ISSN: 2091-2749 (Print)
2091-2757 (Online)

Clinical profile of patients with post-caesarean wound infection: experience of Patan Hospital, Nepal

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Submitted
20 Oct 2019

Accepted
10 Jan 2020

How to cite this article
Ekta Jaiswal, Paban K Sharma, Alka Singh. Clinical profile of patients with post-caesarean wound infection: experience of Patan Hospital, Nepal. Journal of Patan Academy of Health Sciences. 2020Apr;7(1):107-112.

DOI:
https://doi.org/10.3126/jpahs.v7i1.28886

Abstract

Introduction: Would infection following caesarean delivery adds physical, psychological, and health burden to individual and health care system. This hospital based study aim to determine the rate of infection, the risk factors, pathogens and antibiotic sensitivity.

Method: A prospective study was carried out to analyze the wound infection in women following caesarean delivery in the Department of Obstetrics and Gynecology, Patan Hospital, Nepal, between January 2018 to December 2018. The study was approved from the institutional review committee. Clinicodemographic data during perinatal period of caesarean delivery were descriptive analyzed in relation to wound infection.

Result: Wound infection occurred in 102 (3.1%)of 3285 caesarean section (of total 7131 deliveries during the study period. The caesarean SSI rate was 3.1%, all were incisional SSI (84 superficial and 18 deep) and there were no organ-space SSI. Majority (81.3%) SSI cases were detected in emergency LSCS. Coagulase Negative Staphylococci was the most common organism isolated from wound swab. Routine postoperative antibiotics did not have a major impact in reducing wound infection rate. Multiple per vaginal examinations, prolonged rupture of membrane and staples for skin closure were more commonly associated with SSI.

Conclusion: Reduction in caesarean rate is the major key factor for decreasing the post caesarean wound infection. Protocol should be developed and strictly implemented by all the health care professionals in order to minimize and prevent the infection rate after caesarean section.

Keyword: Caesarean section, surgical site infection (SSI), wound infection

Introduction

Caesarean section(CS) wound infections a commonly encountered complication with a prevalence of 3% to 15% worldwide.[1] Surgical Site Infection (SSI) increases maternal morbidity, length hospital stay, cost and may require reoperation.[2] Wound infection gives physical as well as psychological stress to the mother who is trying to recover from the operation and at the same time has to take care of the newborn.

The risk factors for SSI are related to patient (older age, low socioeconomic status, high body mass index BMI, anemia)[2]; obstetric history (parity, zygosity, prematurely ruptured membranes PROM, number of per vaginal examinations, presence of meconium-stained liquor, gestational age <37 weeks[2] and vaginal procedures performed before caesarean); surgery (emergency operation,[3,4] skin closure method, surgery duration,[3] blood loss and use of prophylactic antibiotics)[5]

Though we are giving pre and post-operative antibiotics to all caesarean patients in our hospital, studies have shown that postoperative antibiotics do not have major impact in reducing wound infection. Present study aims to analyze the prevalence of SSI following caesarean delivery, risk factors, organisms isolated and antibiotic sensitivity patterns. These findings may in future help us devise policies to decrease the SSI.

Method

This was a cross sectional study of prospectively collected data on CS to analyze the at Patan Hospital (PH), Patan Academy of Health Sciences (PAHS), Lalitpur, Nepal, from January 2018 to December 2018. The prevalence of SSI, demographic profile of patients including parity, BMI, duration of hospital stay after wound infection, the risk factors, the common pathogens and their antibiotic sensitivity patterns were analyzed. Ethical approval was obtained from the Institutional Review Committee of Patan Academy of Health Sciences.

Our hospital practice is to give Pfannenstiel incision lower segment CS (LSCS), povidone iodine solution for abdomen skin preparation and vaginal toileting in operating room with betadine soaked cotton swab before incision, per urethral catheterization, prophylactic antibiotic 1 g of cephazolin at the time of umbilical cord clamping, chromic catgut to close the uterus. Skin closer depends upon the surgeons choice, either with subcutaneous or mattress sutures (2-0 polyglactin 910, Vicryl®; or Nylon, Ethilon®); or staplers.

Wound was evaluated, during morning round by doctors (MD Obs/Gynae) for SSI on 3rdpostoperative day for the 1sttime and then every day until discharge. Status of CS wound for SSI was recorded for the presence of severe tenderness, induration or discharge (hemorrhagic, serous or purulent). In case of wound discharge, Gram staining and culture was performed, prescribed Ciprofloxacin and Metronidazole (changed appropriately after the culture report) and wound dressing.

Elective LSCS in this study was taken as those operations which were planned and performed when the patient was not in an active labor whereas the remaining CS was classified as emergency LSCS. As per hospital practice, the patients are discharged on 3rdpost-operative day and regular follow up after 1 w and 1 m in the Obs/Gynae outpatient department (OPD). In case of wound infection detected before discharge, the patient stay in hospital till the wound is healthy.

Variables studied included, age, parity, antenatal checkup (ANC), BMI, parity, PROM, number of vaginal examination, and indication for CS, length of hospital stay, wound swab culture and sensitivity. Patients with other documented infections in perinatal period, like respiratory tract infection, urinary tract infection, mastitis and deep vein thrombosis, were excluded from the study.

The data was collected after explaining the study protocol and informed written consent from the patients. Cases were managed according to institute protocol. All the collected data were transferred to predesigned proforma and descriptively analyzed using SPSS (version 12) and Excel 2010 software.

Result

A total 3285 (46.1%, out of 7131 delivery) had CS section during the study period. Wound infection occurred in 102(3.1%) CS, 83 (81.3%%) in emergency and 19 (18.6%) in elective CS. All were incisional SSI (84 superficial and 18 deep) and there were no organ-space SSI, Table 1.

Previous CS was the indication for elective CS in 12 (63.2%) and fetal distress 34 (41%) for emergency CS, Table 2. Staples were used for skin closure Skin closure in 59 and remaining had skin sutures. Eleven patients had subcutaneous skin closure with Vicryl® 2-0 and 32 patients mattress suture with Ethilon®.

Re-suturing was required in 14 out of total 102 CS. Post-operative hospital stay was <5 d 67 (65.7%), Table 1.

Table 1. Demographic and clinical features of women with CS who developed SSI (N=102)

Variables		N	%
Age (years)	<=19	2	1.9
	20-34	91	89.2
	>=35	9	8.8
Place of ANC	Patan Hospital	69	67.6
	Outside	33	32.4
Parity	Primiparous	57	55.9
	Multiparous	45	44.1
BMI	<18.5	0	0
	>=18.5 and <25	50	49
	>=25 and <30	42	41.1
	>=30 and <35	7	6.9
	>=35 and 40	3	2.9
PROM	<12 h	17	56.7
30 (29%)	12-24 h	9	30
	>24 h	4	13.3
Vaginal examination	<4	66	64.7
	4-6	34	33.3
	>6	2	2
Liquor color	Clear	73	71.6
	Light meconium	6	5.9
	Moderate meconium	20	19.6
	Thick meconium	3	2.9
CS	Emergency	83	81.4
	Elective	19	18.6
Skin closure	Staple	59	57.8
	Suture	43	42.2
Hospital stay	<5 d	67	65.7
	5-10 d	19	18.6
	>10 d	16	15.7

Note: ANC- antenatal care, BMI- body mass index, PROM- pre mature rupture of membrane, CS- caesarean section

Table 2. Indication of emergency and elective caesarean section

Emergency LSCS (N=83)		Elective LSCS (N=19)	
Indications	**N(%)**	**Indications**	**N(%)**
Fetal distress	34 (41.1%)	Previous CS	12 (63.1%)
Previous CS in labour	5 (6%)	Malpresentation	2 (10.5%)
Cephalopelvic disproportion	5 (6%)	Multiple pregnancy	1 (5.2%)
Non progression of labour	17 (20.5%)	Others[2]	4 (21.2%)
Failed induction of labour	11 (13.2%)		
Others[1]	11 (13.2%)		

Others[1]: antepartum hemorrhage, Malpresentation, severe oligohydramnios); Others[2]: placenta previa, malpresentation

Table 3. Microorganisms isolated from wound in woman with surgical site infection following caesarean section, N=42

Microorganisms	N(%)
Coagulase-negative Staphylococci	14 (33.3%)
Staphylococcus spp	12 (28.8%)
Escherichia coli	6 (14.2%)
Methicillin-resistant Staphylococcus aureus	4 (9.5%)
Pseudomonas aeruginosa	3 (7.14%)
Klebsiellaspp	1 (2.4%)
Enterococcus spp	1 (2.4%)
Acinetobacter	1 (2.4%)

Wound swab cultures were taken for all 102 cases with SSI. Sixty of them had no growth and 42 had positive culture results. Coagulase Negative Staphylococci were found in 14 (33.3%), followed by Staphylococcus spp. In 12 (28.8%), and 4 (9.5%) Methicillin-resistant S. aureus, Table 3

The antibiotic sensitivity in the isolated microorganisms were penicillins (ampicillin 16.7%, cloxacillin 23.8%), aminoglycosides (gentamycin 40.5%, amikacin 38%), quinolones (ciprofloxacin 21.4%, ofloxacin 16.7%), chloramphenicol (40.5%), erythromycin (7%), clindamycin (7%) and trimethoprim/ sulfamethoxazole (16.7%).

Discussion

Present study showed post caesarean SSI of 3.1% (102 SSI out of 3285 CS), slightly higher than 2.76% reported from our hospital in 2002[6] but still lower than studies from Thai-Myanmar border hospital of 5.9%[7]and higher than 1.27% in others,[8] possibly due to different methodologies used to identify SSIs and prophylactic antibiotics used. Older age, PROM, increased number of per vaginal examinations, presence of meconium-stained liquor, emergency operation, use of staples for skin closure, long surgery duration are associated factors for SSI.[9,10]

In present study, proportionately more SSI were seen in emergency than elective CS, 81.3% vs. 18.6% of total wound infection, similar to other studies from India[11] and Ethopia.[12] Possible explanation may be due multiple per vaginal examinations in emergency cases, and suboptimal overall perioperative conditions in emergency surgeries.

Although, WHO recommends CS rate of 10-15%[13] for any institution, in present study it was 46.1%. This was 46.9% in 2014 in our hospital. [14] This high rate can be attributed to the high number of referrals of complicated cases.

In our study, Coagulase Negative Staphylococci was the most common isolate (33%) similar to other studies. Most SSI in present study were incisional SSIs, which is commonly due to inoculation of resident skin flora, contaminated amniotic fluid coming into the incision site or bacteria from the surrounding environment.[15]

Obesity is associated with higher incidence of SSI in many studies[2] but in our study we could not find any relation of SSI with obesity.

In the present study multiple PVs (>4 times) were done in 35.3%, a proven risk factor of SSIs. Microbes from external genitalia are inoculated in the amniotic cavity through ascending infection and hence caesarean SSIs risk increases.[16]

A study done in Tanzania showed rupture of membranes for 8 hours or longer prior to surgery is a significant risk factor for post caesarean wound infection. In our study (11/102) patients had rupture of membranes for more than 12 hours which is a well-known risk factor of post CS wound infection.[9]

In our study, more patients with SSI had skin staples (57.8%) compared to mattress suture for skin (31.4%) and lowest with subcuticular suture (10.8%). A meta-analysis has shown two-fold increase in wound infection with staples skin closure compared to subcuticular sutures.[10]

Some of the limitations in our study could be lack of case by case follow up of all the CS cases. Some cases may be lost to follow-up in outpatient department.

Conclusion

In our study more SSI were seen in emergency CS, prolonged rupture of membrane and use of staplers for skin closure. Common organism isolated in wound cultures was coagulase negative Staphylococci.

Acknowledgement

I thank all patients for their participation in the study.

Conflict of Interest

None

Funding

None

Author Contribution

All authors read and approved final manuscript; EJ conceptualized, collected data wrote draft; PS concept and revision of manuscript; AS revision of manuscript. All authors read and approved final draft.

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