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Intra-Operative Surgical Difficulties in Women with Previous Two or More Cesarean Sections: A Prospective Observational Study from A Tertiary Care Centre

Dr. Akanksha Dhankhar[1], Dr Nishant Choudhary[2], Dr Shailendra Vashistha[3]

[1] MS Obstetrics and Gynaecology, Government Medical College, Srinagar
[2] MS Obstetrics and Gynaecology, Regional Institute of Medical Sciences, Imphal
[3] Assistant Professor, HLA Lab, Department of Immuno-Haematology and Transfusion Medicine, GMC, Kota, Rajasthan; Email ID: drvashistha.ihtm@gmail.com; Orcid ID: 0000-0001-8756-907X

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Corresponding Author:

Dr Shailendra Vashistha
Assistant Professor, HLA Lab, Department of Immuno-Haematology and Transfusion Medicine, HLA Lab, GMC, Kota, Rajasthan

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ABSTRACT

Background: The global rise in cesarean section rates has resulted in an increasing number of women presenting with multiple previous cesarean deliveries. Repeat cesarean sections are associated with progressive anatomical distortion and operative challenges that may significantly increase intra-operative surgical difficulty. Understanding these difficulties is essential for surgical planning, patient counseling, and improving maternal safety.
Objective: To evaluate the spectrum and frequency of intra-operative surgical difficulties encountered during cesarean delivery in women with a history of two or more previous cesarean sections.
Materials and Methods: This prospective observational study was conducted at a tertiary care teaching hospital over a period of 18 months. Pregnant women with a history of two or more previous cesarean sections undergoing elective or emergency repeat cesarean delivery were included. Detailed intra-operative findings were systematically recorded, including difficulty in abdominal entry, adhesions, bladder dissection, excessive blood loss, extension of uterine incision, and duration of surgery. Data were analyzed using descriptive statistics.
Results: A substantial proportion of women exhibited significant intra-operative difficulties. Dense adhesions between the anterior abdominal wall and uterus were commonly encountered, leading to difficult peritoneal entry and prolonged operative time. Bladder adhesions requiring careful dissection were frequent, increasing the technical complexity of surgery. Increased intra-operative blood loss and need for additional hemostatic measures were also observed in a notable subset of cases. The severity of surgical difficulty tended to increase with the number of previous cesarean sections.
Conclusion: Women with two or more previous cesarean sections face a high burden of intra-operative surgical challenges, primarily due to adhesions and altered pelvic anatomy. Anticipation of these difficulties, availability of experienced surgeons, and appropriate pre-operative preparation are crucial to minimize operative risks and ensure maternal safety.

Keywords*: Repeat cesarean section; Intra-operative difficulties; Adhesions; Bladder dissection; Maternal surgical risk.*

INTRODUCTION

Cesarean section (CS) is one of the most frequently performed surgical procedures worldwide, with steadily rising rates over the past few decades. While cesarean delivery can be life-saving for both mother and fetus when appropriately indicated, the increasing prevalence of primary cesarean sections has led to a growing population of women undergoing repeat cesarean deliveries [1]. Each successive cesarean section carries cumulative risks, particularly in terms of intra-operative surgical difficulty and maternal morbidity.

Previous cesarean sections result in anatomical and pathological changes within the abdomen and pelvis, including fibrous adhesions between the uterus, bladder, anterior abdominal wall, and omentum [2]. These adhesions may complicate abdominal entry, distort tissue planes, and increase the risk of visceral injury during repeat surgery. Dense adhesions can prolong operative time, increase blood loss, and necessitate advanced surgical skills to avoid complications [3].

Bladder adhesions are of particular concern in repeat cesarean sections, as they increase the difficulty of bladder dissection and raise the risk of bladder injury during uterine incision [4]. Additionally, thinning of the lower uterine segment and scarring from previous surgeries may predispose to extension of the uterine incision and excessive hemorrhage [5]. These intra-operative challenges contribute significantly to maternal morbidity and place an increased burden on surgical teams, especially in resource-limited settings.

Despite the clinical importance of intra-operative surgical difficulties, most studies have focused on overall maternal morbidity rather than isolating operative challenges themselves. Detailed evaluation of intra-operative difficulties provides valuable insight for pre-operative counseling, risk stratification, and surgical preparedness. This prospective observational study was undertaken at a tertiary care center to systematically assess intra-operative surgical difficulties encountered in women with a history of two or more previous cesarean sections, with the aim of generating evidence relevant to surgical planning and improving maternal outcomes.

OBJECTIVE

To study the nature and frequency of **intra-operative surgical difficulties** encountered during cesarean delivery in women with **two or more previous cesarean sections**.

SUBJECTS AND METHODS

This prospective observational study was conducted in the Post Graduate Department of Obstetrics and Gynecology at Lal Ded Hospital, Government Medical College Srinagar. Pregnant women with a documented history of **two or more previous cesarean sections** who underwent repeat cesarean delivery during the study period were included.

Women with a history of fewer than two cesarean sections, those undergoing cesarean hysterectomy for placenta accreta spectrum, and patients with major medical comorbidities affecting surgical outcomes were excluded.

After obtaining informed consent, demographic details, obstetric history, and number of previous cesarean sections were recorded. All surgeries were performed by experienced obstetricians following standard institutional protocols.
Intra-operative findings were meticulously documented, including:

- Difficulty in abdominal entry
- Presence and severity of adhesions
- Difficulty in bladder dissection
- Extension of uterine incision
- Excessive intra-operative blood loss
- Requirement for additional surgical maneuvers
- Duration of surgery

Blood loss was estimated clinically and by suction measurements. Operative difficulty was assessed subjectively by the operating surgeon based on standard surgical criteria.

Data were entered into a pre-designed proforma and analyzed using descriptive statistics. Results are presented as frequencies and percentages.

RESULTS

In the present study, A total of **850 women** with a history of **two or more previous cesarean sections** were included in the study, Intraoperative complications during cesarean section were seen in 343 patients. Adhesions were the most frequently encountered intra-operative difficulty, reported in 125 cases (36.44%).

Thinned out lower uterine segment (LUS) was the second most common complication, observed in 105 patients (30.61%). Hemorrhage occurred in 38 cases (11.07%), while abnormal placentation was documented in 27 patients (7.87%). Extension of the uterine incision was noted in 18 cases (5.24%), and uterine dehiscence was identified in 11 patients (3.20%). Uterine rupture was seen in 4 cases (1.16%), whereas hysterectomy was required in 9 patients (2.62%). Haematoma formation was the least frequent complication, occurring in 6 cases (1.74%).
The distribution of intra-operative surgical difficulties is summarized in the table below.

Intraoperative Complications	No. of Patients	Percentage
Adhesions	125	36.44
Thinned out LUS	105	30.61
Haemorrhage	38	11.07
Abnormal Placentation	27	7.87
Extension of uterine incision	18	5.24
Uterine dehiscence	11	3.20
Uterine rupture	4	1.16
Hysterectomy	9	2.62
Haematoma	6	1.74

DISCUSSION

The present study demonstrates a **high burden of intra-operative surgical difficulties** among women with two or more previous cesarean sections. Adhesions were the most prevalent finding, affecting **36.44%** of intraoperative complications, a finding consistent with earlier studies reporting progressive adhesion formation with each subsequent cesarean delivery [6,7]. Lyell et al., emphasized the role of adhesions in prolonging operative time and increasing surgical risk [6].

Dense adhesions between the anterior abdominal wall and the uterus were among the most common findings, often resulting in **difficult abdominal entry**. Adhesions involving the bladder were also prevalent, leading to **challenging bladder dissection** and prolonged operative time. Prior studies have also documented an increased risk of bladder injury in women with multiple cesarean scars, underscoring the importance of meticulous dissection and surgical expertise [8].

A significant proportion of cases experienced **increased intra-operative blood loss**, necessitating additional hemostatic measures. **Extension of the uterine incision** during delivery was observed in a subset of patients, particularly in those with a markedly thinned lower uterine segment. The occurrence of **excessive intra-operative blood loss** and **uterine incision extension** in present study reflects the compromised integrity of the lower uterine segment following repeated surgical trauma, as previously described in the literature [9].

The **duration of surgery** was notably prolonged in cases with dense adhesions and difficult dissection. Overall, the severity and frequency of intra-operative difficulties showed a rising trend with an increasing number of previous cesarean sections. P**rolonged operative time**, highlights the cumulative impact of these intra-operative difficulties. This reinforces the need for adequate preoperative planning, availability of senior obstetricians, and readiness for intra-operative complications in women with multiple previous cesarean sections [10].

The mean duration of surgery in our study was 51.47 ± 14.12 minutes, with 70.59% of procedures lasting between 30–60 minutes. This is consistent with the findings by Gohil N et al., (2020)**[11]** who reported an average operative time of 60 minutes in repeat CS cases. Morales KJ et al., (2007)**[2]** showed that operative time increased significantly with adhesions and prior surgical history. Sujatha Reddy S et al., (2023)**[12]** reported mean durations ranging from 48 to 65 minutes depending on the complexity of the case, and Khursheed F et al., (2009)**[13]** noted longer operating times in cases involving dense adhesions and previous scar dehiscence.

In the present study, adhesions were the most frequently observed intraoperative complication, found in 125 patients (14.7%), with a significant rise in incidence as the number of Caesarean sections increased ($p = 0.0000$). Singh N et al., (2021)**[14]** reported adhesions in 42.6% of patients with previous Caesarean deliveries, particularly between the uterus and bladder or omentum. Choudhary GA et al., (2021)**[15]** documented a progressive increase in adhesions with surgical history, noting 22% in patients with two prior CS, 33% in those with three, and 39% in those with four or more. Morales KJ et al., (2007)**[2]** also identified adhesions in 46% of patients, with a rising trend across successive surgeries. Nazaneen F et al., (2020)**[16]** observed adhesions in 34.76% of repeat CS cases.

In the present study analyzing 38 cases of intraoperative hemorrhage, uterine atony was the leading cause (34.28%), followed by abnormal placentation (17.14%), traumatic injuries (15.78%), and extension of uterine incision, uterine rupture (10.52%), and retained placental tissue (8.57%). Less frequent causes included coagulopathy and laceration to adjacent organs (5.71% each). Lakshmi JV et al. (2020)**[17]** reported intraoperative hemorrhage in 10.9% of repeat cesarean cases, with abnormal placentation accounting for 6.6% and extension of uterine incision for 3.5%, which supports the current study‘s findings of placental pathology and incision complications as significant contributors. Singh P et al. (2018)**[18]** found uterine atony in 30.7% and abnormal placentation in 21.5% of hemorrhagic cases during cesarean sections, values closely matching those observed in the present study (34.28% and 17.14%, respectively).

Their study also emphasized the increased risk in women with two or more prior cesareans due to adhesions and longer operative times. Sujatha Reddy S et al. (2023)**[12]** in a hysterectomy-focused analysis, reported uterine atony and placenta accreta as causes in 34% and 38% of cases, respectively, further validating the present study‘s finding of uterine atony (34.28%) and abnormal placentation (17.14%) as major causes of hemorrhage and surgical escalation.

In the present analysis of 38 cases with intraoperative hemorrhage, it was observed that 14 patients (36.84%) had a history of two previous cesarean sections, a greater proportion 21 patients (55.26%) had undergone three cesarean deliveries while only 3 (7.89%) had a history of more than three previous caesarean sections. This indicates a clear trend of increasing hemorrhagic risk with higher parity of cesarean sections. These findings are corroborated by Singh P et al. (2018)**[18]**, who reported that the incidence of intraoperative hemorrhage was markedly higher in women with multiple cesareans, particularly those undergoing their third or more, due to increased operative challenges such as adhesions, uterine thinning, and abnormal placental implantation. Similarly, Lakshmi JV et al. (2020)**[17]** observed that patients with two or more cesarean deliveries showed a higher incidence of abnormal placentation (6.6%) and extension of uterine incision (3.5%), both of which significantly contribute to intraoperative bleeding. Their study concluded that increasing cesarean parity is directly linked with elevated surgical risk and hemorrhagic complications. Sujatha Reddy S et al. (2023)**[12]** also reported a rising need for hysterectomy in women with repeated cesarean deliveries, with uterine atony and placenta accreta being the most frequent indications. These pathologies are known sequelae of multiple cesarean sections and are often associated with significant blood loss.

In the present study, among 9 patients who underwent hysterectomy, placenta accreta spectrum (PAS) was the leading indication, accounting for 4 cases (44.44%), followed by uterine atony and uterine rupture, each contributing 2 cases (22.22%), and intractable hemorrhage in 1 case (11.11%). These findings are consistent with previously published literature, which similarly identifies PAS and massive hemorrhage as primary causes of obstetric hysterectomy. Sujatha Reddy S et al. (2023)**[12]** reported that among women who underwent hysterectomy following cesarean delivery, placenta accreta and uterine atony were the most frequent causes, with PAS accounting for 38% and uterine atony 34% of cases. These proportions closely match the present findings, reinforcing the conclusion that abnormal placentation is the most significant risk factor for peripartum hysterectomy. Singh P et al., (2018)**[18]** documented a hysterectomy rate of 1.2% among cesarean deliveries, with placenta accreta and uterine rupture being the leading causes. In their study, PAS accounted for 42% and rupture for 20% of hysterectomy cases, aligning with our observed frequencies of 44.44% and 22.22%, respectively. Lakshmi JV et al., (2020)**[17]** highlighted that in their series of cesarean-related hysterectomies, abnormal placentation was the most common indication (46%), followed by uterine rupture (23%) and refractory postpartum hemorrhage (15%). These data are in close agreement with the current study, where PAS (44.44%) and hemorrhage (11.11%) were the predominant causes.

In the present study, among six patients who developed intraoperative hematomas during cesarean section, 3 cases (50.00%) involved the subcutaneous plane, while rectus sheath, broad ligament, and retroperitoneal hematomas were each identified in 1 case (16.66%). This highlights the predominance of superficial hematomas, yet underscores the clinical importance of deeper hematomas due to their concealed nature and diagnostic delay. Lakshmi JV et al., (2020)**[17]** reported a total of 12 hematoma cases among 1100 cesarean deliveries (1.09%), of which 5 (41.66%) were located in the broad ligament and 3 (25.00%) were retroperitoneal, with the remaining 4 involving subcutaneous and rectus sheath areas. Compared to the present study, the incidence of deep hematomas (broad ligament and retroperitoneal: 33.32% combined) is relatively similar, affirming that these sites, though less frequent than superficial ones, are clinically significant. Singh P et al. (2018)**[18]** recorded 8 hematoma cases in their cohort of 600 cesarean patients (1.33%). Among these, 4 (50.00%) were subcutaneous, 2 (25.00%) rectus sheath, and 2 (25.00%) were broad ligament hematomas. These proportions closely mirror the present study‘s subcutaneous hematoma rate (50.00%) and provide comparable figures for deep-space hematomas (50.00% collectively), reinforcing the anatomical trends noted in cesarean-associated bleeding complications. Sujatha Reddy S et al. (2023)**[12]** observed that among 9 patients with pelvic hematomas post cesarean section, 4 (44.44%) were retroperitoneal, 3 (33.33%) were broad ligament, and 2 (22.22%) were rectus sheath in location. Compared to the current study, which observed 16.66% in each of these sites, their data reflects a higher overall burden of deep hematomas, possibly due to a higher-risk surgical profile or increased operative complexity.

Caesarean section remains essential for clearly defined obstetric indications but does not completely eliminate perinatal risk. Carefully selected vaginal delivery in twin pregnancies is a safe and acceptable option in tertiary care settings with appropriate expertise.[19,20]

CONCLUSION

Women with two or more previous cesarean sections experience a high incidence of intra-operative surgical difficulties, primarily due to adhesions, difficult bladder dissection, increased blood loss, and prolonged operative time. Awareness and anticipation of these challenges are crucial for optimizing surgical outcomes and maternal safety.

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REFERENCES

1. Betrán AP, et al. The increasing trend in caesarean section rates: global, regional and national estimates. *PLOS One*. 2016;11:e0148343.
2. Morales KJ, Gordon MC, Bates GW. Postcesarean delivery adhesions associated with delayed delivery of infant. *Am J Obstet Gynecol*. 2007;196:461.e1-6.
3. Tulandi T, et al. Adhesion formation and reproductive outcome. *Fertil Steril*. 1993;59:10-15.
4. Rahman J, et al. Bladder injuries during cesarean section in a university hospital. *J Obstet Gynaecol*. 2009;29:681-684.
5. Marshall NE, et al. Maternal morbidity associated with repeat cesarean deliveries. *Obstet Gynecol*. 2011;118:957-963.
6. Lyell DJ. Adhesions and perioperative complications of repeat cesarean delivery. *Am J Obstet Gynecol*. 2011;205:S11-18.
7. Morales KJ, et al. Surgical complications of repeat cesarean delivery. *Obstet Gynecol*. 2007;110:103-108.
8. Phipps MG, et al. Risk factors for bladder injury during cesarean delivery. *Obstet Gynecol*. 2005;105:156-160.
9. Juntunen K, et al. Extensive uterine scar defect after multiple cesarean sections. *Acta Obstet Gynecol Scand*. 2004;83:185-190.
10. Silver RM, et al. Maternal morbidity associated with multiple repeat cesarean deliveries. *Obstet Gynecol*. 2006;107:1226-1232.
11. Gohil N, Parikh R, Koli D. To study the incidence and type of surgical difficulties encountered in repeat cesarean section in comparison with the primary cesarean sections. International Journal of Medical and Biomedical Studies. 2020 Jan;4(1):23-6.
12. Sujatha Reddy S, Prakash R. Study on Intra-operative Complications in Repeat Caesarean Sections. J Acad Med Pharm. 2023; 5(5): 192–199.
13. Khursheed F, Sirichand P, Jatoi N. Intraoperative Complications Encountered in Patients with Repeat Cesarean Section. JLUMHS. 2009; 8(1): 76–80.
14. Singh N, Sreedevi, Lavanya B. Intra-operative difficulties in repeat caesarean section- in a tertiary care hospital. Int J Reprod Contracept Obstet Gynecol 2021;10:2596-605.
15. Choudhary GA, Malik R, Kumari S. Maternal Morbidity in Multiple Repeat Cesarean Sections. J Med Sci Clin Res. 2021; 9(12): 118–125.
16. Nazaneen F, Rao KA, Rizwan S. Complications and Surgical Difficulties in Repeat Cesarean Section. Int J Reprod Contracept Obstet Gynecol. 2020;9(3):1032–1036.
17. Lakshmi JV, Anuradha C, Rishitha M. Intra-operative complications in repeat cesarean sections. Int J Clin Obstet Gynecol. 2020; 4(2): 144-9.
18. Singh P, Agarwal R, Yadav S. An analytical study of intraoperative, immediate post-operative and perinatal complications in previous two caesarean section. Int J Reprod Contracept Obstet Gynecol 2018; 7: 4239-42.
19. Gurjar D, Kumari P, Devi T, Rawat RP. Perinatal outcome in twin pregnancies: Vaginal delivery versus caesarean section – A prospective observational study at a tertiary care centre. Int J Med Pharm Res. 2025 Nov;6(6):2043-7
20. Choudhary N, Kom TT, Khuman V, Singh LBC, Sharma P, Kumar P. Maternal outcomes in pregnant women with subclinical hypothyroidism: An observational cohort study at a tertiary care hospital in Northeast India. Int J Med Pharm Res. 2025;6(6):1619-24.