

Labour related risk factors for surgical site infection in caesarean section¹Nupur Hooja, Sr.Professor M.B.B.S., M.S.(Obst. & Gynae), S.M.S. Medical College²Kavita Arya, M.B.B.S., Resident (M.S., Obst. &Gynae.), S.M.S. Medical College, Jaipur.³Pragya Sharma, J. Specialist (M.S., Obst. &Gynae.)⁴Premlata Mital, Sr. Professor M.B.B.S., M.S. (Obst. & Gynae), S.M.S. Medical College, Jaipur.**Corresponding Author:** Premlata Mital, Sr. Professor M.B.B.S., M.S. (Obst. & Gynae), S.M.S. Medical College, Jaipur.**How to citation this article:** Nupur Hooja, Kavita Arya, Pragya Sharma, Premlata Mital, “ Labour related risk factors for surgical site infection in caesarean section”, IJMACR- May – June - 2021, Vol – 4, Issue -3, P. No. 98 – 102.**Copyright:** © 2021, Premlata Mital, et al. This is an open access journal and article distributed under the terms of the creative commons attribution noncommercial License 4.0.Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.**Type of Publication:** Original Research Article**Conflicts of Interest:** Nil**Abstract**

Caesarean section is sometimes followed by surgical site infection. Some women are at a greater risk of SSI than others. The objective of the study was to study the role of labour related factors as risk factors for infection following caesarean section. Women undergoing caesarean section were chosen. Detailed history, details of labour – duration, rupture of membranes, presence of meconium, etc were noted. Surgical site infection was looked for in all women. Data was then analysed and conclusions drawn.

Women with prolonged labour (odds ratio 1.57)), prolonged rupture of membranes ((odds ratio=5.17) and presence of meconium stained liquor (odds ratio1.67) were at higher risk of SSI .Women with prolonged labour or early rupture of membranes, meconium stained liquor or has had more digital vaginal examinations should be closely monitored for any evidence of surgical site infections and managed accordingly. Careful prevention measures of associated risk factors, with stringent

infection control practices in the labour room would help to achieve minimal infection rates

Keywords: duration, infection, rupture of membranes, surgical site.**Introduction**

Post-caesarean wound infection is a common cause of maternal morbidity and mortality among women undergoing cesarean section (CS) with reported rates of 3–15%¹.SSIs are associated with increased costs, higher rates of patient dissatisfaction, increased length of hospital stay and high mortality and morbidity rates ².

Extrinsic factors related to the labour and it's management may have role as risk factors for surgical site infection. This may include preoperative preparation of the patient (part preparation and skin asepsis) ³.The length of time either in labour or of membranes ruptured prior to operation, number of vaginal examinations carried out before surgery, duration of operation, emergency or elective surgery, transfusion of blood products and previous caesarean section also may be risk factors.

Objective

To assess the role of labour related risk factors for surgical site infection in caesarean section.

Methods

The observational study was done at a referral centre over six months. Women undergoing caesarean section were included. There were 450 women over a period of six months. Written informed consent was taken prior to the study. Complete history including duration of labour, rupture of membranes, meconium if any was noted. Record of number of digital vaginal examinations prior to caesarean was made. Caesarean section was performed of all selected women using same technique in all. Prophylactic antimicrobials were used as per hospital protocol. —Antibiotic prophylaxis significantly reduces infectious morbidity when given 60 minutes before the skin incision, with no significant effect on neonatal outcome.⁴ Women were observed for any SSI. All data was compiled and analysed.

Results

Of the 450 women included, fifty (11.1%) had surgical site infection. Majority of surgical site infections were apparent between the 5th and 10th postoperative day.

In the study, 15% of women with duration of labour more than twelve hours had SSI. The risk of developing SSI in women with prolonged duration of labour was high (odds ratio=1.57).

Women who had prolonged premature rupture of membrane (PROM) were at higher risk of developing SSI (odds ratio=5.17) as compared to women who had intact membranes during labour. 33% women who had PROM more than twelve hours developed SSI. There was statistically significant association between prolonged PROM and risk of SSI (p = 0.0001).

Table 1: Association of SSI with Duration of Labour and PROM

Parameter	Variable	Women with SSI (n=50)	Women with no SSI (n=400)	Odds ratio (OR)
Duration of Labour (hr)	<12	40(10.4%)	345(89.6%)	1
	≥12	10(15.4%)	55(84.6%)	1.57 (0.74-3.32)
Duration of PROM (hr)	<12	36(8.8%)	372(91.2%)	1
	≥12	14(33.3%)	28(66.7%)	5.17 (2.49-10.69)

17.33% women had more than five digital examinations before undergoing caesarean section, 15.4% of these women developed SSI. Hence, risk of SSI was higher in women with more digital examinations prior to surgery (odds ratio=1.60).

Table 2: No. of Digital Examination as a Risk of Surgical Site Infection

No. of digital examination	Women with SSI (n=50)	Women with no SSI (n=400)	Odds ratio (OR)
<5	38(10.2%)	334(89.8%)	1
≥5	12(15.4%)	66(84.6%)	1.60 (0.79-3.22)

In our study, 20% women with SSI had meconium stained liquor. Among those without SSI, only 13% women had meconium stained liquor. 16.1% of women with meconium stained liquor developed SSI, as compared to 10.3% in those with clear liquor. (odds ratio=1.67).

Table 3: Association of Surgical Site Infection with Meconium Stained Liquor

Colour of liquor	Women with SSI (n=50)	Women with no SSI (n=400)	Odds ratio(OR)
Clear	40(10.3%)	348(89.7%)	1
Meconium stained	10(16.1%)	52(83.9%)	1.67 (0.79-3.55)

Discussion

In our study 11.1% women had SSI, which was apparent between 5th to 10th postoperative days. The rate was however higher than 3.2% reported in a study in France⁵ and 3.7% in Israel⁶. Recently, Ward et al in a multi-center collaborative study of SSI following caesarean section in the UK reported overall wound problem of 13.6% and SSI of 8.9%⁷. On the other hand, SSI was diagnosed in 24.3% of Karachi women following caesarean section⁸, two times higher than our study. These studies demonstrate that the overall SSI rate differs widely, based on the study population, infection prevention strategies taken as well as reliable methods for SSI documentation and reporting.

It was observed that women with prolonged labour, early rupture of membranes, meconium stained liquor or those who had more than five digital vaginal examinations had higher risk of developing SSI.

In a study by Temesgen Getaneh et al⁹, it was reported that the likelihood of surgical site infection after caesarean section was 3.67 times higher among mothers with duration of labour more than 24hr. as compared with mothers whose labour duration was ≤24hr, OR=3.67.

Exposure time where infection can be acquired increased as duration of labour increased. Labour pain may cause maternal fatigue and dehydration as well as prolonged vascular diminishing to reproductive tract tissue by the

presenting part which make favorable condition for microbes and infection even after the procedure.

It was also observed by Temesgen Getaneh et al³ that mothers who had prolonged rupture of membrane more than 12 hr. had increased risk of surgical site infection than mothers who had prolonged rupture of membrane ≤12hr. duration. OR=5.32 and (95%CI: 3.61, 7.83).

Feto-placental membrane is one of the barrier essential for prevention or protection of ascending and iatrogenic infection of the membrane (chorioamnionitis). If this protective barrier is breached by any means, it will lose its property of infection prevention. This can lead to ascending and iatrogenic (during per-vaginal examination) infections and be a bacterial reservoir (micro-organisms). Unsterile membrane including the fluids which contain infection causing micro-organisms will have access to other organs and tissues during caesarean section that could be potential source of infection after caesarean section.

Rupture of membrane had substantially increased risk of surgical site infection. Prolonged labour and rupture of membranes contribute to amniotic fluid colonization from the normal flora of the lower genital tract and lead to surgical wound and peritoneal cavity contamination.

In their study, Manisha Chhetry et al¹⁰ reported that risk of surgical site infection was significantly associated with women with more than three per vaginal examinations. Most patients who had surgical site infection had at three to five per vaginal examinations (2.72±2) and an average of two days of hospital stay (1.85±1) prior to being delivered by caesarean.

Loss of protective cervical mucus plug and barrier effect of foetal membranes and amniotic fluid after rupture of membranes were thought to be the culprits. The more the

vaginal examinations the more risk of introduction of infections¹⁰ Because of routine preoperative antimicrobial prophylaxis given to every women, the incidence of SSI was lower in our study.

In another study, Demisew A et al¹¹ reported that presence of meconium was strongly associated with increased severe form of surgical site infections (p = 0.009). Presence of meconium is associated with chorioamnionitis which strongly associated with increased risk of surgical site infections. They observed that thick meconium has higher infection rates than clear amniotic fluid (44% versus 13%).

Conclusion

Although total elimination of SSI is not possible, careful prenatal and intranatal prevention and management of associated risk factors, with stringent infection control practices in the labour and operation room would help to achieve minimal infection rates in patients undergoing caesarean section, which could have significant benefits in terms of both patient's comfort and medical resources used.

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