



A RETROSPECTIVE STUDY ON ADHESIONS IN CESAREAN SECTION PATIENTS

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ABSTRACT

**Objective:** The purpose of this study was to estimate the incidence, site and density of adhesions after cesarean deliveries.

**Material & Methods:** This was a retrospective study carried out in the Department of Obs. and Gynae in NDMC Medical College & Hindu Rao Hospital, Delhi from November 2018 till January 2019. The medical records of 198 patients who underwent cesarean during this time were reviewed. The incidence, severity, and locations of adhesions and post-operative color of urine were noted.

**Results:** Out of 198 patients, 114 were primary cesareans, 69 were one previous cesarean 14 patients had 2 previous cesareans and only 1 patient had 3 previous cesareans. Only one patient in the primary cesarean had flimsy adhesions. After the first cesarean delivery, of 56.5% women had pelvic adhesive disease but 73.3% of women with previous 2 cesareans. Density of adhesions increased with increasing number of cesareans. Adhesions were mainly present between the uterus and anterior abdominal wall, Uterus and urinary bladder and sometimes both the tubes and ovaries could not be even seen due to dense adhesions.

**Conclusion:** Adhesions are common after CD and their incidence increases with each subsequent procedure. 60% of cesarean deliveries results in adhesive disease. The density of adhesions also increases with increasing number of previous cesareans. Sometimes we may land up doing classic cesarean due to dense adhesions. The potential for adhesive disease should be included in counselling regarding primary elective cesarean births.

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INTRODUCTION

Cesarean delivery (CD) is one of the most common obstetric surgeries. In USA, current cesarean rate is approximately 31.9% and primary cesarean delivery rate is 21.8%. The number of CDs and repeat CDs has increased in the past decade. The rate of vaginal birth after cesarean (VBAC) has declined to as low as 12%.<sup>1</sup>

Improved safety of the CD, fewer VBACs, preference for CD in breech presentation or suspected cephalopelvic disproportion (CPD), increase in high-risk pregnancies, CS on maternal request, rising litigation in obstetrics and changes in practice patterns of providers have contributed in rising CD rates.<sup>2</sup>

Observational studies show an increase in several complications including adhesions as the number of subsequent CDs increases.<sup>2,3,4</sup> Adhesions are abnormal fibrous connection between 2 anatomically different surfaces. Adhesions consist of fibrous scar tissue that abnormally connects internal organs or structures and form during tissue healing.<sup>5</sup>

Physiological changes in pregnancy favour decreased fibrinolysis with an increased propensity for adhesion development. Adhesions are reported as a frequent complication of CS, and can result in abdominal discomfort, pain and associated lower quality of life.<sup>6</sup> Adhesions lead to a difficulty in performing other abdominal operations and repeat CS due to the additional tissue separation required, which increases operation time, the risk of bleeding and injury to organs, such as the bladder, intestines and other intra-abdominal organs. Adhesions delay entry into the uterine cavity, which increases time to delivery.<sup>6,7,8,9</sup>

Following a CD, the size of the uterus prevents direct contact between the incision site and the intestines in the first few days. Therefore, most adhesions related to CDs are found in the lower abdomen between the uterus, bladder and omentum.<sup>10</sup>

Density of adhesions increases with each repeat cesarean section. 46-83% of women develop adhesions after repeat CS (second through fourth CS).<sup>6,7</sup> This variation in incidence may, in part, be due to differing surgical techniques and the adhesion-scoring methods used. Different surgical techniques include closure or non-closure of the peritoneum, type of uterine incision used and the technique used for hysterotomy closure.<sup>11,12</sup> Hamel *et al* concluded that closure of the rectus muscle or the parietal peritoneum at primary section resulted

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in significantly fewer adhesions at repeat cesarean delivery.<sup>13</sup> One of the meta-analysis provides strong evidence that closure of both layers of peritoneum during modified Stark's caesarean section significantly reduces the risk of adhesion formation.<sup>14</sup>

Regardless of the surgical method used, it is clear that adhesions frequently occur after CD and that the incidence increases with each subsequent CD, as shown by many clinical studies<sup>6,7, 8, 9</sup>

Due to rising cesarean rates, more and more women are likely to be affected by adhesions and may continue to do so if this trend continues. The aim of our study was to evaluate the prevalence and extent of intra-abdominal adhesions in Cesarean sections.

**MATERIALS AND METHODS**

This retrospective study was performed in the Department of Obstetrics and Gynecology at NDMC Medical College & Hindu Rao Hospital from November 2018 to January 2019. Demography of the patients and other medical information were retrospectively retrieved from the hospital medical records. 198 cases who underwent cesarean section including primary or repeat cesareans were included in the study. Presence of adhesions was established during CS by the operating gynecologist or resident and was noted from the operative records in the case sheets. The primary outcome measures were the prevalence, extent and density of adhesions, areas affected by the adhesions, visibility of tubes and ovaries and color of urine. We graded adhesions and assigned a score of 0 for no adhesions, 1 for flimsy adhesions (transparent and easily dehisced), 2 for moderate adhesions and 3 for dense adhesions. The site and structures involved in adhesions were noted from operative records. We also studied the color of urine in the post-operative period and classified it as clear, high colored or hemorrhagic. A comparison of adhesions was done according to the number of previous cesareans.

The data was tabulated on Microsoft excel sheet. All statistical analyses were performed with SPSS software. Chi-square test was used as test of significance.

**RESULTS**

- The mean age of the patients who underwent primary CS, one repeat CS and ≥2 repeat CSs were 25.6 years, 27 years, and 26.7 years respectively and was comparable. Other demographic data were comparable (Table 1).
- Out of 198 cases of CDs, 169 were emergency, 20 were done electively and 5 patients were planned for elective but landed in emergency (Table 2). For calculation purpose, these 5 patients were included in emergency cesarean group.
- There were 84 cases with previous cesarean altogether. Out of 198 cases, 113 patients had undergone primary cesarean, 69 had 1 previous CS, 14 had 2 prev CS and 1 patient had undergone 3 previous CS. The number of women who had undergone three-repeat CS was only 1, accordingly, we combined it with patients with previous two cesareans.
- Only one patient had flimsy adhesions in women who underwent primary cesarean. Another patient had

undergone laparotomy earlier due to ectopic pregnancy so, we included her in the previous cesarean group.

**Table 1** Mean age of patients

|           |          | Mean age of patients | Std deviation |
|-----------|----------|----------------------|---------------|
| Previous  | 1        | 27.02                | 3.89          |
| Cesarean  | 2        | 26.73                | 3.97          |
|           | None     | 24.09                | 3.40          |
| Adhesions | Flimsy   | 29                   | 2.58          |
|           | Moderate | 26.88                | 3.94          |
|           | Dense    | 27.23                | 4.38          |

**Table 2** Demographic profile of patients

| Demographic profile  | All (n) | No adhesions | adhesions  |
|----------------------|---------|--------------|------------|
| Emergency CS         | 72      | 31 (43%)     | 41 (57%)   |
| Elective CS          | 12      | 3 (25%)      | 9 (75%)    |
| Gest age < 37 weeks  | 11      | 3 (27.3%)    | 8 (66.7%)  |
| Gest age 37-41 weeks | 73      | 31 (42.5%)   | 42 (57.5%) |

- Out of 84 cases of previous cesarean, adhesions were present in 50 (60%) patients. Out of these 50 patients, 4 (4.76%) cases had flimsy adhesions, 25 (29.8%) had moderate adhesions and 21 (25%) patients had dense adhesions. Table 3 & 5.
- 73.3% of patients with ≥ 2 CSs and 56.5% cases with previous one CS had adhesions and this difference was statistically significant (Table 3).
- At repeat CS, adhesions were found mainly between the uterus and the bladder, between the uterus and the anterior abdominal wall and omental adhesions and around tubes and ovaries (Table 4).
- Of 50 patients with adhesions, 38 patients had adhesions between the uterus and the abdominal wall, in 34 patients, bladder was adherent to uterus and pulled up, 12 patients had omental adhesions. Tubes and ovaries were obscured in 13 cases on one or both sides. In 4 patients one tube could not be visualized and in 9 patients both tubes could not be visualized. This was also correlated to number of previous cesareans. Out of 69 patients with 1 previous cesarean, in 13% cases Fallopian tubes were embedded on one or both sides, but 26.6% cases of previous 2 cesareans had embedded tubes Table 4, Fig 1).
- The density of adhesions on these areas was also more severe after ≥2 CSs than after one CS (Table 5, Fig 2).

**Table 3** Correlation of Adhesions with number of previous cesarean

|                   |   | Adhesions  |            | Total |
|-------------------|---|------------|------------|-------|
|                   |   | present    | Absent     |       |
| Previous cesarean | 1 | 39 (56.5%) | 30 (43.5%) | 69    |
|                   | 2 | 11 (73.3%) | 4 (26.6%)  | 15    |
| Total             |   | 50 (60%)   | 34 (40%)   | 84    |

**Table 4** Distribution of sites of adhesions with number of previous cesareans

| Adhesions B/W     | Adhesions in Prev 1 CS (n = 39) | Adhesions in Prev 2 CS (n = 15) | Total      |
|-------------------|---------------------------------|---------------------------------|------------|
| Uterus- AAW       | 28(71.8%)                       | 10(90.9%)                       | 38 (45.2%) |
| Uterus -Bladder   | 27(69.23%)                      | 7(63.6%)                        | 34 (40.5%) |
| Omentum           | 7(17.9%)                        | 5(45.5%)                        | 12 (14.3%) |
| Tubes and ovaries | 9(23.07%)                       | 4(36.4%)                        | 13 (15.5%) |

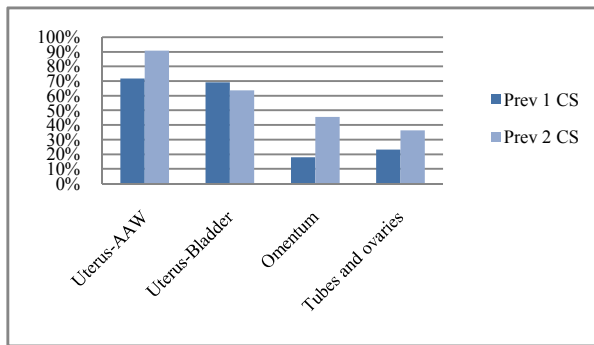


Fig 1

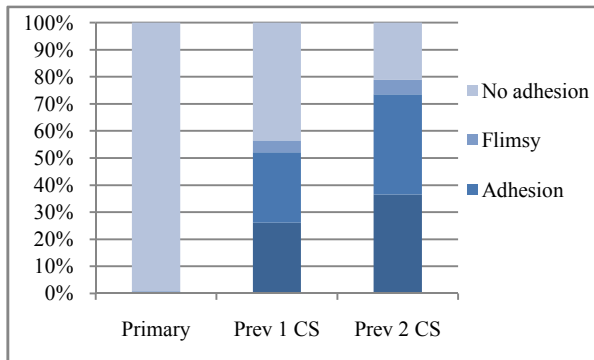


Fig 2

Table 5 Correlation between density of adhesions and number of previous cesareans

| Density of Adhesions | Previous 1 CS | Prev 2 CS | P value |
|----------------------|---------------|-----------|---------|
| Flimsy               | 3             | 1         |         |
| Adhesions            | 18            | 7         |         |
| Dense adhesions      | 18            | 3         |         |
| Total                | 39            | 11        |         |

| Colour of urine | Previous 1 CS | Prev 2 CS   | Total |
|-----------------|---------------|-------------|-------|
| Clear           | 58 (84.06%)   | 11 (73.33%) | 69    |
| High coloured   | 11 (15.94%)   | 3 (20%)     | 14    |
| Heamorrhagic    | 0 (0%)        | 1 (6.67%)   | 1     |
| Total           | 69            | 15          |       |

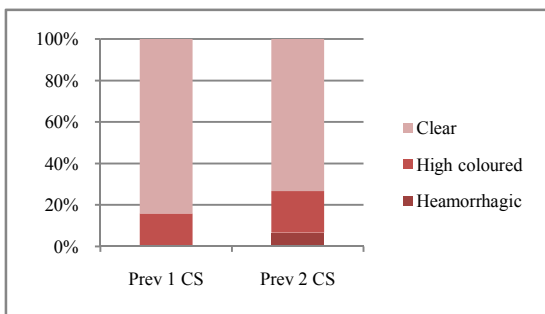


Table 6, Fig 3 Correlation between number of previous cesareans and hemorrhagic urine

Table 7 Intra-operative visibility of tubes and ovaries during cesarean in previous cesarean cases

| Visibility of tubes and ovaries | No. of Previous cesarean |    | Total |
|---------------------------------|--------------------------|----|-------|
|                                 | 1                        | 2  |       |
| Both tubes seen                 | 60                       | 11 | 71    |
| Right tube not seen             | 0                        | 1  | 1     |
| Left tube not seen              | 2                        | 1  | 3     |
| Both tubes not seen             | 7                        | 2  | 9     |

- In two cases, uterus had to be opened in upper segment due to dense adhesions.
- There were no cases of cystotomy or bowel injury in any patient.

DISCUSSION

The results of our study showed that at repeat CS, 60% of patients had adhesions. Adhesions were found mainly between the uterus and the bladder and between the uterus and the anterior abdominal wall in 40% and 45% cases of previous cesarean respectively. This is in agreement with previous reports.

In cases of repeat CS, adhesions were found mainly between the uterus and the bladder and between uterus and the anterior abdominal wall. Dense adhesions between the uterus and the bladder and between the uterus and the abdominal wall were significantly higher and denser after ≥2 CSs (46.3% and 48.2%) than after one CS (29.8% and 25.6%).<sup>16</sup>

In another study by Numah *et al* of 335 patients, 207 (62%) did not have adhesions and 128 (38%). Prevalence of adhesions increased with history of caesarean section (0% with no history of CS or abdominal surgery, 2.8% (3/107) with no history of CS but may have had a previous abdominal surgery, 51% (77/150) of women who had one previous CS, and 62% (48/78) of those with two or more CS.<sup>4</sup>

Tulandi T in 2009 found no adhesions in women who underwent primary cesarean delivery. Compared with women with a second cesarean delivery (24.4%), more patients were found to have adhesions after 3 (42.8%; 95% CI, 0.84-0.99; P <.05), and >4 cesarean deliveries (47.9%; 95% CI, 0.91-0.98; P <.001). The sites of adhesions were predominantly between the abdominal wall and uterus (range, 2 to 4 cesarean deliveries; 47.8- 53.7%) and between the bladder and the uterus (range, 2 to > 4 cesarean deliveries; 25.9-35.0%). Patients also had multiple adhesion sites.<sup>6</sup>

In a study by Morales *et al* in 2007 showed 4% patients who underwent primary cesarean section had adhesions that were documented, although 153 (53%) of the women who underwent re-peat cesarean delivery had adhesions (OR, 27; 95% CI, 13.2-47.9; P <.001).<sup>7</sup>

Forty-six percent of second cesarean deliveries (OR, 19.5; 95% CI, 10.6-39.7), 75% of the third cesarean deliveries (OR, 44.3; 95% CI, 31.5-164.6), and 83% of fourth cesarean deliveries had documented adhesive disease. Fifty-four percent of the adhesions were classified as severe. Seven percent of all adhesions involved only the uterus and bladder. Adhesions that involved the anterior abdominal wall were noted in 77% of the individuals with repeat cesarean deliveries. Other sites that were documented included the uterus, bladder, adnexa, omentum, and small bowel. Two episodes of incidental cystotomy and 1 bowel injury were noted in each group.<sup>7</sup>

CONCLUSION

Adhesions are common after CD and their incidence increases with each subsequent procedure. 60% of cesarean deliveries results in adhesive disease. The density of adhesions also increases with increasing number of previous cesareans. Adhesions mainly occur between uterus and anterior abdominal wall, uterus and urinary bladder, omentum and sometimes tubes and ovaries maybe embedded in the

adhesions. We may land up doing classic cesarean due to dense adhesions. The potential for adhesive disease should be included in counselling regarding primary elective cesarean births.

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