



RISK FACTORS FOR WOUND COMPLICATIONS AFTER CESAREAN SECTION IN TERTIARY CARE HOSPITAL MUZAFFARABAD- A RETROSPECTIVE COHORT STUDY

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Abstract

Background: Cesarean delivery is a widely practiced surgical procedure globally.

Objective of the Study: The primary objective of this retrospective cohort study is to pinpoint and examine the factors that contribute to wound complications after cesarean section in a tertiary hospital in Muzaffarabad.

Subjects and Methods: The study analyzed 250 women who had cesarean sections at Tertiary Care Hospital Muzaffarabad from November 2020 to January 2021. Patient interviews and clinical examinations were conducted to gather detailed information.

Results: This study included 250 participants who had gynecological surgeries. Among them, 32% were above 30 years old. Wound Infections were noted in 12% (30 patients), while wound dehiscence happened in 4% (10 patients). Surgeries lasting more than 90 minutes had a strong link to complications (OR = 5.40, 95% CI: 2.56-11.41, $p < 0.001$). Emergency cesarean sections had a high risk (OR = 5.56, 95% CI: 2.83-10.94, $p < 0.001$), with the lack of preoperative antibiotics being the most crucial factor (OR = 7.00, 95% CI: 3.44-14.26, $p < 0.001$).

Conclusion: Surgeries lasting more than 90 minutes, and Ages above 30 years are the main risk factors for having complications after cesarean section.

Keywords: Gynecological Surgery, Wound, Cesarean Section Complications

Introduction

Surgery always has risks, and complications can happen during or after the surgery. Following surgery, there may be problems such as fever, upper respiratory infections, surgical site infections, urinary tract infections, urinary retention, and abdominal distension. Surgical site infections make up 0.5 to 15% of postoperative issues and are the most frequent concerns (1). Cesarean section (CS) is a widely conducted surgical procedure around the globe. The frequency of C-Section varies between countries, with around 20% of deliveries in France reaching up to 60% in specific regions of Latin America (2). Cesarean section is frequently done for women to give birth. As reported by WHO, the C-section birth rate should fall around 10%-15% of all deliveries (3).

The presence of wound infection can significantly affect the management of different diseases. Untreated wounds can lead to swelling and ulcer formation. Hence, it is important to diligently focus on preventing wound infections during disease treatment (4). Antibiotics are commonly used to treat inflammations caused by wound infections. The overuse of antibiotics can result in allergies, toxic reactions, and the development of bacterial resistance (5–8). Drug-resistant bacteria are now a common reason for infections that cannot be treated, leading to a significant number of deaths from wound infections each year (9).

Globally, about 4,511 operations for every 100,000 population occur annually, which means one surgery is done annually for about twenty-two people (10). Surgical wounds are the most common type of wounds managed in acute care settings and are associated with a variety of complications such as bleed and dehiscent. However, surgical site infections are the most common and preventable hospital-acquired infection (11). Globally, surgical site infection rates are estimated to range from 1.9% to 40% of surgeries (12,13). Approximately one in four patients experience postoperative complications within 14 days of being discharged from the hospital (14).

Surgical site complications, such as wound infections and separations, may occur due to hematomas, seromas, or infections of subcutaneous tissues. These complications can result in a decreased quality of life for patients, increased outpatient and emergency room visits, a higher rate of readmissions and admissions to the intensive care unit, an extended hospital stay, and a greater need for home services. It is estimated that each complication leads to an increase in costs of at least \$3500 (15).

One study conducted by Gulseren Yilmaz found that using Enhanced Recover After Surgery (ERAS) procedures results in a shorter hospital stay, less fluid intake, quicker return of bowel function, and earlier mobilization without an increase in complication rates for women undergoing minor laparoscopic or hysteroscopy gynecologic surgery (16).

In a study conducted in Pakistan, it was found that approximately 19.94% of women (62 out of the total) experienced surgical site wound infections. The most common contributing factors were prolonged duration of rupture of membranes (51.6% or 32 out of 62), prolonged duration of labor before the operation (29% or 18 out of 62), and excessive volume of intraoperative blood loss (29% or 18 out of 62) (17).

Material and Methods

This research was a retrospective study conducted at a tertiary care hospital in Muzaffarabad, Azad Jammu Kashmir, from November 2020 to January 2021. The study focused on patients undergoing gynecology surgeries at the Gynecology Department. Patients who had surgeries unrelated to gynecology lacked complete medical records, or had significant pre-existing conditions (diabetes and hypertension) were not included in the study. This exclusion was necessary because these factors could affect wound healing and increase the likelihood of complications. The study focused on people who underwent gynecological surgeries during the specified period and had comprehensive medical documentation. A skilled surgeon performed all the surgeries, meticulously documenting factors like the duration of the surgeries, cesarean type, use of the preoperative antibiotics, and also care after the operation.

The sample size required for the study was calculated with the help of the WHO sample size calculator by keeping the parameters including 95% CI, 10% anticipated population, and 5% absolute precision. The final result indicated that a sample size of N=250 was necessary, and this was achieved through nonprobability consecutive sampling.

Data extraction was done from electronic health records (EHR), covering patient demographics, surgery types, wound care protocols, and postoperative outcomes. Wound care protocols were categorized based on specific criteria, including antiseptic solutions used, dressing types, and the frequency of changes. Data analysis was conducted using SPSS, version 25.

Results

The data below provides a summary of the demographic and procedural characteristics of 250 individuals who underwent cesarean sections. Age-wise, 24% were below age 25, 44% of patients were of age between 25 and 30 years, and above 30 years there were 32% patients. Regarding BMI, 40% had a BMI below 25 kg/m², 36% had a BMI ranging from 25-30, and 24% had a BMI exceeding 30 kg/m². The duration of surgeries showed variability 52% lasted less than 60 minutes, 32% lasted between 60 and 90 minutes, and 16% lasted over 90 minutes. Elective cesarean sections made up 64% of the cases, while emergency procedures constituted 36%. Preoperative antibiotics were given to 80% of patients, with the remaining 20% not receiving them. Postoperative care was standard for 60% of patients, while 40% required intensive care. (Table No. 1)

Table 1 Demographic and Clinical Features of Participants in the Study

Demographic and Clinical Characteristics	N = 250	Percentage (%)
Age (Years)		
< 25	60	24.0
25-30	110	44.0
>30	80	32.0
BMI kg/m²		
< 25	100	40.0
25-30	90	36.0
>30	60	24.0
Duration of Surgery		
< 60 minutes	130	52.0
60-90 minutes	80	32.0
>90	40	16.0
Type of Cesarean		
Elective	160	64.0
Emergency	90	36.0
Preoperative Antibiotics		
Yes	200	80.0
No	50	20.0
Postoperative Care		
Standard	150	60.0
Intensive	100	40.0

Eighty percent of the patients, equivalent to 200 individuals, had no complications during their treatment. Reports showed that 12% of patients, a total of 30 people, had wound infections, while 4%, or 10 patients, experienced wound dehiscence. A small percentage of patients, 2% each, suffered from hematoma or seroma, with five individuals affected by each condition. This data highlights that however a majority of patients had smooth recoveries without issues, infections were the most prevalent complication among the affected individuals. (Table No. 2)

Table 2 Incidence of Wound Complications

Wound Complications	N=250	Percentage
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No Complications	200	80.0
Wound Infection	30	12.0
Dehiscence	10	4.0
Hematoma	5	2.0
Seroma	5	2.0

Patients aged 30 and above had a much higher odds ratio of 4.20, with a 95% confidence interval ranging from 2.16 to 8.15, and a p-value less than 0.001. Moreover, having a BMI exceeding 30 kg/m² also posed an increased risk, with an odds ratio of 2.67, a 95% confidence interval of 1.39 to 5.13, and a p-value of 0.003. Surgical procedures lasting longer than 90 minutes showed a strong connection to complications, the odds ratio is 5.40, indicating a strong relationship by a 95% CI from 2.56 - 11.41, and there was very strong evidence against the null hypothesis that the p-value was below 0.001. Emergency cesarean sections presented a significant risk, with an odds ratio of 5.56, a 95% confidence interval of 2.83 to 10.94, and a p-value less than 0.001. The absence of preoperative antibiotics emerged as the most crucial factor, showcasing an odds ratio of 7.00, a 95% confidence interval of 3.44 to 14.26, and a p-value less than 0.001. The thorough follow-up care after surgery did not show any connection, having an OR of 0.57, a CI of 95% ranging between 0.29 and 1.13, and with p-value of 0.110. (Table No. 3)

Table 3 Risk Factors Associated with Wound Complications

Risk Factor	With Complication (N=50)	Without Complications (N=200)	Odds Ratio (95% CI)	p-value
Age > 30 years	30 (60.0%)	50 (25.0%)	4.20 (2.16-8.15)	<0.001**
BMI > 30 kg/m ²	20 (40.0%)	40 (20.0%)	2.67 (1.39-5.13)	0.003**
Duration > 90 minutes	20 (40.0%)	20 (10.0%)	5.40 (2.56-11.41)	<0.001**
Emergency Cesarean	35 (70.0%)	55 (27.5%)	5.56 (2.83-10.94)	<0.001**
No Preoperative Antibiotics	25 (50.0%)	25 (12.5%)	7.00 (3.44-14.26)	<0.001**
Intensive Postoperative	15 (30.0%)	85 (42.5%)	0.57 (0.29-1.13)	0.110

Discussion

Surgical complications were uncommon in this study. In the study, wound infection after the cesarean section was seen in 30 patients (12%) out of 250 patients, as compared to N. Shneid-Kofman et al (18), where 3.7% suffered from a wound infection. According to the study of T. Cicero et al (19), the independent risk factors for post-cesarean surgical site infections (SSI), as identified in a multivariate analysis, including young age, obesity, hypertension or preeclampsia, diabetes mellitus, chorioamnionitis, nulliparous, less than seven prenatal visits, extended time from rupture of membranes until cesarean, emergency cesarean delivery, lack of appropriate antibiotic prophylaxis, increased surgical time, and the birth of twins.

In the study, surgical procedures (C-Section) lasting for more than 90 minutes were strongly associated with complications. In a study conducted by D. Odado et al (20), a total of 1,262 cesarean deliveries were carried out, with 2.1% experiencing surgical site infections post-cesarean section. The incidence of surgical site infections was not significantly influenced by risk factors like gestational age, body mass index, rupture of membranes, and antibiotic prophylaxis.

Emergency cesarean sections showed a high risk (OR = 5.56, 95% CI: 2.83-10.94, p < 0.001), and lack of preoperative antibiotics was the main factor (Odds Ratio = 7.00, with a Confidence interval of 95%: 3.44-14.26, p < 0.001). However, no significant association was shown by intensive preoperative care (Odds Ratio = 0.57, Confidence interval of 95%: 0.29 to 1.13, p-value=0.110).

The limitations of this study may include its retrospective design, reliance on medical record documentation, potential for missing data, and limited generalizability to other settings. However, we will make efforts to minimize bias and address limitations through rigorous data collection and analysis methods.

Conclusion

The research discovered significant results concerning wound issues following cesarean deliveries. Operations lasting over 90 minutes were strongly correlated with complications. Emergency cesarean procedures carried a high complication risk, with the lack of pre-surgery antibiotics being the most critical factor for developing wound problems. Surprisingly, elaborate post-surgery care did not demonstrate a notable impact on lowering complications.

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