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Research Article

Surgical Site Wound Infection in Emergency and Elective LSCS – A Comparative Study

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Abstract: Lower segment cesarean section being the most commonly performed surgery in obstetric practice an attempt has been made to study the incidence of wound infection in emergency and elective lower segment cesarean section (LSCS) and factors predisposing to wound infection. The differences in incidences of wound infection in emergency and elective LSCS is studied. This Hospital based prospective and comparative study was conducted in Modern Government Maternity Hospital, Petlaburj, Osmania Medical College, Hyderabad, from October 2012 to September 2013. Total number of LSCS performed from November 2012 to October 2013- 5864 (32.16% of the total deliveries-18236).Total number of surgical site infections (SSI) in254cases (4.33% of total LSCS performed) SSI in elective LSCS = 36 (1.03% of elective LSCS performed) SSI in emergency LSCS = 218 (9.18% of emergency LSCS performed). Cases of SSI with cesarean section performed elsewhere and referred to our hospital are excluded. The mean age among cases of elective LSCS is 25 years. The mean age among cases of emergency LSCS is 24 years. Anemia (26.77%) and preeclampsia (25.19%) are the most commonly associated risk factors for SSI. The causative organisms for wound infection in cases of lower segment cesarean section at wound site is studied in detail for the characteristics of wound- erythema, induration, discharge from the wound, wound gaping and intactness of rectus sheath. Wound site is followed up with regular dressing, change of antibiotics as per culture and sensitivity from wound site report. Formation of granulation tissue and timing of resuturing is noted.
Keywords: cesarean section, wound infection, wound healing, eclampsia, purulent discharge

INTRODUCTION:

Every operation in surgery is an experiment in bacteriology, this statement by Lord Moynihan provides the remarkable insight to the seemingly unpredictable nature of infection [1]. Far reaching advances in t h e field of medicine , techniques in surgery, dependable anesthetic techniques innumerable antibiotics , advances in the operating room maintenance after the introduction of the lamellar air flow systems and the body exhaust systems, have enriched the surgeon's armamentarium [2, 3, 4, 5]. As a result, the post-operative infection rate has come down from about 70% in the pre-Listerian era to less than 1% in the developed countries[6].

Despite of these encouraging results wound infection still remains a major cause of post-operative morbidity and mortality [7, 8, 9, 10]. The types of incisions used during cesarean section-Midline vertical incision, Para median incision, Transverse incision, Pfanenstiel incision, Maylard incision, Cherney incision, Joel Cohen incision [11].

The term wound has been defined as a disruption of normal anatomical structure and, more importantly, function. Wound healing is divided into four sequential, yet overlapping phases: (1) hemostasis (2) inflammation, (3) proliferation and (4) remodeling [12].

Complications in wound healing can arise from abnormalities in any of the basic components of the repair process. Deficient scar formation, Hypertrophic scar, Keloid, Exuberant granulation, Desmoids, Contractures, Avoidable scarring [13, 14]. The factors that influence repair can be categorized into local and systemic.

The classification system was developed initially by the American College of Surgeons and adapted in 1985 by the Centers for Disease Control and Prevention. Four classes of surgical wound types are described based on the wound's level of contamination:

I clean, II clean-contaminated, III contaminated and IV dirty-infected.

METHODOLOGY:

This study was conducted in Modern Government Maternity Hospital, Petlaburj, Osmania Medical College, Hyderabad from October 2012 to September 2013 .This was hospital based prospective and comparative study.

254 Cases of surgical site wound infection in elective and emergency LSCS are taken for study. All the cases of surgical site wound infection with lower segment cesarean section done at this hospital. Women fulfilling the inclusion criteria and are willing to participate in the study are included.

Cases of SSI with cesarean section performed elsewhere and referred to our hospital, also mothers who refused consent are excluded from study. Detailed obstetric history and intrapartum details were obtained. All the cases were given ampicillin and gentamycin as preoperative prophylactic antibiotics. All the cases were given postoperative antibiotics.

Uterine incision is closed in 2 layers with vicryl. Rectus sheath is closed with prolene. Skin suturing is done intermittently with thread. Associated medical and obstetric complications were noted. Wound site is studied in detail for the characteristics of wound-erythema, induration, discharge from the wound, wound gaping and intactness of rectus sheath.

Wound swab for culture and sensitivity is sent. Wound site is followed up with regular dressing, change of antibiotics as per culture and sensitivity from wound site report. Formation of granulation tissue and timing of resuturing is noted. Post operative duration of stay in the hospital is noted.

OBSERVATION:

Total number of LSCS performed from November 2012 to October 2013 are 5864 .Surgical site infections in emergency LSCS are 218 (9.18%) and 36(1.03%) of elective LSCS. (Table- 1)

Table: 1

	Total cases	Surgical site infection in LSCS	%
Elective	3489	36	1.03%
Emergency	2375	218	9.18%
	N=586	N=254	4.33%

All the cases fall in the normal reproductive age group. The mean age among cases of elective LSCS is 25 years. The mean age among cases of emergency LSCS is 24 years. In this study about 75.5% (192) cases with SSI (both elective and emergency LSCS) belong to upper and lower socio- economic class.

Un-booked cases are 163 (64.17% of the total cases with SSI) of the total cases with SSI. Study shows that the number of cases of 1 prev LSCS -116 (45.66% of total cases of SSI) is more among cases of SSI in both elective and emergency LSCS (Table 2).

Table: 2

	Elective LSCS	Emergency	Total
Primary	4(11.11%)	74(33.94%)	N=78
1 prev	20(55.55%)	96(44.03%)	N=116
2prev	12(33.33%)	48(22.01%)	N=60
Total	N=36	N=218	N=254

Our study shows that anemia (26.77% of the total cases with SSI) and preeclampsia (25.19% of the total cases with SSI) are the most commonly associated risk factors for SSI.

Eclampsia (18.9%), failed induction (15.9%), prolonged PROM>18hrs (15.9%) are the common obstetric complications associated with SSI. (Fig-1).

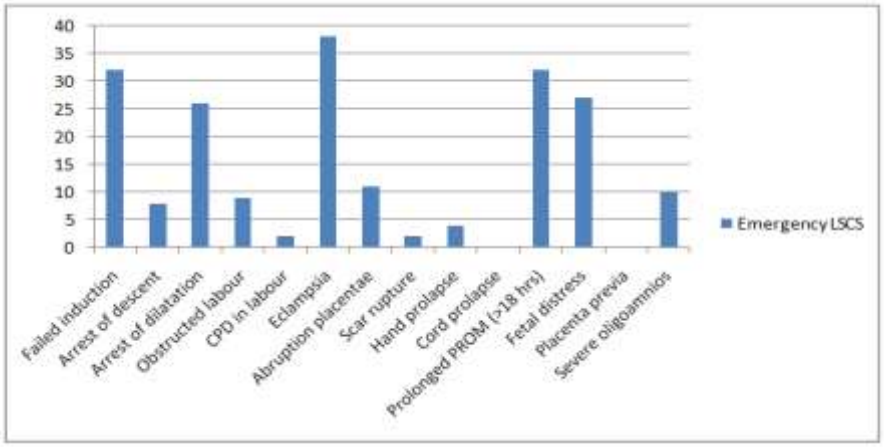

Fig: 1 Obstetric complication in cases of Emergency LSCS with surgical site infection

In our study 1st previous LSCS (27.7%) with PROM is the most common indication for Emergency LSCS, followed by arrest of dilation (20.8%)

Table shows that post operative day on which infection is noted in cases with surgical site infection. (Table-3). Our study shows that 18 (50%) cases of SSI in elective LSCS present without any complaints. Discharge from the wound (28.44%) and Fever (24.13%) are common complaints in cases of SSI in emergency LSCS followed by burning micturition and pain.

Table: 3

Post op day	Elective LSCS	Emergency LSCS	Total
Day 3	1	22	23
Day 4	0	19	19
Day 5	15	70	85
Day 6	20	83	103
Day 7	0	24	24
Total	N=36	N=218	N=254

Wound characteristics in cases with surgical site infection are shown in (Table -4). In our study more cases with anemia complication have wound gaping (63.2% of total SSI cases with anemia)-(Fig-2) and more cases of pre eclampsia have wound discharge (65.6%).

Table: 4

	Elective LSCS	Emergency LSCS
Erythema	2(5.555)	34(15.6%)
Induration	13(36.11%)	96(44.03%)
Discharge from wound	29(80.55%)	206(94.5%)
Wound gaping	13(36.11%)	178(81.65%)
Burst abdomen	0	10(4.58%)

A – Gaping **B – Burst Abdomen**

Fig-:2

This study shows that E.coli (41.7% of the total cases with SSI) is the most commonly isolated organism from wound swab for culture followed by Klebsiella species (22.83% of the total cases with SSI).(Fig-3) In cases of SSI in elective LSCS 18 (50%) cases did not show growth of any organism. (Table -5)

Table: 5

	Elective LSCS	Emergency LSCS
Escherichia coli	10	96
Klebsiella	5	53
Pseudomonas	1	3
Staphylococcus	2	24
Streptococcus	0	14
Campylobacter	0	1
No growth	18	27

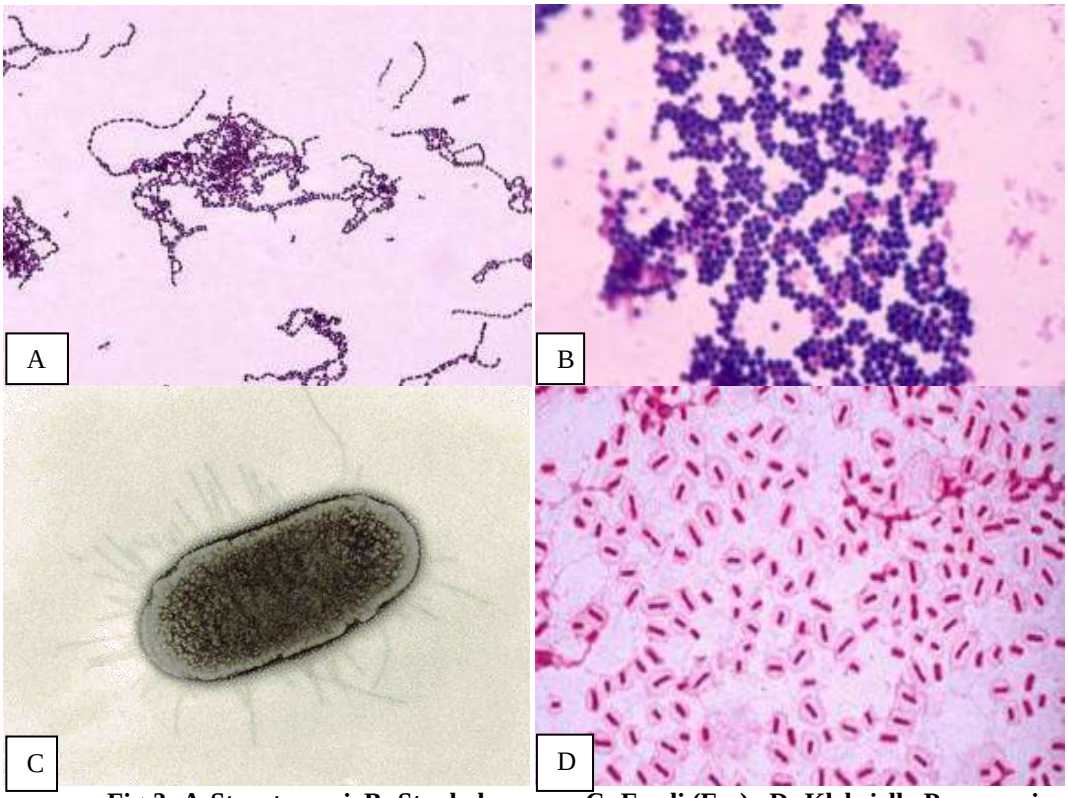

Fig-3: A-Streptococci, B- Staphylococcus, C- E.coli (Em) D- Klebsiella Pneumonia

Out of 254 cases176 (69.29% of total SSI) cases required resuturing of the wound. 10 cases with burst abdomen are managed with mass closure with application of tension sutures. In Elective LSCS the mean post operative duration of stay was 11 days and in Emergency LSCS the mean post operative duration of stay was 21 days.

DISCUSSION

Total number of deliveries from November 2012 to October 2013 at Modern Government Maternity Hospital, Petlaburj is 18236, of which 5864 deliveries are by cesarean section with 32.16% cesarean section rate.

As per the World Health Statistics 2012, cesarean section rate in India is 9% and increasing further. Increase in cesarean delivery rate had no impact on maternal, neonatal and infant mortality rates [15]. Of the 5864 cases of cesarean sections performed 254 cases had surgical site wound infection, with a rate of 4.33%. Habib FA *et al.;* showed that the overall post cesarean wound infection rate was 4.5% [16], 4.2% [17] other study showed the incidence of post caesarean wound infection of 9.3% [18].

Elective LSCS were 3489 of which 36 cases had surgical site wound infection (1.03%).Emergency LSCS were 2375 of which 218 cases had surgical site wound infection (9.18%).Hansa Dhar *et al.;* studied a cumulative total of 7,923 CS surgeries and showed a higher infection rate was noted in emergency (119, 1.50%) in comparison with elective (92, 1.16%) LSCS procedures [19].

The mean age distribution among cases of surgical site wound infection in elective LSCS is 25

years and emergency LSCS is 24 years. About 75.5% (192) cases with surgical site wound infection belong to upper lower and lower middle socio-economic class.

Oliver C Ezechi *et al.;* study could not confirm the association between maternal age, anaemia, prolonged labour, previous caesarean section, multiple vaginal examination, unbooked status and post caesarean wound infection [18]. In our study the number of cases of 1 previous LSCS (116, 45.66% of total cases of SSI) is more among cases of SSI in both elective and emergency LSCS.

In our study anemia (26.77% of the total cases with SSI) and preeclampsia (25.19% of the total cases with SSI) are the most commonly associated risk factors for SSI. Hansa Dhar *et al.;*) study showed that those women who had hypertension and pre-eclampsia were three times more likely to develop a wound infection compared to women without these conditions [19].

In one study identified lower preoperative hemoglobin as one of the factors independently associated with an increased risk of surgical site infection [20]. In our study eclampsia (18.9%), failed induction (15.9%), prolonged PROM>18hrs (15.9%) are the common obstetric complications associated with SSI.

Oliver C Ezechi *et al.;* study showed the risk of developing wound infection was increased by more than four times in patients having prolonged rupture of membranes when adjustment was made for the potential confounders[18]. In our study post cesarean section SSI is most commonly presented on day 5 and 6 (188 cases, 74% of total cases with SSI).

In our study 235 cases (92.51% of the total cases with SSI) with SSI have discharge from the wound and 191 cases (75.2% of the total cases with SSI) have wound gaping. E.coli (41.7% of the total cases with SSI) is the most commonly isolated organism from wound swab for culture followed by Klebsiella species (22.83% of the total cases with SSI). In cases of SSI in elective LSCS 18 (50%) cases did not show growth of any organism. Hansa Dhar *et al.;* study of 7,923 CS, post cesarean section wound infections occurred in 211 (2.66%) cases and were confirmed by positive bacteriology in 164 (77.72%) cases. The majority of SSI cases yielded growth of Staphylococcus aureus 66, (31.27%) followed by E. coli (40, 18.95%) [19]. In our study 176 cases (69.3% of the total cases with SSI) required resuturing of the wound for wound gaping. In our study 10 cases had burst abdomen and mass closure was done.

SUMMARY

The limitations of the study are that most of the patients coming to our hospital belong to upper lower and lower middle socio economic groups. Hence uniformity of the study population is missed. Being a tertiary referral hospital, cases with associated medical and obstetric complications are referred here and some cases are referred late. Thus the rate of complications in such cases is more.

The cesarean section rate at Modern Government Maternity Hospital is high around 32.16% and thus post cesarean wound infection is an important cause increasing maternal morbidity and hospital stay. The surgical site infection rate is high among cases performed by emergency LSCS (9.18%) as compared to cases performed by elective LSCS (1.03%).

Anemia (26.77% of the total cases with SSI) and preeclampsia (25.19% of the total cases with SSI) are the most commonly associated risk factors for SSI. Eclampsia (18.9%), failed induction (15.9%), prolonged PROM >18hrs (15.9%) are the common obstetric complications in cases of emergency LSCS associated with SSI.

E.coli (41.7% of the total cases with SSI) is the most commonly isolated organism from wound swab for culture followed by Klebsiella species (22.83% of the total cases with SSI). In cases of SSI in elective LSCS 18 (50%) cases did not show growth of any organism.

69.3% cases with SSI required resuturing of the wound for wound gaping. The mean post operative duration of stay is prolonged in cases with surgical site infection and mean duration of stay in cases of emergency LSCS is 21 days as compared to 11 days in cases of elective LSCS.

CONCLUSION

The incidence of surgical site infection in cases of emergency LSCS is high, increasing the maternal morbidity. The recognition and correction of associated medical complications in the antenatal period is vital. Early decision making in cases of emergency LSCS reduces the infection rate in cases of emergency LSCS. Gram negative E.coli and Klebsiella are the most commonly isolated organisms and are sensitive to amino glycosides and quinolone. Empirical treatment may be started against these organisms in case of delay in culture and sensitivity report.

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