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**Original Article**

# Frequency of Wound Infection and its causative Factors among Patients undergoing Cesarean Section

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## ABSTRACT

**Background:** Surgical site infections (SSI) account for about 20% of all hospital acquired infections. The etiology of wound infection is polymicrobial.

**Objectives:** To determine the frequency of wound infection and common factors leading to it among patients after cesarean section.

**Methods:** Descriptive (cross-sectional) study was conducted from December 2017 to December 2018 at the Department of Obstetrics & Gynecology Sheikh Khalifa Bin Zayad Hospital Muzaffarabad. Sample was collected through nonprobability consecutive sampling.205 patients who were fulfilling the inclusion criteria were enrolled in the study. All patients were followed up to7th postoperative day for wound infection and risk factors were noted. Data was collected on a pre-designed Performa including demography, gravidity, parity wound infection and risk factors. Data was analyzed by using SPSS version 20**.**

**Results:** A total of 205 postoperative patients were recorded during the study period. The frequency of wound infection was calculated as 13(6.3%). The common factors leading to wound infection were prolonged labor in 16patients (7.8%), anemia 70 patients (34.1%), prolonged rupture of membranes 15 patients (7.3%) and chorioamnionitis 2 patients (1.0%). Mean age of the patients was 29.02±6.102, gravidity 2.42±1.485 and parity was calculated as 1.32±1.409.**Conclusions:** The study concludes that the frequency of wound infection in this setting is in keeping with globally cited frequencies. Other findings such as causes of wound infection and maternal morbidity data also agree with most national and international studies on this topic.

**Keywords:** Wound infection, Caesarean section, Risk factors and SKBZ Hospital Muzaffarabad

## Introduction

Cesarean section is a commonly performed surgical procedure globally.[1] In the past 35 years, the rate of cesarean section has steadily increased from 5% to approximately 25%.[2] This increase in the rate of cesarean delivery at an institutional level is not associated with any clear overall benefit for the baby or the mother but is linked with increased morbidity for both. [3]

Compared with vaginal delivery, the risk of maternal mortality is 3 to 5 times higher in cesarean sections.[3] There is four-fold increased risk of hysterectomy and double risk of admission to intensive care and hospital stay of more than seven days.[3]

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Cesarean delivery also has increased cost implications.[4] The risk of post-partum infection is five times more in cesarean sections compared to vaginal delivery.[3] Infectious morbidity consisting primarily of endomyometritis and wound infection remain a leading cause of post-operative complications. Post cesarean infection rate ranges from 7-20% depending upon demographic and obstetric variables.[5] The risk of wound infection is twice in emergency as compared to elective sections. [6]

Surgical site infections (SSI) account for about 20% of all hospital acquired infections.[7] The etiology of wound infection is polymicrobial. The most common pathogens are group B Streptococcus; Anaerobic streptococci, E coli, Staph aureus, and bacteroids.[1] Clinical presentation of wound infection include purulent discharge, erythema and induration of the incision site with fever.[5]

Associated risk factors include younger age, obesity,

presence of hypertension or preeclampsia, preoperative infection at a remote body site, nulliparity, prolonged labor, type of cesarean section (elective or emergent), preoperative illness, prolonged rupture of membranes, multiple gestation, anemia, emergency delivery, repeated vaginal examinations and absence of antibiotic prophylaxis.

Management of wound infection includes toileting and cleaning with normal saline and pyodine, antibiotics after taking wound swab, and wound debridement and re-suturing in cases of deeper incisional infections.[1] Post cesarean infectious morbidity is common and costly and rarely can lead to life threatening conditions like necrotizing fasciitis.[5] Antibiotic prophylaxis should obviously be a part of comprehensive strategy to reduce SSIs including patient preparation and surgical technique.[9]

Rising rates of cesarean sections over the past few decades have increased the number of patients with postoperative complications including wound infection. Some women are more at risk compared to others. In this context, it is important to determine the magnitude of the problem in our population and also to quantify the common factors leading to wound infection. This type of study has never been conducted in our local population and the statistics generated after completing this study will be very useful in making critical decision at higher level regarding control of wound infection and its common factors after cesarean section as using the results of this study we will draw some conclusions and recommendations for the management of patients undergoing emergency cesarean section and to do our best in reducing the morbidity associated with it.

## Material & Methods

This study was conducted in Department of Obstetrics and Gynecology, Sheikh Khalifa Bin Zayad Hospital/ CMH Muzaffarabad. It is a Descriptive (cross-sectional) study. Study was conducted from December 2017 to November 2018.

Sample size **205** patients were collected from ER department, by Consecutive nonprobability sampling. Patient included in study were, all patients undergoing emergency lower segment cesarean section, all women with 37 completed weeks of gestation with any gravidity and parity and age group from 15-45years.Patients with diabetes having fasting blood glucose of more than 126mg/dl, with immune-compromised state like intake of steroids and with HIV/AIDS as detected by past medical records were excluded.

The study was conducted after approval from hospitals ethical and research committee. All pregnant women presented to ER department in labor after having completed 37 completed weeks of gestation and planned to undergo emergency cesarean section were included in the study. The purpose and benefits of the study were explained to all patients and a written informed consent was obtained.

All women were subjected to detailed history and clinical examination followed by routine pre-operative investigations. All women were subjected to emergency cesarean section by single expert obstetrician having minimum of 5 years of experience. After the surgery, all women were followed till 7$^{th}$post operative day to determine the wound infection. Once detected, all those women were carefully scrutinized to detect common factors leading to wound infection i.e. prolonged labor, anemia, prolonged rupture of membranes and chorioamnionitis.

All the information including name, age and address were recorded in a pre-designed Performa. Strictly exclusion criteria were followed to control confounders and bias in the study results.

Data was analyzed using SPSS version 20. Mean $\pm$ SD was calculated for numerical variables like age, gravidity and parity. Frequency and percentages were calculated for categorical variables like wound infection and common factors leading to it (prolonged labor, anemia, prolonged rupture of membranes and chorioamnionitis). Wound infection and common factors were stratified among age, gravidity and parity to see the effect modifications. All results were presented in the form of tables.

## Results

A total sample of 205 patients was selected having post-operative follow-up for wound infection and common factors leading to infection included in the study.

Mean age of the patients with standard deviation (SD) 29.02±6.102 ranging from 18 to 40 years. Gravidity was ranging from 1 to 11 with mean of 2.42±1.485 and the parity was ranging from 0-10 with mean of 1.32±1.409 as shown in the.

Wound infection was found in 13(6.3%) of patients, while the rest 192(93.7%) were not infected out of the total 205 patients. 16(7.8%) patients were found with prolonged labor while the rest 189(92.2%) patients were not with prolong labour.70(34.1%) patients were found with anemia while the rest 135(65.9%) patients

were not anemic.15(7.3%) patients were found with prolonged rupture of membranes while the rest 190(92.7%) patients were not found with the factor leading to infection.2(1.0%) patients were found with chorioamnionitis while the rest 203(99.0%) patients were not found with the factor leading to infection.

Frequency distribution of post-operative follow-up wound infection, patients with prolonged labor were found with wound infection 12(5.9%) while 01(0.5%) of wound infection was not found from prolonged labor out of 13(6.3%) of wound infection as shown in the **table 1**.

**Table 1: Frequency distribution of post-operative follow-up (wound infection) with prolonged labor**

| Post op follow-up (wound infection) | Prolonged labor | | Total |
|---|---|---|---|
| | Yes | No | |
| Yes | 12 | 1 | 13 |
| | 5.9% | 0.5% | 6.3% |
| No | 4 | 188 | 192 |
| | 2.0% | 91.7% | 93.7% |
| Total | 16 | 189 | 205 |
| | 7.8% | 92.2% | 100.0% |

Frequency distribution of post-operative follow-up wound infection, all of anemic patients found with wound infection 13(6.3%) out of 13(6.3%) of wound infection, shown in the **table 2**.

**Table 2: Frequency distribution of post-operative follow-up (wound infection) with anemia**

| Post op follow-up (wound infection) | Anemia | | Total |
|---|---|---|---|
| | Yes | No | |
| Yes | 13 | 0 | 13 |
| | 6.3% | .0% | 6.3% |
| No | 57 | 135 | 192 |
| | 27.8% | 65.9% | 93.7% |
| Total | 70 | 135 | 205 |
| | 34.1% | 65.9% | 100.0% |

Frequency distribution of post-operative follow-up wound infection, all of prolonged rupture of membranes patients found with wound infection 13(6.3%) out of 13(6.3%) of wound infection as shown in the **table 3**. Frequency distribution of post-operative follow-up wound infection, patients with chorioamnionitis were found with wound infection 02(1.0%) while 11(5.4%) of wound infection was not found due to chorioamnionitis out of 13(6.3%) of wound infection as shown in the **table 4**.

**Table 3: Frequency distribution of post-operative follow-up (wound infection) with prolonged rupture of membranes**

| Post op follow-up (wound infection) | prolonged rupture of membranes | | Total |
|---|---|---|---|
| | Yes | No | |
| Yes | 13 | 0 | 13 |
| | 6.3% | .0% | 6.3% |
| No | 2 | 190 | 192 |
| | 1.0% | 92.7% | 93.7% |
| Total | 15 | 190 | 205 |
| | 7.3% | 92.7% | 100.0% |

**Table 4: Frequency distribution of post-operative follow-up (wound infection) with chorioamnionitis:**

| Post op follow-up (wound infection) | Chorioamnionitis | | Total |
|---|---|---|---|
| | Yes | No | |
| Yes | 2 | 11 | 13 |
| | 1.0% | 5.4% | 6.3% |
| No | 0 | 192 | 192 |
| | .0% | 93.7% | 93.7% |
| Total | 2 | 203 | 205 |
| | 1.0% | 99.0% | 100.0% |

# Discussion

The frequency of wound infection ranges from 3% - 15%[1,2]. It depends upon various preoperative risk factors like prolong labor, prolong rupture of membrane, chorioamnionitis anemia[3,4].

Wound infection is a very stressful condition both for patients as well as the consultants. The hospital stay increases with it and is also burden in terms of cost for family[1]. In our study, a sample of 205 patients was selected having post-operative follow-up for wound infection and common factors leading to infection were determined.

In our study frequency of wound infection is 6.3% which is near to another study by **Ghuman M, et al**[9]with SSI rate of 5%.The frequency of wound infection in our study is in between different studies like **Wloch, et al** in a multicenter study of post cesarean section SSI in Britain showed frequency of 8.9 %.[10] **Farkhanda Akhter,** et al showed frequency of 4.4 %.[11] Frequency distribution of post-operative follow-up wound infection, patients with prolonged labor were found with wound infection 12(5.9%) while 01(0.5%) of wound infection was not found from prolonged labor out of 13(6.3%) of wound infection

With regard to the common risk factor leading to wound infection i.e. prolonged rupture of membranes,

15(7.3%) patients were found with prolonged rupture of membranes while the rest 190(92.7%) patients were not found with the factor leading to infection. A study by **Nasreen Kishwer, Nazish Hayat** et al also found higher risk of wound infection with prolonged labor and prolong rupture of membrane. [12]

With regard to the common risk factor leading to wound infection i.e. chorioamnionitis, 2(1.0%) patients were found with chorioamnionitis while the rest 203(99.0%) patients were not found with the factor leading to infection.

Anemia has strong association with wound infection. Frequency distribution of post-operative follow-up wound infection, all of anemic patients found with wound infection 13(6.3%) out of 13(6.3%) of wound infection. this relation is also documented by **Zaman.**[13]

The tremendously rising rate of cesarean section is putting the population at various risks like infections, which lead to maternal and fetal morbidity, as mother can't take care of herself and baby. Later on it even leads to adhesions formation which in turn lead to infertility, ectopic pregnancy and difficult gynecologicalsurgeries.[14]

The rate of surgical site infection after cesarean section can be reduced with the help of prophylactic antibiotics. Prophylactic use of antibiotics is helpful in both emergency and elective cesarean section. Both cephalosporins and penicillins are effective as a prophylaxis of wound infection. There is no significance of using multiple pre-operative antibiotic doses as the result are the same either we use single or multiple antibiotic doses. But dose of antibiotic should be according to the BMI of the patient.[15-17]

## Conclusions

The study concludes that the frequency of wound infection in this setting is same in keeping with globally cited frequencies. Other findings such as causes of wound infection and maternal morbidity data also agree with most national and international studies on this topic.The rate of cesarean section must be controlled to prevent the complications by vigilant monitoring of labour and all the measures including aseptic vaginal examination andcatheterization should be done to reduce the development of infection.

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- Maryam Zubair participated in Conception/ Study Designing/ Planning, Experimentation/ Study Conduction, Analysis, Interpretation and Discussion
  Manuscript Writing
- Naheed Akhtar participated in Analysis, Interpretation, Discussion, Facilitated for Reagents, Material and analysis
- Hina Zubair participated **in** Analysis, Interpretation, Discussion, Facilitated for Reagents, Material and analysis
- Saima Perveen and Shafaq Hanif participated in Analysis, Interpretation, Discussion and Critical Review
- Zahid Iqbal Awan participated in Experimentation, Study Conduction, Analysis, Interpretation, Discussion and Manuscript Writing