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## Comparison of Intraoperative and Postoperative morbidity between in situ and extra-abdominal Uterine repair at Cesarean delivery

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### ABSTRACT

In-situ and extra abdominal repair of uterine wound during cesarean section are two valid approaches. This study was carried out to compare intra operative and post operative morbidity in women undergoing caesarean delivery using these two techniques. This is a prospective interventional randomized controlled study. The study subjects include 170 women undergoing Lower segment caesarean section (LSCS) at Southern Railway HQ hospital, Chennai. Intra operative and post operative parameters were analysed in all the study subjects. In in-situ group, 12.6 % women experienced intra operative pain and 30.1% women in extra abdominal group. Intra operative nausea and vomiting was seen in 16.1% women in in-situ group and 28.9% women in extra abdominal group. 1.1% women in in-situ had post-operative febrile morbidity and 8.4 % had in extra abdominal group. The median fall in haemoglobin was 1.30 g/dL and 1.40 g/dL in in-situ and extra abdominal group respectively. In-situ repair of the uterine wound at cesarean delivery is associated with lesser incidence of intra operative pain , intra operative nausea or vomiting and post operative febrile morbidity compared to extra abdominal repair technique.



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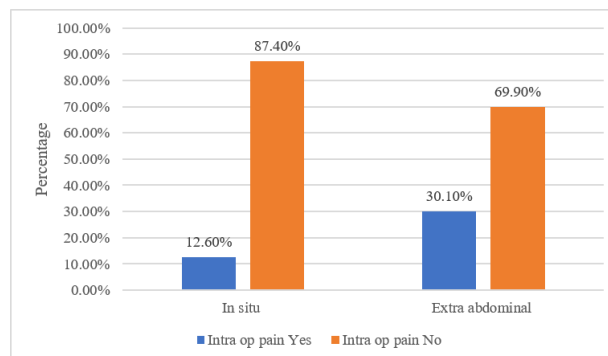
### INTRODUCTION

Cesarean delivery is one among the most commonly done surgical procedure done in a day to day practice. Cesarean delivery is defined as the birth of a fetus via laparotomy and then hysterotomy (Cunningham, 2104). The basic principles of surgery are the same. Yet, subtle differences in techniques adopted were used for the comfort of the surgeon and the benefit of the patient (Lurie and Glezerman, 2003). These technical variations have been aimed at reducing the operative blood loss, easier surgical access, length of the procedure, febrile or infec-

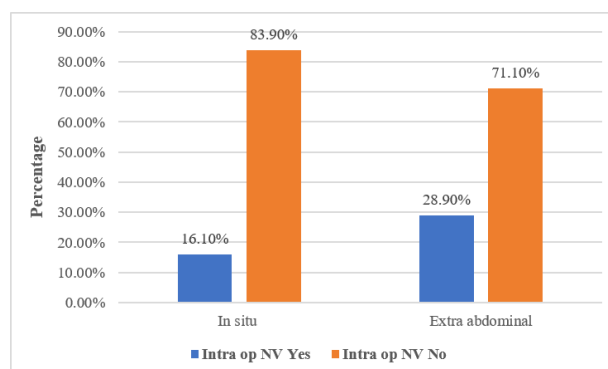
tious morbidity, reducing the days of hospital stay, decreasing adverse effects, and other events like nausea, vomiting, pain, hypotension etc (Dandolu *et al.*, 2006). Closure of the uterine wound within the abdominal cavity is in-situ uterine repair. In many institutes, when performing the closure technique of uterine wound, transient removal of uterus from the abdomen and exteriorising it is done. This is of immense help when the exposure of the uterine angles is difficult or with the extension of the uterine incision due to difficult delivery or thinned out lower uterine segment (Dodd *et al.*, 2014). However, it might lead to intraoperative and postoperative events like nausea, vomiting, hypotension, trauma to the adnexal structures and pain, which are undesirable (Gode *et al.*, 2012). Exteriorization of the uterus also has a potential risk of infections (Gode *et al.*, 2012). After observing these techniques which are practised routinely question arises to which technique is superior with respect to reduced morbidity, patient safety, comfort and surgeon's preference. In the newest National Family Health Survey (NFHS)-4 (2015-16) it is shown that the births delivered by Cesarean Section account to 17.2% in India as compared to 8.5% in NFHS-3(2005-2006) (Sheet, 2017). Owing to the volume of caesarean deliveries done globally, even a small difference in morbidity between the techniques could cause a massive impact on the improvement of women's health and their quality of life. Many surgical practices have not been thoroughly assessed in randomised controlled trials and so whether they are associated with a better outcome for the women and babies are not identified. Hence, this study was undertaken to identify these differences that might provide the best possible care for the patient.

## MATERIALS AND METHODS

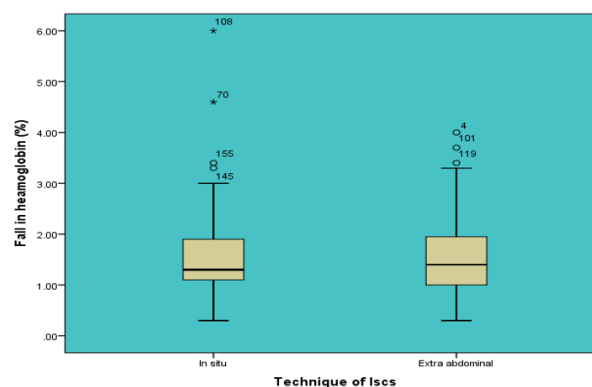
This was a prospective interventional randomised controlled study done to compare intraoperative and postoperative morbidity between in situ and extra-abdominal repair in women undergoing caesarean delivery. The study was conducted with 170 pregnant women undergoing LSCS at Department of Obstetrics and Gynecology, Southern Railway Headquarters Hospital, Perambur, Chennai between June 2016 to May 2018. Approval of the Institutional Ethical Committee had been obtained before the start of the study. Intraoperative pain and Intraoperative nausea vomiting were considered as primary outcome variables. Fall in haemoglobin levels, time taken for the return of bowel functions, and febrile morbidity were taken as secondary outcome variables. The technique of LSCS was considered as the primary explanatory variable.



**Figure 1: Clustered bar chart of comparison of the technique of LSCS with Intra op pain**



**Figure 2: Clustered bar chart of comparison of the technique of LSCS with intraoperative nausea and vomiting**



**Figure 3: Comparative box plots of median value in fall in haemoglobin (g/dL) between techniques of LSCS**

## STATISTICAL ANALYSIS:

A Shapiro- Wilk's test ( $p > 0.05$ ) and a visual inspection of their histograms, standard Q-Q plots and box plots showed that fall in Haemoglobin, Verbal analogue score for pain, the return of bowel function parameters were non-normally distributed for the technique of LSCS.

Descriptive analysis of quantitative variables was carried out by mean and standard deviation for normally distributed variables and median, the

**Table 1: Comparison of the technique of LSCS with intraoperative pain**

Intra op pain	Technique of LSCS		Chi-square	P-value
	In-situ (N=87)	Exteriorisation (N=83)		
Yes	11 (12.6%)	25 (30.1%)	7.773	0.005
No	76 (87.4%)	58 (69.9%)		

**Table 2: Comparison of the technique of LSCS with intraoperative nausea & vomiting**

Intraoperative Nausea or Vomiting	Technique of LSCS		Chi-square	P-value
	In situ (N=87)	Extra abdominal (N=83)		
Yes	14 (16.1%)	24 (28.9%)	4.025	0.045
No	73 (83.9%)	59 (71.1%)		

**Table 3: Comparison of median value in fall in Haemoglobin (g/dL) between techniques of LSCS**

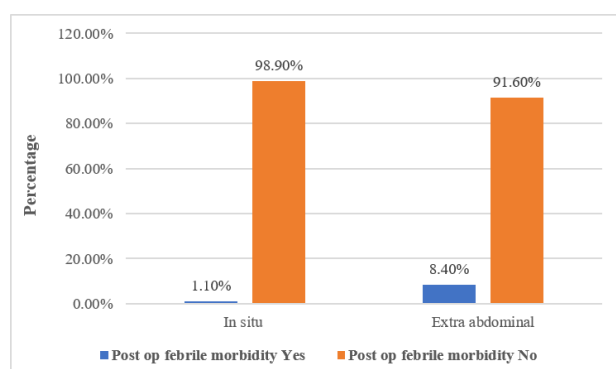
Technique of LSCS	fall in haemoglobin (g/dL) Median (IQR)	Mann Whitney U test (P-value)
In situ	1.30 (1.10, 1.90)	0.971
Extra abdominal	1.40 (1.00, 2.00)	

**Table 4: Comparison of median value in return of bowel function between techniques of LSCS**

Technique of LSCS	Return of bowel function Median (IQR)	Mann Whitney U test (P-value)
In situ	6 (6,6)	0.088
Extra abdominal	6 (6, 6)	

**Table 5: Comparison of the technique of LSCS with postoperative febrile morbidity**

Postoperative febrile morbidity	Technique of LSCS		Chi-square	P-value
	In-situ (N=87)	Extra abdominal (N=83)		
Yes	1 (1.1%)	7 (8.4%)	5.026	0.025
No	86 (98.9%)	76 (91.6%)		

**Figure 4: Clustered bar chart of comparison of the technique of LSCS with postoperative febrile morbidity**

interquartile range for non-normally distributed variables. Categorical variables were summarised by frequency and proportion. The comparison between the technique of LSCS fall in Haemoglobin, Verbal analogue score for pain, the return of bowel function parameters were assessed by comparing the median values. Mann Whitney U test was used to determine statistical significance.

The association between the technique of LSCS, intraoperative and postoperative pain, intra and postoperative NV, postoperative febrile morbidity were assessed by cross-tabulation and comparison of percentages. Chi-square test was used to test statistical significance. P value < 0.05 was considered

statistically significant. IBM SPSS version 22 was used for statistical analysis.

## RESULTS AND DISCUSSION

The mean age was  $26.49 \pm 4.11$  in the study population. The mean gestational age (in weeks) was  $38.63 \pm 0.91$  in the study population. Among the study population, 105 (61.80%) women had repeat cesarean, and 65 (38.20%) women had a primary cesarean. In the in-situ group, 54 (62.1%) women had repeat cesarean, and 33 (37.9%) women had a primary cesarean. In the extra-abdominal group, 51 (61.4%) women participants repeat cesarean, and 32 (38.6%) women participants had a primary cesarean. Among the study population, 87 (51.20%) women had insitu of LSCS and 83 (48.80%) women had extra-abdominal of LSCS.

In the in-situ group, 11 (12.6%) women had intraoperative pain. Extra abdominal group, 25 (30.1%) women had intraoperative pain. The difference in the proportion of intra operative pain between the technique of LSCS was statistically significant ( $P=0.005$ ) (Table 1 & Figure 1)

In the in-situ group, 14 (16.1%) women had intraoperative nausea or vomiting. Extra abdominal group, 24 (28.9%) women had intraoperative nausea or vomiting. The difference in the proportion of intraoperative nausea or vomiting between the technique of LSCS was statistically significant ( $P=0.045$ ) (Table 2 & Figure 2)

The mean fall in Haemoglobin was  $1.61 \text{ g/dL} \pm 0.85$  in the study population. Among the people with in situ, the median fall in Haemoglobin was 1.30 (IQR 1.10 to 1.90), and it was 1.40 (IQR 1 to 2) in people with extra-abdominal. The difference in the fall in Haemoglobin between techniques of LCSC groups was statistically not significant ( $P=0.971$ ) (Table 3 & Figure 3).

The median for returning of bowel function was 6 hours (IQR 6 to 6) in the study population. Among the people with in situ, the norm for returning of bowel function was 6 hours (IQR 6 to 6), and it was 6 hours (IQR 6 to 6) in people with extra-abdominal. The difference in the return of bowel function between techniques of LSCS groups was statistically not significant ( $P=0.088$ ) (Table 4).

Among the study population, 8 (4.70%) participants had postoperative febrile morbidity. In the in-situ group, 1 (1.1%) women had postoperative febrile morbidity. Extra abdominal group, 7 (8.4%) women had postoperative febrile morbidity. The difference in the proportion of postoperative febrile morbidity between the technique of LSCS was statistically sig-

nificant ( $P=0.025$ ) (Table 5 & Figure 4)

In this present study, 11 out of 87 women (12.6%) in the in-situ group while 25 out of 83 women (30.1%) in the extra-abdominal group had intraoperative pain. The difference in the proportion of intraoperative pain between the two techniques of LSCS was statistically significant ( $P=0.005$ ). In contrast to our findings, the incidence of intraoperative pain was not statistically significant (Wahab et al., 1999; Siddiqui et al., 2007). This may be due to non-standardisation of the anaesthesia protocol and inadequate patient preparation. Visceral pain is carried through unmyelinated C fibres are poorly localised. Despite the use of adequate anaesthesia and level of blockade (sensory level T4 motor level T6), some of these fibres may not be blocked, leading to the perception of pain.

Our present study revealed that 16.1% of women had intraoperative nausea or vomiting in the in-situ group compared to that of 28.9% of women who had intraoperative nausea or vomiting in the extra-abdominal group. The difference in the proportion of intraoperative nausea or vomiting among two techniques of LSCS was statistically significant ( $P=0.045$ ) in our study. Similarly, exteriorisation of the uterus was reported to have an increase in intraoperative nausea and vomiting in various studies (Siddiqui et al., 2007; Shuja et al., 2015).

In our study standardisation of anaesthesia protocol and patient preparation for surgery was carried out meticulously. Despite seeming dense sympathetic blockade following spinal anaesthesia, vigorous manipulation can trigger emesis. Hypotension might also be a cause for the increased incidence of nausea and vomiting. In contrast, there is no statistically significant difference in intraoperative nausea and vomiting between the two techniques have been documented (Edi-Osagie et al., 1998; Jacobs-Jokhan and Hofmeyr, 2004). Intraoperative nausea or vomiting can be triggered by different factors like inadequate level of the blockade in spinal anaesthesia, hypotension, visceral pain, drugs used in anaesthesia, Postpartum haemorrhage prophylaxis, opioids etc. which have not been standardised in these studies.

In this present study, the median fall in Haemoglobin was found to be  $1.30 \text{ g/dL}$  in in-situ (IQR 1.10 to 1.90) compared to  $1.40 \text{ g/dL}$  (IQR 1 to 2) in the extra-abdominal group. The difference in the fall in Haemoglobin between techniques of LSCS groups was statistically not significant ( $P=0.971$ ). Our findings are in line with various studies (Bharathi et al., 2017; Doğanay et al., 2010). Blood loss during surgery was predominately reduced by the active



management of the third stage of labour and not related to these techniques. In contrast, other studies have concluded that exteriorisation of the uterus is associated with a reduction in fall of haemoglobin levels (Orji *et al.*, 2008; Ezechi *et al.*, 2005). Many confounders like placenta removal manually, non-standardisation of estimation of blood loss, usage of uterotonics were not well randomised in these studies. Hence, when all the other parameters were standardised, both these techniques showed no difference concerning fall in Haemoglobin.

In this present study, 1.1% of women in the in-situ group had postoperative febrile morbidity compared to 8.4% women in the extra-abdominal group had postoperative febrile morbidity. The difference in the proportion of postoperative febrile morbidity between techniques of LSCS was statistically significant ( $P = 0.025$ ), which is in line with the study done by Magann *et al.* (Magann *et al.*, 1993). This includes endometritis, cystitis, postoperative fever, wound infection. Manipulation of any intraabdominal organ outside its original body cavity might lead to increased risk of infection. Several studies have shown no difference in postoperative febrile morbidity between the two techniques (Magann *et al.*, 1993; Abalos *et al.*, 2013). Febrile morbidity is influenced by various other factors like a prolonged preoperative hospital stay, premature rupture of membranes, increased number of per vaginal examinations, chorioamnionitis, poor socioeconomic status, unhygienic practices which have not been analysed in any of these studies.

In our present study, the median time taken for returning of bowel function was 6 hours in both the groups. The difference in the return of bowel function among the two techniques of LSCS groups was statistically not significant ( $P = 0.088$ ). Similar results have been concluded with Bharathi K *et al.* (Bharathi *et al.*, 2017). This may be due to early mobilisation and adequate fluid management. In contrast, few studies have shown a faster return of bowel function in situ group probably due to reduced handling of the bowel (Zaphiratos *et al.*, 2016; El-Khayat *et al.*, 2014). Cesarean delivery has evolved markedly and will continue to evolve. It is the incumbent on the clinicians to perform and teach evidence-based Cesarean section (Berghella *et al.*, 2005).

## CONCLUSIONS

We have concluded in our study that In-situ repair of the uterine wound at cesarean delivery is associated with a lesser incidence of intraoperative pain and intraoperative nausea or vomiting than compared

to extra-abdominal repair technique. Postoperative febrile morbidity was also found to be lesser in in-situ group. By our findings in the present study, it might be better to adopt the in-situ uterine repair technique for the benefit of the patient.

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## Conflict of Interest

The author declared there is no conflict of interest.

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