e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2025; 17(12); 359-363

Original Research Article

A Study on Post Caesarean Wound Infection- Incidence, Etiology, Risk Factors, Prevention and Management

Meenakshi Pahariya[1], Priyanka Beniwal[2], Jyoti Nagar[3]

[1]Senior Resident, SMS Medical College, Jaipur
[2]Medical Officer, Medical and Health Department, Rajasthan (Post Graduation- Mahatma Gandhi University, Jaipur, Rajasthan)
[3]Junior Specialist, Jhalawar Medical College, Jhalawar, Rajasthan, India

Received: 03-10-2025 / Revised: 02-11-2025 / Accepted: 03-12-2025
Corresponding Author: Dr. Meenakshi Pahariya
Conflict of interest: Nil

Abstract:

Background: As a surgical procedure, caesarean delivery may be accompanied by a number of complications, surgical site infection (SSI) being one of them. The rate of SSI ranges from 0.5% to 15% worldwide.

Methods: An observational study included 250 patients undergoing lower segment caesarean section was conducted at Jhalawar Medical College, Jhalawar during the period of February 2022 to December 2022. Women underwent lower segment caesarean section including both elective and emergency caesarean section were evaluated for entry in to the study. A written consent was taken. Various risk factors like BMI, anaemia, hypertension, DM, PROM, socioeconomic status were taken into consideration.

Results: The incidence of wound infection in my study was 8.8%. This present study depicted that Anemia, PROM, DM, HTN, increased surgical time, increase BMI, low socioeconomic status, increased no. of PV examinations are predominant risk factors leading to wound infection.

Conclusion: Correcting malnutrition, anemia, stabilizing diabetes and eradicating all infection such as urinary tract infection, proper preparation of skin, proper surgeons scrubbing, and using proper surgical technique can decrease the risk of post operative abdominal wound infection. Strategies for prevention of this morbidity must aim to correct anemia , to avoid prolonged hospital stay prior to delivery, to correct maternal co-morbidities prior to surgery and Strict adoption of asepsis. SSI surveillance must be done as a part of HAI audit which aims at improving Quality control measures and infection control practices.

Keywords: Surgical site infection, Caesarean section, Anemia, Socioeconomic status, Diabetes Mellitus.

Introduction

Caesarean section is an operative procedure by which a foetus, placenta, and membranes are delivered through an abdominal and uterine incision which is performed whenever abnormal conditions complicate labour and vaginal delivery threatening the life or health of the mother or the baby. [1] This excludes delivery through an abdominal incision where the foetus, lying free in the abdominal cavity following uterine rupture or in secondary abdominal pregnancy. Caesarean delivery is the most commonly performed operation in obstetrics.

The incidence of cesarean deliveries, both repeat and primary, has risen dramatically over the last few decades, with an estimated global number of 22.9 million cesarean deliveries in 2012. [2-3] As a surgical procedure, cesarean delivery may be accompanied by a number of complications, surgical site infection (SSI) being one of them. As per national healthcare safety network division of CDC, "SSI are defined as infections which develops at the surgical site within 30 days of surgery."

The rate of SSI ranges from 0.5% to 15% worldwide. [4] The variation in incidence may reflect differences in population characteristics and risk factors, peri-operative practices, and the duration from the procedure until ascertainment. The risk for developing SSI has significantly decreased in the last three decades, mainly owing to improvements in hygiene conditions, antibiotic prophylaxis, sterile procedures, and other practices. [7-8] Despite this decrease, the occurrence of SSI is expected to increase given the continuous rise in the incidence of cesarean deliveries. Postcesarean SSI may increase maternal morbidity and mortality. [9-10] In addition, SSI can be frustrating for the mother trying to recover from the procedure and at the same time take care of the newborn. It may prolong maternal hospitalization, increase health care costs, and lead to other socioeconomic implications.

Material and Method

Study Subjects: Pregnant women with gestational age 37-42 weeks, delivered by caesarean section at Department of Obstetrics and Gynaecology at Shrimati Heera Kunwar Ba Mahila Hospital in association with Jhalawar Medical College, Jhalawar, Rajasthan, during the study period.

Study Design: Observational analytical study.

Study Setting: Department of Obstetrics and Gynaecology at Department at Shrimati Heera Kunwar Ba Mahila Hospital in association with Jhalawar Medical College, Jhalawar, Rajasthan.

Inclusion Criteria:

1. Gestational Age- 37-42weeks
2. Delivered by caesarean section

Exclusion Criteria:

1. All women who delivered vaginally.
2. <37 weeks gestational age

Sample size: 250 calculated by the formula

Equation:

Sample size $n= Z^2pq/D^2$

n = Sample Size

Z = Table Value (1.96)

d = error 0.05

p = prevalence (8) [7]

As per reference noted (7) for wound infection rate vary from 0.5% to 15% [7], sample size calculated.

q=(1-p),

n= 245, which is further rounded off to 250.

Method of Collection of Data

An observational study included 250 patients undergoing lower segment caesarean section was conducted at Jhalawar Medical College, Jhalawar during the period of February 2022 to December 2022. Women underwent lower segment caesarean section including both elective and emergency caesarean section were evaluated for entry in to the study. A written consent was taken. Various risk factors like BMI, anemia, hypertension, DM, PROM, socioeconomic status were taken into consideration.

Operative characteristics like duration of the procedure, type of anaesthesia and their influence on wound infection was studied.

In post-operative period patients were monitored for signs of development of wound infection such as nature of discharge from operative site, wound erythema and induration.

Data analysis- All data were collected through validated performa and entered in MS-EXCEL:2010. The data were analyzed through SPSS 23.0(trail version) and Chi-square test was applied to find statistically significant association between groups based on post operative complications. Data are expressed as percentage or numbers. P value <0.05 was considered to be statistically significant.

Results

Table 1: Incidence Of Wound Infection

Complications	No. of Cases	Percentage (%)
Wound Infection	22	8.8
No Wound Infection	228	91.2
Total No. of Cases	250	100

In our study of 250 patients, 22 developed wound infections which accounted for 8.8%.

Table 2: Wound Infection with Reference to Socioeconomic Status

SES	No Infection	Serous Discharge	Pus Discharge	Wound Gaping	Total
5	26(74.28%)	0(0%)	2(5.7%)	7(20%)	35
4	132(92.95%)	4(2.81%)	2(1.40%)	4(2.81%)	142
3	69(95.83%)	2(2.7%)	0(0%)	1(1.3%)	72
2	1(100%)	0(0%)	0(0%)	0(0%)	1
Total	228	6	4	12	250

It is demonstrated that 26% of the women from SES 5 had wound infection. According to Pearson Chi-square test, Pearson chi-square value is 27.041 and P value is 0.001, statistically significant. Lower socioeconomic status is a significant risk factor for wound infection.

Table 3: Wound Infection with Reference to Parity

		Complication			
		No	**Serous**	**Pus**	**Gapping**
Parity	Prime	126 (94.02%)	3 (2.23%)	1 (0.74%)	4 (2.98%)
	Multi	102 (87.93%)	3 (2.58%)	3 (2.58%)	8 (6.89%)
Total		228	6	4	12

5.8% of the primi and 12.0% of multi had wound infections. According to pearson Chi-square test pearson Chi-square value is 3.582 and P value is 0.310, which is statistically insignificant.

Table 4: Wound Infection with Reference to BMI

		Complication				Total
		No	**Serous**	**Pus**	**Gaping**	
BMI	<20	12 (100%)	0	0	0	12
	20-25	184 (95.33%)	3 (1.55%)	2 (1.03%)	4 (2.07%)	193
	26-30	32 (71.11%)	3(6.66%)	2 (4.44%)	8 (17.77%)	45
Total		228	6	4	12	250

According to Pearson Chi-square test, Pearson Chi-square value is 28.939, and P value is 0.001, which is statistically significant, depicting more the BMI, more are the chances of infection.

Table 5: Wound Infection with Reference to Diabetes Mellitus

		Complication				Total
		No	**Serous**	**Pus**	**Gaping**	
Diabetes Mellitus	Yes	9 (47.36%)	4 (21.05%)	1 (5.26%)	5 (26.31%)	19
	No	219 (94.80%)	2 (0.86%)	3 (1.29%)	7 (3.03%)	231
Total		228	6	4	12	250

According to Pearson Chi-square test, Chi-square value is 55.697, and P value is 0/001, which is statistically significant, indicating diabetes is significant risk factor for wound infection.

Tablet 6: Comparison of risk factors and Wound Infection

S. No.	**Variable**	**Complication**	**Total**	**P value**
Yes	**No**			
1	**BMI**	**N (%)**	**N (%)**	
Less 19	0	12	12	<0.05
20-25	9	184	193	
26-30	13	32	45	
2	**Anemia**			
Yes	8	42	50	>0.05
No	14	186	200	
3	**Hypertension**			
Yes	18	4	22	<0.05
No	56	172	228	
4	**Diabetes Mellitus**			
Yes	10	9	19	<0.05
No	12	219	231	
5	**PROM**			
<5	11	194	205	<0.05
05-Oct	11	34	45	

Table 7: Types of wound infection

Complications	**No. of Cases**	**Percentage (%)**
Serous Discharge	6	28
Pus Discharge	4	18
Wound Gaping	12	54
Total	22	100

Table 8: Commonly Obtained Organisms

Organism	No	%
No Growth	5	22.72
S. Aureus	8	36.36
Entrococceus	4	18.18
E. Coli	3	13.63
Pseudomonas	1	4.54
CONS	1	4.54

Staph Aureus was most commonly isolated organism from culture of infected wounds from patients after caesarean section.

Discussion

The current study was conducted on 250 patient who underwent elective or cesarean section during the study period from February to December 2022 at SHKBM hospital for wound infection. Out of those 250 patients, 22 have developed wound infection.

Age group with maximum infection was more than 30 years. Maximum infections were in multigravida patients. Maximum infection was in SES group 5. Maximum infection were from emergency LSCS group. Maximum infections were in anaemic patients. Maximum infected patients were hypertensive. Diabetics developed more infections. More BMI led to more infections. Increased hours of surgery increased infections.

The wound infection rate varies from 0.5 to 15% worldwide and in present study wound infection rate is 8.8% which similar to the study done by conducted by A.R. Mahale et al 2008 showed an incidence of 8.6%. Also study done by Hulubante B. et al (2020) showed high incidence (12.4%).

Table 9: Study of SSI

S. No.	Study of SSI	SSI Incidence
1.	My present study	8.8%
2.	A.R. Mahale et al [98]	8.6%
3.	Hulubante B. et al [90]	12.4%

The rate of wound infection is increasing with advancement of age in my study, in less than 20 years 4.5%, in 21- 25 years 6.9%, 26 – 30 years 11.3%, more than 30 years 15.7% developed wound infection, which is similar to study done by Hulubante B. et al, where wound infection was 10.5% in <30 year, and 15.7% in >30 year age group. [12]

Conclusion

Caesarean delivery is one of the most frequent surgical interventions performed around the world. Post caesarean wound infection is a major cause of prolonged hospital stay, increases maternal morbidity and increased medical costs which poses a significant burden to health care system.

Caesarean section is a clean contaminated type of surgery where procedure related chance of infection is less. Hence proper assessment of risk factors that predisposes to SSI is critical for developing preventive strategies. Knowledge of these risk factors would help the obstetrician in avoiding this complication and help to decrease the maternal morbidity post operatively.

The incidence of wound infection in my study was 8.8%. This present study depicted that Anemia, PROM, DM, HTN, increased surgical time, increase BMI, low socioeconomic status, increased no. of PV examinations are predominant risk factors leading to wound infection.

The commonest organism isolated is Staphylococcus Aureus which is most sensitive to Amikacin. Based on the sensitivity pattern of different isolates of bacteria, an empiric antibiotic therapy in post caesarean infection can be implemented

Correcting malnutrition, anemia, stabilizing diabetes and eradicating all infection such as urinary tract infection, proper preparation of skin, proper surgeons scrubbing, and using proper surgical technique can decrease the risk of post operative abdominal wound infection. Strategies for prevention of this morbidity must aim to correct anemia, to avoid prolonged hospital stay prior to delivery, to correct maternal comorbidities prior to surgery and Strict adoption of asepsis. SSI surveillance must be done as a part of HAI audit which aims at improving Quality control measures and infection control practices.

References

1. Solomokin J, P G, P B, A L, S B, M E, et al. WHO global guidelines for the prevention of surgical site infection Geneva. Switzerland. Lancet Infect Dis. 2017; 17(3):262–4. https://doi.org/10.1016/S1473-3099(17)30081-6 PMID: 28244389

2. Miller ES, Hahn K, Grobman WA. Consequences of a primary elective cesarean delivery across the reproductive life. Obstet Gynecol. 2013;121(4):789–797. doi: 10.1097/AOG.0b013e3182878b43.
3. Molina G, Weiser TG, Lipsitz SR, et al. Relationship between cesarean delivery rate and maternal and neonatal mortality. JAMA. 2015;314(21):2263–2270. doi: 10.1001/jama.2015.15553.
4. Williams Obstetrics 25th edition -cunningham, Leveno, Bloom et al; 2019 (chapter 26, 30, 37, 48, 57, 64)
5. Olsen MA, Butler AM, Willers DM, Devkota P, Gross GA, Fraser VJ. Risk factors for surgical site infection after low transverse cesarean section. Infect Control Hosp Epidemiol. 2008;29(6):477–484. doi: 10.1086/587810. discussion 485–486.
6. Schneid-Kofman N, Sheiner E, Levy A, Holcberg G. Risk factors for wound infection following cesarean deliveries. Int J Gynecol Obstet. 2005;90(1):10–15.
7. .Opøien HK, Valbø A, Grinde-Andersen A, Walberg M. Post-cesarean surgical site infections according to CDC standards: rates and risk factors. A prospective cohort study. Acta Obstet Gynecol Scand. 2007;86(9):1097–1102. doi: 10.1080/00016340701515225.
8. Gibbs RS. Clinical risk factors for puerperal infection. Obstet Gynecol. 1980;55(Suppl 5): S178–S184.
9. Krieger Y, Walfisch A, Sheiner E. Surgical site infection following cesarean deliveries: trends and risk factors. J Matern Fetal Neonatal Med. 2016; 705:1–5. doi: 10.3109/14767058.2016.1163540.
10. Salim R, Braverman M, Teitler N, Berkovic I, Suliman A, Shalev E. Risk factors for infection following cesarean delivery: an interventional study. J Matern Neonatal Med. 2012;25(12):2708–2712. doi: 10.3109/14767058.2012.705394
11. Gong SP, Guo HX, Zhou HZ, Chen L, Yu YH. Morbidity and risk factors for surgical site infection following caesarean section in Guangdong Province, China. J Obstet Gynaecol Res 2012; 509–515.
12. Park`s textbook of preventive and social medicine, 26th edition. 2021; chapter 6.
13. Bizuayew H, Abebe H, Mullu G, Bewuket L, Tsega D, Alemye T (2021) Post-cesarean section surgical site infection and associated factors in East Gojjam zone primary hospitals, Amhara region, North West Ethiopia, 2020. PLoS ONE 16(12): e0261951