

## 2.5. Ethical Considerations

Informed consent was requested and obtained from participants, confidentiality and anonymity were maintained. The results obtained will be used only for scientific purposes.

## 2.6. Difficulties

The difficulties encountered were the follow-up of patients after discharge from hospital until recovery.

## 3. Results

**Table 1.** Distribution of patients according to sociodemographic characteristics.

Features Sociodemographic	protocol (n=125) N (%)	protocol (n=125) N (%)
Maternal age		
15 - 19	24(19.20)	26(20.80)
20 - 24	39(31.20)	41(32.80)
25 - 29	34(27.20)	32(25.60)
35 years and over	28(22.40)	26(20.80)
Occupation		
Housewives	50(40.00)	52(42.80)
Students	3(2.40)	35(28.80)
Liberal	22(17.60)	20(25.60)
Employee	20(16.00)	18(20.80)
Marital status		
Bride	102(81.60)	106(85.00)
Bachelor	23(18.40)	19(15.00)
Parity		
Primiparous	50(40.00)	53(42.40)
Pauciparous	41(32.80)	37(29.60)
Multiparous	16(12.80)	20(16)
Large multiparous	18(14.40)	15(12)

The sociodemographic profile of the patients was the same in both arms. The mean age of the patients was 24 years with extremes of 14 and 42 years; the 20-24 age group was the most represented (31.2% vs 32.8%). Our series was dominated by primiparas (40% vs 42%). (Table 1)

The main mode of admission was evacuation (78.4% vs. 64%).

Cesarean sections were performed in an emergency context (82.40% vs. 84.1%) with the main indication being acute fetal

distress (37.1% vs. 38.2%). The average time to treatment was 60 min with extremes ranging from 10 min to 300 min. (Table 2)

**Table 2.** Distribution of patients according to clinical characteristics.

Features clinics	Long protocol n (%)	protocol n (%)	OR (95% CI)	p-value
Admission mode				
Evacuated	98 (78.40)	80 (64)	2.04(1.16-3.57)	0.011
Admitted	27 (21.60)	45 (36)		
Type of cesarean section				
Emergency	103 (78.40)	105 (64)	0.891 (0.459-1.731)	0.735
Scheduled	22(29.60)	20 (36)		
Time elapsed				
< 60 minutes	60 (48)	62 (49)	1.02 (0.564-1.872)	0.927
≥ 60 minutes	32 (25.60)	34 (27.20)		
Indications				
Suffering fetal acute	31 (14.80)	34 (27.20)	0.88 (0.50-1.55)	0.772
Hemorrhages	24 (19.20)	18 (14.40)	1.41(0.72-2.75)	0.397
Basin Shrunk	21 (7.60)	20 (16)	1.06 (0.54-2.07)	1.00
Presentation	13 (10.40)	15 (12)	0.85 (0.38-1.87)	0.841
Eclampsia	18 (14.40)	20 (16)	0.88 (0.44-1.74)	0.866
Complications				
Fever	17 (13.20)	10 (8.00)	3,245 (1,114-9,450)	0.028
Endometritis	6 (4.800)	4 (3.20)	1,840 (0.460-7.352)	0.383
Infection of the site operative	5 (4.00)	15 (12.00)	0.231 (0.070-0.767)	0.013
Release of suture threads	0 (0.00)	2 (1.60)	0	0.171

The main early postoperative complication encountered was fever (8.2% vs 13.2%) followed by surgical site infection (4% vs 12%). We recorded 10 cases of endometritis, six in the short protocol (4.8%) and four in the long protocol (3.2%). The other postoperative complication observed was suture thread release.

Bivariate analysis shows a statistically significant association between the occurrence of postoperative fever and the long antibiotic protocol ( $p = 0.028$ ) and this protocol is a protective factor against surgical site infection ( $p = 0.013$ ) and is more frequently used in the context of emergency cesarean section ( $p = 0.011$ ). (Table 2)

## 4. Discussion

In this work we attempted to analyze the effectiveness of

the long antibiotic prophylaxis protocol versus the short antibiotic prophylaxis protocol during cesarean section at the maternity ward of the Donka nation hospital. Cesarean section increases the risk of infectious complications. This risk can be reduced on the one hand by respecting the rules of prevention and control of infections on the one hand and on the other hand by administering antibiotic prophylaxis during the procedure. Antibiotic prophylaxis helps prevent infection and antibiotics are only administered in case of suspicion or proven infection [9].

The World Health Organization recommends that antibiotic prophylaxis be administered after clamping of the umbilical cord. One dose of antibiotic is sufficient and is no less effective than 3 doses or 24 hours of antibiotic therapy in preventing infection. However, if the procedure lasts more than 6

hours or in case of blood loss greater than or equal to 1500 ml, a second dose of antibiotic is recommended. In Guinea as in most low-income countries, caesarean section remains the prerogative of young, uneducated, married women and is performed in an emergency context [10-13].

In our series, despite the free obstetric care, the lack of qualified personnel in peripheral structures, poor prenatal monitoring and poor distribution of the health card make emergency cesarean section the main type with respective rates of 78.40% (cases) and 64% (controls). This confirms the level III maternity status of our service.

Our study did not find a statistically significant difference in morbidity between antibiotic prophylaxis and antibiotic therapy. Incidentally, several studies have shown that there is no additional benefit of using multiple doses after a single dose of antibiotic prophylaxis for the prevention of surgical site infections [14, 15].

Thus, the intraoperative administration of a single dose of antibiotic for prophylactic purposes for cesarean section is indicated in scheduled cesarean sections. For Pardo et al. the risk of postoperative infection would be multiplied by four in the absence of antibiotic prophylaxis [16].

The efficacy of antibiotic prophylaxis during cesarean section in low-resource settings. A randomized controlled trial conducted in Mozambique compared a single preoperative dose of gentamicin and metronidazole with seven days of a combination of crystalline penicillin, metronidazole and erythromycin without finding a statistically significant difference [17].

Alekwe in Nigeria compared a single dose of ceftriaxone with the combination of ampicillin, gentamicin and metronidazole. This study concluded that a single dose was as effective as the multiple combination [18]. In Nepal, Shakya et al. compared the administration of a single dose of cefazolin and metronidazole intraoperatively with multiple doses of the same antibiotics postoperatively without finding any difference between the two regimens [15].

Some studies have identified the surgeon's qualification as an independent risk factor for infection during cesarean section, which would explain the fact that cesareans performed by interns are marred by more infectious complications than those performed by seniors [19].

The indication for cesarean section seems to play a role in the occurrence of postoperative infection. Our main indications for cesarean sections were acute fetal distress and third trimester hemorrhages. This is in fact a vicious circle involving fetopelvic disproportion, prolonged labor, and untimely vaginal examinations sometimes performed in a context of premature rupture of membranes. This results in infection of the egg, which is a major risk factor for infectious complications.

The same observations have been reported in some studies [20, 21]. Fever was the main infectious complication (8% vs. 13.2%). In our study, the rates of parietal suppuration (8.5% vs. 14.7%) are lower than those reported by Ghoro A et al.

although a proportion of surgical wound infections during cesarean section are avoidable, compliance with infection prevention rules and antibiotic prophylaxis reduce them considerably [2, 22].

Thus, surgical wound infections are used as an indicator of the performance of a health structure. The high frequency of parietal suppurations during cesarean section could be explained by the close contact between parturients and non-medical staff, particularly parents, who are unaware of the basic principles of antisepsis [23].

Furthermore, the number of examiners and untimely vaginal examinations would increase the risk of cross-contamination. Given the risk factors for post-cesarean infection, our patients can be considered at high risk. Indeed, the vast majority were housewives, primiparous and evacuated in a third of cases. It is important to emphasize that our series was dominated by emergency cesarean sections.

Surgical site infection is the most common postoperative complication. Any measures aimed at preventing it will speed up the patient's recovery and therefore reduce the length of hospital stay. The cost of medications is an important parameter, especially in resource-limited settings where patients do not have health insurance. The administration of multiple doses of antibiotics results in higher costs than that of a single dose. In addition, antibiotic prophylaxis reduces the workload of nurses, especially during shifts. This is all the more important in resource-poor countries where the shortage of health care personnel is a recurring problem [24].

## 5. Conclusion

Administration after cord clamping of a single intravenous dose of ampicillin (2g) and multiple doses 24 hours after emergency cesarean section are not statistically different in terms of infectious morbidity.

Antibiotic prophylaxis is as effective as antibiotic therapy and thus represents a significant health saving for our countries.

A multicenter study analyzing the efficacy of antibiotic prophylaxis versus antibiotic therapy including new variables is included in our perspectives.

## Abbreviations

IC	Confidence Interval
SPSS	Statistical Package for the Social Sciences

## Authors Contributions

All authors contributed to this work.

## Conflicts of Interest

The authors declare no conflicts of interest.

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