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Surgical site infections in post LSCS patients: The SSI rates and bacteriological profile.

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Abstract:

Background*: surgical site infections (SSIs) are among the most common healthcare associated infections (HAIs)· Post Lower Segment Cesarean SSI result in maternal morbidity, longer hospital stays, repeated admissions and greater healthcare costs to both patients and the healthcare system overall. These are preventable through infection prevention control measures and good surgical practices.*

Materials and Methods*: In this prospective study conducted by the Department of Microbiology and Department of Obstetrics and Gynecology all patients undergoing Lower Segment Cesarean section were observed for postoperative wound infection for 30 days period. Samples were collected by sterile cotton swabs and processed by standard microbiological techniques. Surgical site infection rates both in emergency as well as elective cases were calculated.*

Results*: Total 1453 LSCS were performed from February 2021 to June 2021and all were observed for any post-operative surgical site infections. Out of 1453 cases 116 patients developed SSIs, SSI rate being 7.9%. Total number of emergency procedures were 1359 which is 93.53% .The emergent SSI rate was 8.2% while the elective SSI rate was 5.3%.The higher incidence was associated with emergency surgery. Out of 116 cases, 72 cases manifested on postoperative day 3.Most common organism isolated was Staphylococcus aureus (62%), followed by Klebsiella pneumoniae (13%), Acinetobacter baumannii(13%), Escherichia coli(8%) and Enterococcus species(4%). Methicillin-resistant Staphylococcus aureus (MRSA) was the most common pathogen encountered with 33% prevalence. Vancomycin, linezolid and clindamycin were found to be most sensitive for Gram positive organisms. A high level of MDR was noted by E. coli, Klebsiella spp., and S. aureus.Whereas among gram negative isolates Meropenem, Gentamicin, Piperacillin-Tazobactam, and Colistin were found to be most sensitive.*

Conclusion: *Hospital acquired infections are complicated by the increasing prevalence of some multi drug resistant organisms like Methicillin resistant Staphylococcus aureus(MRSA) Gram negative multidrug resistant organisms. Also prevalence of SSI increases in emergency surgeries due to absence of preprocedural activities. Most common cause of postoperative wound infection lies in the operation theatre itself since most common day of event is day 3..*

Key Word*:* Post Lower Segment Cesarean SSI*; SSI rates;SSI.*

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I. Introduction

Surgical site infections (SSIs) are among the most common healthcare associated infections (HAIs)[1]with an incidence over three times higher than that seen in developed nations[2].Post Lower Segment Cesarean SSI result in maternal morbidity, longer hospital stays, repeated admissions and greater healthcare costs to both patients and the healthcare system overall. These are preventable through infection prevention control measures and good surgical practices.The Centers for Disease Control and Prevention defines SSI as an infection occurring within 30 days from the operative procedure in the part of the body where the surgery took place.[3]

The aim of this study was to determine the prevalence of SSI in post caesarean section patients. It also aimed atstudying the bacteriological profile in Post Lower Segment Cesarean SSI pathogens along with

determination of multidrug resistance (MDR) pattern among isolates. It aimed to provide data to implement targeted infection prevention and control (IPC) activities provide a platform for measuring the impact of IPC activities.

II. Material and Methods

This prospective study was carried out on patients of Department of Obstetrics and Gynecologyat Government Medical College and Hospital, Aurangabad, Maharashtra from February 2021 to June 2021. This study focuses on inpatient surveillance with a provision for post-discharge surveillance, if feasible for 30 days. The SSI case was defined as a patient within 30 days of the surgical procedure with the following observed or reported symptoms:

a. A purulent (pus) discharge in, or coming from, the wound (including evidence of an abscess) OR
b. Any reopening of the surgical wound OR
c. Evidence of fever with painful, spreading erythema surrounding the surgical site

The case definition is for the purpose of surveillance and is not meant to serve as a clinical definition for diagnosis and treatment. Post Lower Segment Cesareanwound was assessed on third, fifth and post discharge and sampleswerecollectedby two sterile cotton swabs and sent for culture sensitivity in Microbiology department. Samples were collected from the patients undergoing electiveas well as emergency lower segment Cesareansections in Obstetrics and Gynecology department.Samples were collected using sterile cotton swabs. Samples were transported to laboratory immediately. Swabs were inoculated on Blood Agar & MacConkey Agar andwere cultured for 24-48 hours at 37°c, followed by theidentification of the isolates based on their culturalcharacteristics and morphology with their biochemicalreactions.Antibiotic susceptibility pattern of the isolates was studied by Modified Kirby Bauer disc diffusion technique following Clinical Laboratory Standards Institute (CLSI) guidelines[4].
Total 1453 LSCS were performed from February 2021to June 2021. Out of 1453 cases 116 developed postoperative surgical site infection. SSI rate, Emergent and elective SSI rates were also calculated**.**

Statistical analysis

Data was analyzed using SPSS version 20 (SPSS Inc., Chicago, IL).

- **Total SSI rate** was calculated as SSI per 100 procedures. (Divide the total number of SSI recorded by the number of procedures performed and then multiply by 100.)
- **Elective SSI rate** was calculated as SSI per 100 elective procedures. Divide the number of SSI recorded for elective procedures by the number of elective procedures performed and then multiply by 100.
- **Emergent SSI rate** was calculated as SSI per 100 emergent procedures. Divide the number of SSI recorded for emergent procedures by the number of elective procedures performed and then multiply by 100.

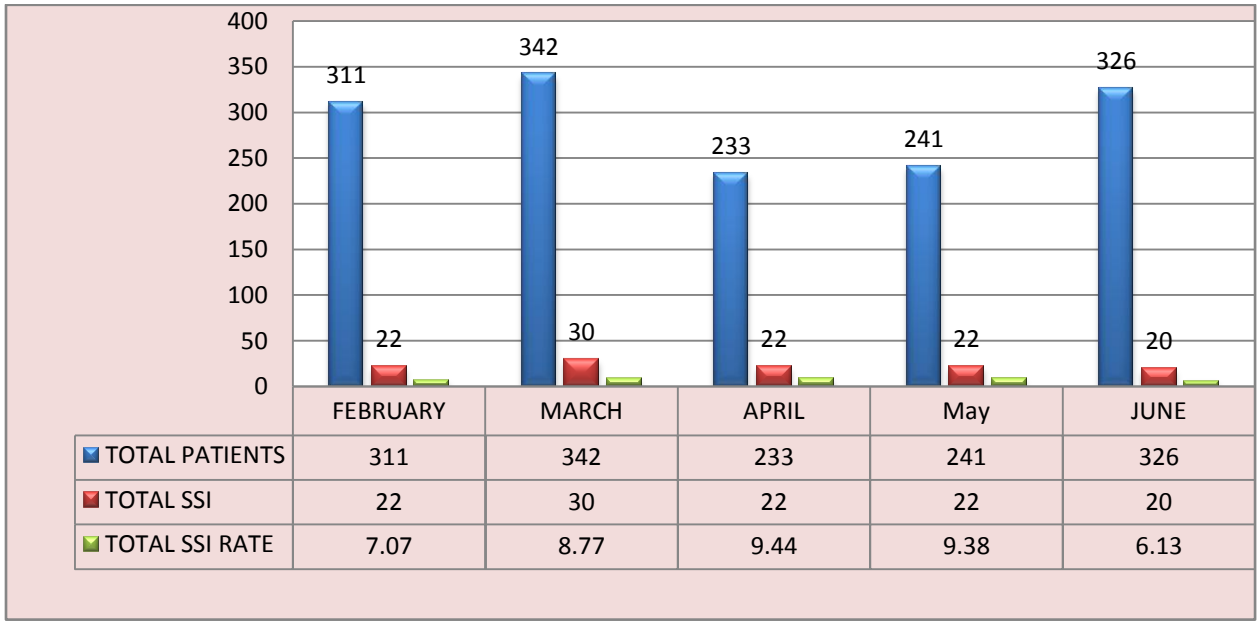
III. Result

Total 1453 Lower Segment Cesarean Sections were performed from February to June 2021. All 1453 cases were observed for any post-operative surgical site infections. Out of 1453 cases 116 patients developed SSI. The total SSI rate was 7.9%. The higher incidence was associated with emergency surgery.

Table no 1:SSI Rate In Post-LSCS cases.

	February	March	April	May	June
Total no of Patients	311	342	253	241	326
Total SSI cases	22	30	22	22	20
SSI rates	7.07	8.77	9.44	9.38	6.13

Chart 1: SSI Rate in Post-LSCS cases



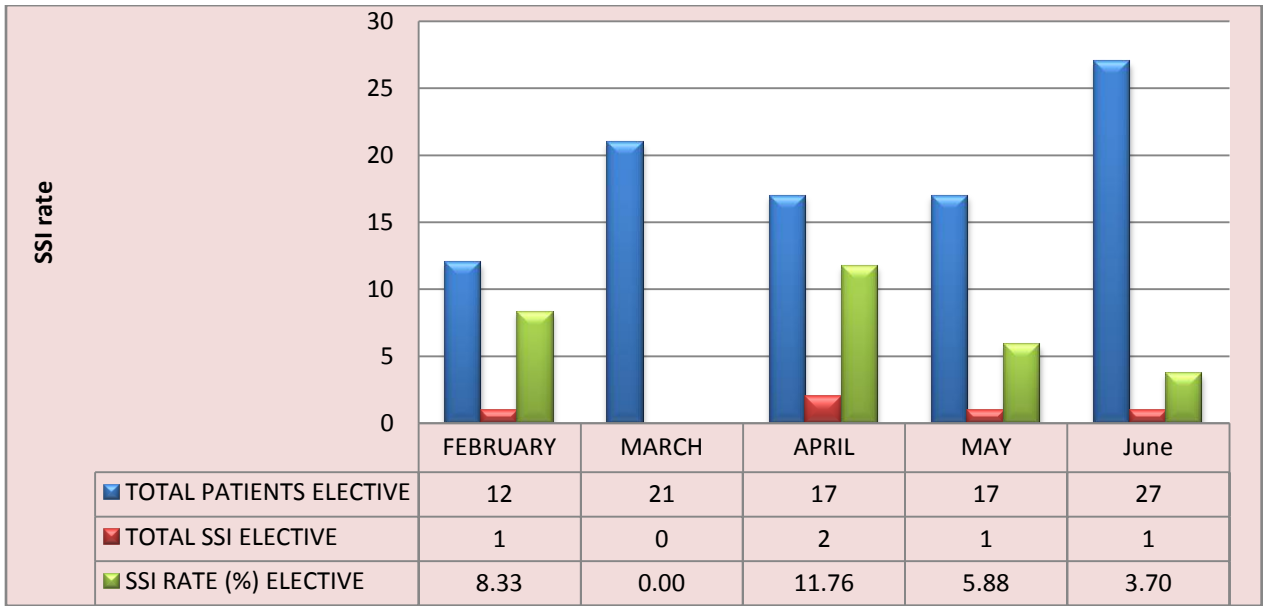
	FEBRUARY	MARCH	APRIL	May	JUNE
TOTAL PATIENTS	311	342	233	241	326
TOTAL SSI	22	30	22	22	20
TOTAL SSI RATE	7.07	8.77	9.44	9.38	6.13

Total number of emergency procedures was 1359 out of 1453 which is 93.53% .While total number of elective procedures were 94. The emergent SSI rate was 8.2% while the elective SSI rate was 5.3%.

Table no 1 : SSI Rate in Emergency and Elective procedures LSCS in OBGY

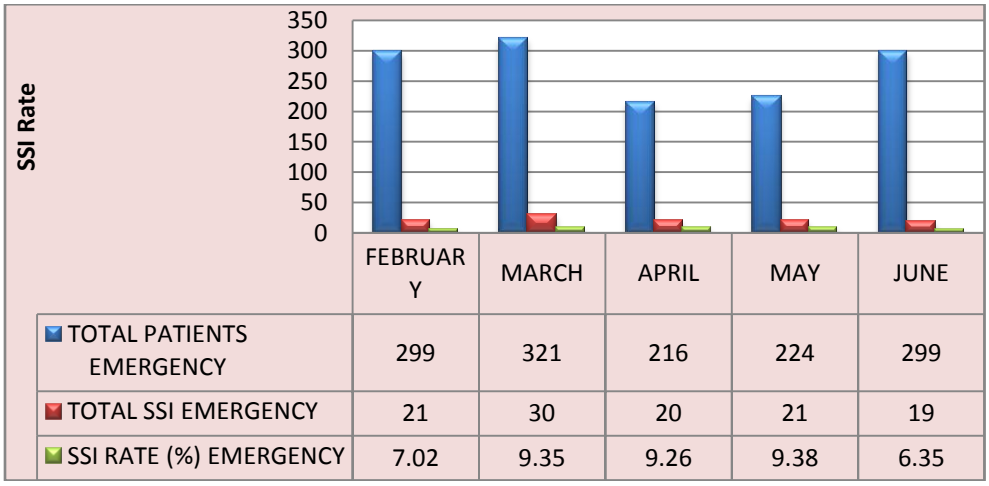
	Elective LSCS	Emergency LSCS	Total cases
Total no of Patients	94	1359	1453
Total SSI cases	5	111	116
SSI rates	5.3	8.2	7.9

Chart 1: Elective LSCS SSI Rates In Post-LSCS cases



	FEBRUARY	MARCH	APRIL	MAY	June
TOTAL PATIENTS ELECTIVE	12	21	17	17	27
TOTAL SSI ELECTIVE	1	0	2	1	1
SSI RATE (%) ELECTIVE	8.33	0.00	11.76	5.88	3.70

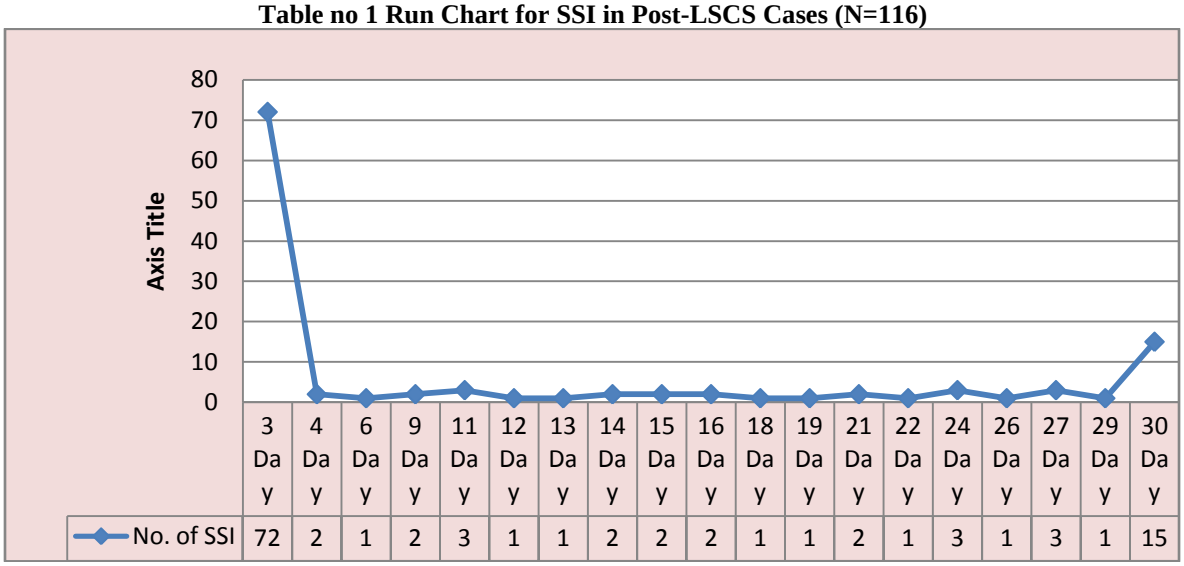
Chart 1: Emergency LSCS SSI Rates In Post-LSCS cases



	FEBRUARY	MARCH	APRIL	MAY	JUNE
TOTAL PATIENTS EMERGENCY	299	321	216	224	299
TOTAL SSI EMERGENCY	21	30	20	21	19
SSI RATE (%) EMERGENCY	7.02	9.35	9.26	9.38	6.35

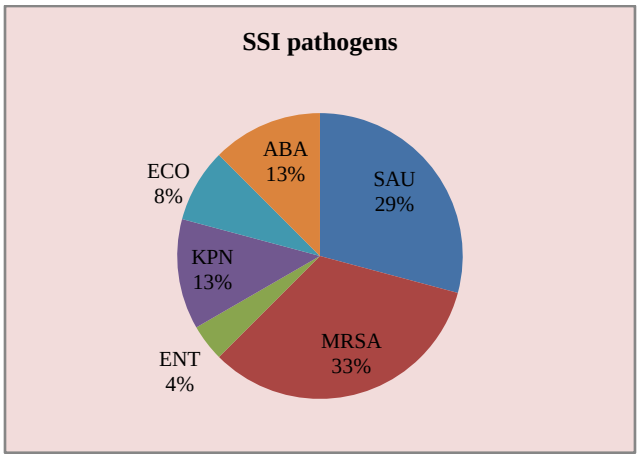
In all 116 cases date of event was noted. Most commonly observed feature was that most of the cases manifested after surgery. About 72 cases out of 116 cases manifested on third postoperative day as shown in graph.

Table no 1 Run Chart for SSI in Post-LSCS Cases (N=116)



	3 Day	4 Day	6 Day	9 Day	11 Day	12 Day	13 Day	14 Day	15 Day	16 Day	18 Day	19 Day	21 Day	22 Day	24 Day	26 Day	27 Day	29 Day	30 Day
No. of SSI	72	2	1	2	3	1	1	2	2	2	1	1	2	1	3	1	3	1	15

Most common organism isolated was Staphylococcus aureus (62%), followed by Klebsiella pneumoniae (13%), Acinetobacter baumannii(13%), Escherichia coli(8%) and Enterococcus species(4%). Methicillin-resistant Staphylococcus aureus (MRSA) was the most common pathogen encountered with 33% prevalence. Vancomycin, linezolid and clindamycin were found to be most sensitive for Gram positive organisms. A high level of MDR was noted by E. coli, Klebsiella spp., and S. aureus. Whereas among gram negative isolates Meropenem, Gentamicin, Piperacillin-Tazobactam, and Colistin were found to be most sensitive.



IV. Discussion

Hospital acquired infections are complicated by the increasing prevalence of some multi drug resistant organisms like Methicillin resistant Staphylococcus aureus(MRSA) Gram negative multidrug resistant organisms. Also prevalence of SSI increases in emergency surgeries due to absence of preprocedural activities. Most common cause of postoperative wound infection lies in the operation theatre itself since most common day of event is day 3.The high incidence rate of SSIs after LSCS in this study highlight the need for prioritizing SSI control and surveillance. Study provides useful information for infection control interventions to reduce the incidence of SSI. The emphasis needs to be given to the preoperative factors and intraoperative factors since most of the cases showed symptoms on day 3.

V. Conclusion

The present study revealed the consistently high rate of surgical site infections after LSCS. This suggests need to initiate stringent SSI surveillance and also implement the interventions to decrease SSI rate. A baseline assessment of focused infection control practices (e.g., hand hygiene, pre-surgical prophylaxis, sterilization,

disinfection, and aseptic practices, and environmental cleaning) in labour rooms, operating theaters and post-surgical wards should be performed before initiating surveillance to identify gaps in infection control policies and practices. The information from the baseline assessment should be used to prioritize SSI prevention and activities to improve safe surgical practice. Surgical focused infection control practices should be reassessed at least annually to evaluate progress.

Monitoring or Measurement of Surgical Care Improvement could be done by introducing SSI bundle care checklist. Their translation into practice in surgical services and operating rooms is the ultimate and most important goal to achieve a reduction of harm due to SSI through the continuum of the patient's surgical journey.

The dissemination and implementation of these guidelines are crucial steps that should be undertaken by the hospital infection control committee.

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