



STUDY OF POST CESAREAN SECTION WOUND INFECTION, COMORBIDITIES AND MICROBIOLOGICAL EPIDEMIOLOGY IN A PRIVATE HOSPITAL, MORAR, M.P. INDIA

Dr. Jayshree Chimrani*

DNB Resident, Dept of Obstetrics & Gynecology, Jaipur Golden Hospital, Delhi, India. *Corresponding Author

Dr. Uma Jain

Professor, Dept of Obstetrics & Gynecology, GMC associated with DH Shivpuri, M.P. India.

Dr. Preeti Gupta

Senior Consultant, Dept of Obstetrics & Gynecology, Gupta Hospital Morar, Gwalior, M.P. India

ABSTRACT

INTRODUCTION: Cesarean section stands as one of the most common surgical procedures done worldwide. However, it carries a risk of developing surgical site infection. Surgical site infection can have effect on mother's health in terms of significant morbidity.

AIMS & OBJECTIVE: Present study was undertaken to determine the microbiological profile of surgical site infection among post-partum females who underwent cesarean section.

MATERIALS & METHODS: A total of 147 females with surgical site infection were identified in a study conducted in a North Indian teaching care hospital. A semi-structured questionnaire was prepared to know the socio-demographic details along with diagnostic and therapeutic parameters.

Mean age of study subjects were 25.61 years with 57.8% cases occurring in age group more than 25 years. Staphylococcus aureus was the most common identified organism (29.2%) followed by sterile culture (25.2%). Ceftriaxone was the most common given antibiotic (27.9%). Among co-morbidities, anemia and PROM were the most common. Resuturing was required in 17.69% of the cases.

CONCLUSION: Patient factors, microbiological profile and empirical therapy are a prerequisite for controlling surgical site infection.

KEYWORDS : Surgical site infection, Cesarean, Staphylococcus aureus, discharge, sepsis.

INTRODUCTION:

One of the most common surgical procedures done worldwide is cesarean section which carries a risk of many events such as wound infection, dehiscence, bruises or seroma. This causes morbidity among post-cesarean women.¹ In a study conducted in New Delhi, India the incidence of surgical site infection was found to be 24.2%. India has a cesarean section proportion of 17.2% as depicted in a nationwide survey.² Surgical site infection after cesarean section is dependent upon factors which are related to maternal condition, procedure done and antibiotics given.

The definition of surgical site infection as per Centre for Disease Control (CDC) is the occurrence of infection within 30 days from the operative procedure in the part of the body where the surgery took place.³ The most common organism identified is Staphylococcus aureus with 15-20% cases.⁴ The knowledge of bacteriology and risk factors present in patient helps in providing adequate therapeutic services to the patient. Many preventive strategies have also been recommended to prevent or mitigate the occurrence of SSI. These include hair clipping, skin preparation, vaginal preparation, antibiotic prophylaxis, aseptic techniques, type of incision used, placental removal etc.⁵ The present study was conceived to know the epidemiological profile of surgical site infections after cesarean section and its related factors among post-partum women.

MATERIAL AND METHODS

The present study was an observational study done in department of Obstetrics and Gynaecology, Private Hospital, Gwalior (M.P.) India. This hospital is a Maternity and Child hospital providing services for Obstetric and Gynecological procedures. The duration of the study was from January 2018 to June 2020 among post cesarean section female patients to determine the incidence of surgical site infection.

INCLUSION CRITERIA

- The study included post cesarean section female patients who developed surgical site infection.

EXCLUSION CRITERIA

- Patients who received antibiotics for more than one week
- Patients who did not give consent
- Patients who underwent surgery after cesarean section

STUDY PROCEDURE

A questionnaire was prepared to include the demographic details of the study subjects which included age, BMI, socio-economic status, antenatal status, referral status, previous medical and surgical history, number of pre-operative days, prophylactic antibiotics, surgical site preparation etc. Other details noted were the details regarding cesarean section such as elective or emergency, blood transfusion, length and type of incision, spontaneous healing or suturing etc. The general details were asked from the patient whereas details of the operative procedure were retrieved from the medical record department. Regarding microbiological status, micro-organism was grown on culture and the sensitivity and/or resistance to antibiotics were studied. When the culture was positive, an antibiotic sensitivity assay was performed using standard microbiology techniques. The present study was a hospital-based study.

As defined by Centre for Disease Control, surgical site infection is occurrence of infection within 30 days after operative procedure.

STATISTICAL ANALYSIS

Data was entered in Microsoft Excel spreadsheet and analyzed using SYSTAT software version 13.2 for Windows. Quantitative data was presented as mean and standard deviation whereas qualitative data was described as frequency and proportion.

RESULTS

Mean age of the study participants was 25.61 years with standard deviation of 4.07. Age range was 19-35 years. Table 1 is showing demographic details for the study subjects.

Table 1: Characteristics of the patients who underwent cesarean section

Variable	Category	Frequency	Percentage
Age category	<25 years	62	42.2
	25-30 years	70	47.6
	>30 years	15	10.2
No of pre-op days	1-2 days	62	42.2
	3-4 days	76	51.7
	5-7 days	5	3.4
	8-10 days	4	2.7
Part preparation before cesarean	No	8	5.4%
	Yes	139	94.6%
Post-op antibiotics given	Yes	147	100
	No	0	0

POD of 1 st sign of infection	3-4 days	139	94.6
	5-10 days	8	5.4

Table 2: Different representations of surgical site:

Serous discharge	60.5%
Pus	27.2%
Wound gaping	8.2%
Serosanguinous discharge	3.4%
Fecal discharge	0.7%

On dressing, there was different presentation of surgical site infection which was serous discharge (60.5%), Pus (27.2%), wound gaping (8.2%) and serosanguinous in 3.4% subjects. Fecal discharge at the site of infection was present in 0.7% cases as depicted in Table 2.

Primary management of surgical site infection was done with antibiotics in all patients. There was presence of comorbidities among the patients of which common were anaemia (16.3%), PROM (9.5%), Pre-eclampsia (6.8%) and obesity (6.1%). Apart from these, there were other comorbidities which were diabetes, meconium-stained liquor, hypothyroidism, jaundice and tuberculosis as shown in Table 3.

Table 3 : Different Comorbidities Among The Patient With Surgical Site Infection:

Comorbidity	Frequency	Percentage
Anaemia	24	16.3
Leaking per vaginum	14	9.5
Pre-eclampsia	10	6.8
Obesity	9	6.1
Diabetes	7	4.7
Meconium-stained liquor	7	4.7
Skin infection	2	1.4
Hypothyroidism	2	1.4
Vaginitis	2	1.3
Hypertension	2	1.4
Eclampsia	1	0.7
Jaundice	1	0.7
Sepsis	1	0.7
Tuberculosis	1	0.7
None	64	43.5
Total	147	100.0

Table 4 : Type of sample collected from surgical site infection:

Sample taken	Frequency	Percentage
Serous	102	69.4
Pus	45	30.6
Total	147	100

The sample taken for culture and sensitivity of the surgical site infection was serous (69.4%) and pus (30.6%) respectively as shown in Table 4. Antibiotics were given to all patients which have been tabulated in table 5.

Table 5: Distribution of antibiotics which were administered to patients with surgical site infection.

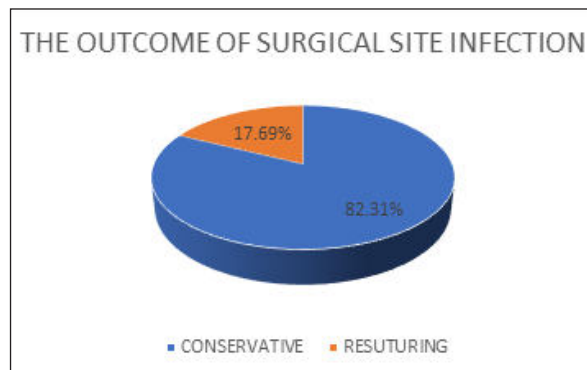
Antibiotics given	Frequency	Percentage
Ceftriaxone	41	27.9
Amoxycylav	28	19.0
Ciplox/Metrogyl	27	18.4
Piperacillin/Tazobactem	24	16.3
Clindamycin	16	10.9
Linezolid	8	5.4
Meropenem/Colistin/Vancomycin	3	2.0
Total	147	100

Table 3: Microbiological Summary Of Organism Found In Ssis

Antibiotics given	Frequency	Percentage
Staphylococcus	43	29.2
Sterile	37	25.2
Klebsiella	28	19.0
E-coli	25	17.0
Streptococcus	13	8.8
MRSA	1	0.7
Total	147	100

Most common surgical site infection was due to staphylococcus (29.2%) followed by sterile (25.2%). This has been summarized in table 3. The outcome of the surgical site infection was conservative in 82.31% patients whereas 17.69% had to undergo resuturing of the wound (figure 1).

Outcome	Frequency	Percentage
Conservative	121	82.31
Resuturing	26	17.69
Total	147	100

**Fig.1: Outcome Of The Surgical Site Infection**

DISCUSSION

The present study was conducted to know the microbiological profile of surgical site infection among post cesarean patients. Mean age of patients with SSI was 25.6 years. More than half of patients (57.8%) were aged 25 years above who developed SSI. A study done in Ethiopia reported 5 times higher odds of developing SSI where age of the mother was 20-34 years.⁶ Another study done in Rajasthan, India reported a higher proportion of SSI among patients aged 25 years and above (74.2%).⁷ A study from Assam, India reported increased risk of SSI with higher BMI.⁸

In the present study, anemia followed by PROM were the most common comorbidities. A study from Telangana, India reported a higher proportion of anemia (51%) and hypertension (25%) as risk factors for developing SSI.⁹

Regarding the organism isolated from the aspirate/pus from the SSI, most common in the index study was Staphylococcus aureus (29.2%) followed by no growth (sterile, 25.2%). Similar result was reported from a study by Devi et al. where Staphylococcus infection was most common (36%), Klebsiella (23%) followed by sterile culture (17%).⁹ Another study by Sangwan et al reported sterile culture (67%) as most common with staphylococcus found in only 17.5% samples.¹⁰ Similar results are being reported by other studies.^{8,11} In contrast, E.coli was reported as the most common organism isolated from SSI in a study conducted from New Delhi, India.¹²

For treating the surgical site infection, Ceftriaxone was the most common antibiotic given, followed by Amoxiyclav and ciprofloxacin/Metronidazole in the present study. Meropenem/Colistin/ Vancomycin were in given only in 3 patients. A study from Pune reported Amikacin/Ciprofloxacin/ Gentamicin for E.coli and Ciprofloxacin/Doxycycline for Methicillin Resistant Staphylococcus aureus.¹³

Outcome of the surgical site infection was conservative management, which included daily aseptic dressings along with antibiotic cover, in 82.31% whereas resuturing was required for rest 17.69%. Similar results were reported by a study conducted in Pune, Maharashtra where resuturing was performed in 30.4%.¹³ Study conducted in Telangana reported a higher proportion of patients undergoing secondary suturing (63%).⁹ Also, a study from Haryana reported similar (80%) resuturing pattern among patients with SSI. However, the sample size in Haryana study was only 40 patients.¹⁰

CONCLUSION

Surgical site infection is a common entity seen after cesarean section among female patients. Staphylococcus aureus is the most common organism isolated responsible. Management of SSI is conservative along with resuturing when need arises. Practice of aseptic techniques,

peri-operative antibiotics, correction of co-morbid factors such as anemia and hypertension and surveillance of organism for hospital infections is must to decrease and eliminate the rates of SSI. Drug sensitivity pattern of antibiotics should be the basis of empirical antibiotic therapy.

REFERENCES

1. Yerba K, Failoc-Rojas V, Zeña-Nañez S, Valladares-Garrido M. Factors Associated with Surgical Site Infection in Post-Cesarean Section: A Case-Control Study in a Peruvian Hospital. *Ethiop J Health Sci.* 2020 Jan;30(1):95–100.
2. National Family Health Survey [Internet]. [cited 2021 Feb 28]. Available from: <http://rchiips.org/nfhs/nfhs3.shtml>
3. Horan TC, Gaynes RP, Martone WJ, Jarvis WR, Emori TG. CDC definitions of nosocomial surgical site infections, 1992: a modification of CDC definitions of surgical wound infections. *Infect Control Hosp Epidemiol.* 1992 Oct;13(10):606–8.
4. Korol E, Johnston K, Waser N, Sifakis F, Jafri HS, Lo M, et al. A systematic review of risk factors associated with surgical site infections among surgical patients. *PLoS One.* 2013;8(12):e83743.
5. Suarez-Easton S, Zafran N, Garmi G, Salim R. Postcesarean wound infection: prevalence, impact, prevention, and management challenges. *Int J Womens Health [Internet].* 2017 Feb 17;9:81–8. Available from: <https://pubmed.ncbi.nlm.nih.gov/28255256>
6. Dessu S, Samuel S, Gebremeskel F, Basazin A, Tariku Z, Markos M. Determinants of post cesarean section surgical site infection at public hospitals in Dire Dawa administration, Eastern Ethiopia: Case control study. *PLoS One [Internet].* 2021 Apr 16;16(4):e0250174. Available from: <https://doi.org/10.1371/journal.pone.0250174>
7. Sahay N, Jhakhar R. Study of post caesarean section wound infection and microbiological epidemiology in tertiary care centre, Western Rajasthan, India. *Int J Reprod Contraception, Obstet Gynecol.* 2020;9(5):2042.
8. Dutta BK, Basumatary BK, Sarma A. Surgical Site Infection Following Caesarean Section in a Tertiary Care Hospital. *J Evid Based Med Healthc.* 2020;7(1):01–5.
9. Devi SL, Durga DVK. Surgical site infections post cesarean section. *Int J Reprod Contraception, Obstet Gynecol.* 2018;7(6):2486.
10. Sangwan A, Malhotra V. Assessment of risk factors for surgical site infection following caesarean section. *Int J Reprod Contraception, Obstet Gynecol.* 2019;8(11):4518.
11. Lilani SP, Jangale N, Chowdhary A, Daver GB. Surgical site infection in clean and clean-contaminated cases. *Indian J Med Microbiol.* 2005 Oct;23(4):249–52.
12. Dahiya P, Gupta V, Pundir S, Chawla D. Study of Incidence and Risk Factors for Surgical Site Infection after Cesarean Section at First Referral Unit. *Int J Contemp Med Res.* 2016;3(4):1102–4.
13. Mhaske DG, Vadehra DP, Junnare DK, Kalra K. Study of surgical site infection (SSI) in patients undergoing caesarean section (CS): A retrospective study. *Int J Clin Obstet Gynaecol.* 2020;4(1):350–3.