

DOI: <https://dx.doi.org/10.18203/2320-1770.ijrcog20232288>

Original Research Article

A re-look into intra-operative impediments and post-operative morbidities in repeat caesarean section

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Received: 08 June 2023

Accepted: 04 July 2023

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ABSTRACT

Background: Repeat caesarean sections are known to be a cause of significant morbidity in both intra and post-operative period. The challenges faced by the surgeon may include adhesions, difficulty in delivery of foetus, visceral injury and bleeding. The post-operative recovery may be marred by problems such as post-partum haemorrhage, febrile morbidity, wound infections and the after effects of intra-operative visceral injury. It is these issues that often make repeat caesarean section a cause for concern and delay the recovery of the mother.

Methods: At random, hundred ante-natal patients visiting the obstetric OPD, meeting the inclusion criteria of previous caesarean section and planned for repeat caesarean section were selected and all the data were collected and tabulated.

Results: After careful analysis of the data, it is observed that the intra-operative findings of adhesions, placenta praevia and excessive blood loss were encountered in relook caesarean sections. Similarly post operative morbidity in the form of wound infection and fever were observed in the same study population.

Conclusions: If we are more vigilant and restrict the number of primary caesarean sections to evidence based appropriate indications, we may be successful in reducing the number of repeat caesarean sections and thereby mitigating the subsequent hardships for the mother.

Keywords: Adhesions, Blood loss, Caesarean, Morbidity, Repeat

INTRODUCTION

The history of caesarean section remained an enigma for several centuries. It was widely believed that it derived its name due to the surgical birth of Julius Caesar, but in that era no mother was expected to survive a surgical delivery. Another reason cited for its origin is the Latin words Caedere which means 'to cut open' and Caesone for infants born via post-mortem operations.¹

Repeat caesarean section would be any caesarean section that is performed after the primary caesarean, irrespective of the indication and outcome for which it is being done. The mortality rate following repeat caesarean section though negligible at present, associated morbidity is still significant.

This surgical procedure has become safer over the years by improvements in the field of anaesthesia, antibiotic therapy, availability and access to blood, blood products and extensive pre and post-operative monitoring.

One of the major indications for this surgery is a previous caesarean section. Although earlier the dictum was "once a caesarean, always a caesarean", there has been a change in that perception with the advent of the idea of VBAC (vaginal birth after caesarean). At present, repeat caesarean section is recommended electively for cases of previous three or more caesarean section, though many obstetricians are inclined to do elective repeat caesarean section after only two caesarean sections.²

Worldwide the rates of caesarean section have been increasing over the past few decades. The steady rise in the

caesarean section rates has been due to inclusion of newer indications like maternal request, obesity, electronic foetal monitoring leading to early intervention and altered obstetric practices like caesarean for primigravida with breech presentation.

Between 1979 and 2010, primary caesarean section rate has increased from 11% to 18.5%, a relative rise of 68%. The fall out of this rise has been a subsequent increase in the incidence of repeat caesarean by 178% (5.2% to 14.4%) between 1979 and 2010. Caesarean delivery rates in India have also shown a rise comparable to other parts of the world. It has reportedly doubled to 17.5% in 2017 from 8% in 2005.³

Repeat caesarean sections are associated with problems like encountering adhesions while entering abdomen and subsequently bowel and bladder adhesions intra-abdominally. The other associated complications are visceral injury, extension of uterine incision, difficulty in delivery of foetus and increased peri-operative blood loss. Caesarean hysterectomy is one of the dreaded aftermaths of this surgery.

Maternal mortality after CS has been estimated to be between 5.81 and 6.1 per 100,000 procedures. The risk of mortality after caesarean is 4 to 5 times more compared to vaginal delivery.⁴

The immediate post-operative period is also associated with complications such as increased pain leading to prolonged immobilisation, deep vein thrombosis, wound infection, sepsis, febrile morbidity and haemorrhage.

Various other factors like route of anaesthetic administration, duration of surgery, post-operative analgesia, necessity for blood and blood product transfusion, duration of hospital stay, financial and social factors become important while discussing the different facets of repeat caesarean section.

Keeping all these factors in mind we planned to undertake a study to revisit the various intra-operative difficulties faced by the surgeon and post-operative maternal morbidities encountered in repeat caesarean sections.

METHODS

This prospective observational study was conducted at a tertiary care teaching hospital over a period of two years (2019-2021).

Inclusion and exclusion criteria

Hundred ante-natal cases of previous caesarean section, irrespective of the number, who underwent repeat caesarean section were included in the study. Women with any other previous abdominal surgery, morbid obesity of BMI (body mass index) $>40 \text{ kg/m}^2$ and intra-uterine foetal demise were excluded.

The participants underwent a detailed evaluation including history taking, physical examination and necessary investigations.

The sample size was calculated by considering salient intra-operative and post-operative complications in repeat caesarean sections using the WinPepi software. One of the most significant and commonly seen complication in repeat caesarean section is the presence of intra-operative adhesions. In a study conducted by Somani et al, the rate of adhesions was found to be 40% in previous single caesarean section.⁷ Entering this data in WinPepi software with acceptable difference of 10% at 95% confidence interval, the calculated sample size was found to be 93, which was rounded off to 100.

Standard protocols were followed for pre-operative preparation of patients, in terms of antibiotic prophylaxis and preparation of parts.

The following pre/intra-operative data were recorded: Adhesions encountered in skin-subcutaneous and intra-peritoneal structures; visceral injury; difficulty in extracting the foetus; placental abnormalities (low lying placenta, morbidly adherent placenta); duration of surgery: calculated from time of skin incision to skin closure; haemorrhage- blood loss was calculated by estimating blood soaked mops and gauze pieces and amount of blood in the suction bottle as per guidelines laid down in trauma monthly journal.⁵

Transfusion of blood and blood products was decided on the basis of intra-operative blood loss and clinical judgement.

During the post-operative period, in addition to routine post-operative care, specific attention was given to: scoring of post-operative pain - assessed during first 48 hours after surgery using a visual analogue scale and doses of analgesics required; features used to clinically suspect infection: rise of temperature ($\geq 100.4^\circ\text{F}$), discharge from skin wound and/or offensive per-vaginal discharge, leucocytosis in CBC (complete blood count); Post-partum haemorrhage; either primary or secondary.

Data was entered in EXCEL sheet, tabulated and analysed using Epi 7/WinPepi/SPSS. Quantitative data summarised using mean and SD. Qualitative data summarised using proportions. Appropriate tests of statistical significance such as Chi-square, t-test and paired t-test used.

Ethical committee clearance was obtained before commencement of the study.

RESULTS

Patient's demographic data revealed maximum patients to be in age group of 26-30 years with BMI in the range of 25-29 kg/m^2 and previous single caesarean section (Table 1).

In the study done by us, maximum number of cases were vertex presentation and the mean age at termination was 37.5 weeks' gestation.

Table 1: Demographic variables.

Parameters	Outcome
Mean age	26.1 years
Mean BMI	26.2 kg/m ²
Most frequent parity	Second gravida with previous single caesarean (77%)

The analysis of duration of surgery showed the shortest operating time as 35 minutes and the longest as 120 minutes. The maximum number of cases, i.e. 49% were in the range of 46-60 minutes (Table 2).

Table 2: Distribution of cases according to duration of surgery.

Duration of surgery (minutes)	Number of patients
30-45	10
46-60	49
61-75	15
76-90	14
91-105	7
106-120	5
Mean duration of surgery	69 minutes

Table 3: Distribution of cases according to intra-operative blood loss.

Intra-operative blood loss (ml)	Number of patients
200-500	81
500-800	15
800-1000	2
>1000	2
Mean blood loss	456 ml

Intra-operative blood loss analysis showed the minimum to be 200 ml and maximum as 1400 ml. Most patients had blood loss in the range of 200-500 ml (Table 3). The two cases with blood loss exceeding 1000 ml were anterior placenta praevia and uterine rupture.

Table 4: Haemoglobin concentration (pre and post-operative).

Haemoglobin concentration (gm/dl)	Number of patients pre-operatively	Number of patients post-operatively
<8	1	1
Between 8 and 10	12	45
>10	87	54
Mean haemoglobin value	11.6 gm/dl	10.2 gm/dl

As shown in Table 4, the number of cases with haemoglobin concentration in the range of 8-10 gm/dl increased post-surgery. While the category of haemoglobin value >10 gm/dl showed a decrease post-operatively.

The difference between the mean pre-operative and post-operative haemoglobin was found to be 1.4 gm/dl, and this fall was statistically significant (p value <0.0001).

Table 5: Distribution as per causes for difficult delivery of foetus.

Attributable causes	Number of patients
Intra-peritoneal adhesions	5
Breech presentation	1
Floating head	2
Placenta praevia	1
Rupture uterus	1

In 10% cases, delivery of foetus was difficult and time taken from uterine incision to delivery exceeded 60 seconds. Most important cause was noted to be peritoneal adhesions and the other causes are listed in Table 5.

Intra-operatively, adhesions before entering the peritoneal cavity were those encountered from the skin, through the subcutaneous tissue up to rectus abdominus muscle i.e. the individual layers could not be well delineated or separated. We came across three such cases.

Adhesions with the parietal peritoneum or omentum were present in 17 cases, requiring sharp dissection for adhesiolysis. Bladder adhesions were noted in 12 patients, either in the form of pulled up bladder adherent to the lower uterine segment or the anterior parietal peritoneum.

Dehiscence of the previous uterine scar was noted in three patients as seen by a thinned-out scar and visualisation of foetal presenting part prior to uterine incision with an intact peritoneal layer over uterus. One case had an overt scar rupture where the peritoneal covering over the uterus was also breached with the foetus in peritoneal cavity, along with hemo-peritoneum of approximately 1000 ml.

Table 6: Other complications encountered intra-operatively in cases of repeat caesarean section.

Intra-operative complications	Number of patients
Adhesions prior to entering peritoneal cavity	3
Intra-peritoneal adhesions	29
Scar dehiscence/uterine rupture	4
Placenta praevia	2

Complete anterior placenta praevia was encountered in two cases, both cases of previous single caesarean. One of these cases was diagnosed intra-operatively as a case of

focal morbid adhesion; in which a portion of the placenta (3x3 cm) was focally adherent to the anterior uterine wall just below the level of uterine incision. It was left in-situ and uterus closed; the patient had an uneventful post-operative recovery (Table 6).

Intra-operatively, five patients had extension of uterine incision, of which three were inadvertent extensions during delivery of foetus, while two were intentionally converted into inverted-T incisions, to facilitate delivery of foetus.

Post-operative morbidities notable in our study were 4% patients with superficial surgical site infection at the level of skin-subcutaneous tissue, managed conservatively with daily saline dressings and antibiotics; none of these cases required secondary suturing and 11% patients developed post-operative febrile morbidity ($\geq 100.4^{\circ}\text{F}$) between days one and seven, the causes for which are shown in Table 7. Of the 4 cases of puerperal sepsis, 3 had infection restricted to endometritis as seen by a positive culture of the vaginal swab while one developed frank septicaemia. All the patients were managed conservatively with adequate hydration, anti-pyretics and higher level of antibiotics. While the case of septicaemia ultimately required obstetric hysterectomy as she was non-responsive to conservative management.

Table 7: Causes of post-operative febrile morbidity.

Cause for post-operative febrile morbidity	Number of patients
Superficial incisional surgical site infection	2
Urinary tract infection	3
Dengue	2
Puerperal sepsis	4

13% cases required blood transfusion; of which 4 were transfused pre-operatively and the others received post-surgery.

There were no cases of intra-operative injury to the bladder, bowel, ureter or any other viscera.

We did not encounter any cases of deep venous thrombosis or post-partum haemorrhage in the post-operative period till discharge from hospital.

DISCUSSION

Caesarean section today has become a frequent mode of delivery in our day-to-day obstetric practice. Whatever may be the advantages, the fact remains that this surgery is associated with significant morbidities. However, the improvement in management protocols has led to a decline in complications like visceral injury, but placenta accrete syndromes and alike are showing an alarming rise.

Multiple caesarean sections are known to be associated with short- and long-term risks for the mother and the baby. These are in the form of haemorrhage requiring blood transfusion, peritoneal adhesions, morbidly adherent placenta, visceral injury including uterine rupture and peripartum hysterectomy. Newborns are more prone to be born asphyxiated.⁶

Blood transfusions and ICU admissions are more frequent in higher order repeat caesarean sections particularly in more than 3rd repeat cases. These are mostly due to adhesions, abnormal placentation and organ injury.⁶

Study by Lakshmi et al, on 200 cases of repeat caesarean section, 10.9% had haemorrhage which was attributable to uterine atony, adhesions, placenta accreta and trauma.⁷

Mean blood loss in our study was 456 ml. By this standard, we considered 800 ml or more as significant loss. We had four such cases of significant blood loss which were attributable to adhesions, placenta praevia and one case of uterine rupture.

Dalvi reported difficulty in extracting the fetus is encountered in 1-2% cases of caesarean delivery. This number increases with the rise in the number of repeat caesarean sections. Common causes are dense adhesions, floating head, abnormal presentations.⁸

10% cases in our study faced difficulty during delivery of foetus, the numbers being slightly on the higher side. A possible factor for this could be, ours being a teaching hospital, many of the surgeries are performed by resident doctors under guidance of senior faculty members.

Kaplanoglu et al found the rate of dense intra-operative adhesions to be 8.4%, 7.6% and 16.1% in cases of second, third and fourth caesarean deliveries respectively.⁶

The most common type of adhesion has been found to be between parietal peritoneum and anterior uterine surface in 63.9% cases, followed by omentum and uterus in 59.3% cases. Severe adhesions also lead to increased blood loss, operative time and chance of organ injury.⁷

We, in the present study encountered 32% adhesions in our study. 3% cases in skin-subcutaneous tissue, 17% intra-peritoneal adhesions with the parietal peritoneum or omentum and 12% cases of bladder adhesions; of these, 40% were dense adhesions and required sharp dissection.

There were two cases of placenta praevia in our study. One of these was diagnosed intra-operatively as a case of focal morbidly adherent placenta.

In a review of maternal and fetal risks in higher multiple caesarean sections by Zwergel et al, the incidence of placenta praevia in second, third and fourth caesarean deliveries was quoted to be 1.35%, 1.22% and 2.87%

respectively. Placenta accreta noted in 0.36%, 0.67% and 2.57% respectively.⁹

In our study, uterine scar disruption was present in three cases, who presented in labour. Of these, two were cases of scar dehiscence while one was a case of rupture uterus where the foetus was seen in peritoneal cavity.

Zwergel et al reported scar rupture in 0.61%, 3.71%, and 4.34% in 2nd, 3rd, and 4 or more repeat caesarean sections respectively.⁹ Dehiscence were seen to be 5.5%, 4.4% and 7.8% in women with previous three, two and one caesarean delivery.

The rate of injury to the bladder was 0.5%, 0.8% and 4.2% in previous one, two and three caesarean groups as per Kaplanoglu et al.⁶ Similarly, bowel injury rates were 0.4%, 0.3% and 0.6% respectively.

We did not encounter any case of bowel, bladder, ureter or any other visceral injury.

In our study, four patients developed superficial surgical site infection of the skin wound. We had 11 cases of postpartum febrile morbidity and the causes were skin wound infection, urinary tract infection, dengue and puerperal sepsis. One case of post-partum severe sepsis, not responsive to conservative management underwent obstetric hysterectomy.

Kaplanoglu et al in their observation noted the rates of post-operative wound dehiscence as 1%, 0.5%, and 0.9% in previous one, two and three caesarean deliveries.⁶ Wound infection was seen in 4.9%, 5.5%, and 5.4% respectively. Endometritis was observed in 1.8%, 1% and 1.5% in the three categories.

CONCLUSION

Caesarean sections are known to be associated with intra-operative difficulties and post-operative morbidity, more so if they are cases of repeat caesarean section.

The present study also confirmed this observation. During the course of the study, we encountered significant intra-operative and post-operative challenges, however, all the cases were successfully managed and sent home in a healthy state.

However, many a times these complications and subsequent morbidities prolong the hospital stay leading to

considerable anxiety and financial strain on the mother and her family.

This study further confirmed that if we are more vigilant and restrict the number of primary caesarean sections to evidence based appropriate indications, we may be successful in reducing the number of repeat caesarean sections and thereby mitigating the subsequent hardships for the mother and also her immediate family.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Subrmanian S, Chugh A, Bal H. A re-look into intra-operative impediments and post-operative morbidities in repeat caesarean section. Int J Reprod Contracept Obstet Gynecol 2023;12:2445-9.