

## IMPACT OF PLACENTAL ABNORMALITIES IN PATIENTS WITH PREVIOUS LOWER SEGMENT CESAREAN SECTION: A CROSS-SECTIONAL STUDY FROM CENTRAL INDIA

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### Abstract

**Background:** The risk of abnormal placentation is around 4 times higher among the cases of placenta previa cases than normal placentation. This study aims to estimate the incidence of abnormalities of placenta in previous caesarean section and determine fetomaternal outcome in subjects with abnormal placenta in previous caesarean section. **Materials and Methods:** This study was conducted as an observational cross sectional study on antenatal subjects with previous LSCS presenting to Department of Obstetrics and Gynaecology, tertiary medical college. Detailed history was obtained and necessary investigations were done. Subjects were followed up through-out their postnatal period and the fetomaternal outcome of these subjects was studied. **Result:** The majority (83.2%) of participants had one Caesarean section. Type IV (Complete placenta previa) was observed in 46 cases. Placenta Accreta was observed in 7.2% patients. Placental abnormalities were associated with adverse neonatal outcomes e.g. in 13 participants with placenta accreta, 5 (38.5%) had term deliveries, 8 (61.5%) had preterm deliveries, and none had IUGR. Among the 9 participants with placenta increta, 6 (66.7%) had term deliveries, 3 (33.3%) had preterm deliveries, and none had IUGR. For the 11 participants with placenta percreta, 5 (45.5%) had term deliveries, 4 (36.4%) had preterm deliveries, and 2 (18.2%) had IUGR. **Conclusion:** The study provides valuable insights into the prevalence and impact of placental abnormalities in patients with a history of LSCS. The findings highlight the significant impact of placental abnormalities on maternal and neonatal health, emphasizing the need for careful monitoring, early diagnosis, and specialized care for high-risk pregnancies.

## INTRODUCTION

Over the past few decades, the global incidence of cesarean deliveries has increased significantly, with approximately one in four women undergoing a cesarean section, a third of which are repeat procedures.<sup>[1]</sup> Repeat LSCS has been associated with increased morbidity, including placental disorders such as placenta previa, placenta accreta, increta, and percreta.<sup>[2]</sup>

Placental abnormalities are violations of the normal localization, attachment or shape of the placenta. In India, the incidence of abnormal placentation in patients with prior LSCS has been increasing, necessitating research into its impact on fetomaternal outcomes.<sup>[3]</sup> Risk categorization of

placental abnormalities in location and anatomy is imperative in all the pregnant woman. Preferably, placental localization and anatomy are evaluated at the first or second trimester anomaly scan. Therefore, it is important to identify and reduce the modifiable risk factors associated with it, such as reducing the primary caesarean section rate, encouraging VBAC in eligible subjects fulfilling the criteria for it, increasing awareness and education about contraceptive methods and misuse of medical methods of abortion that are responsible for a safe abortion, along with timely diagnosis and management of cases with abnormal placental attachment early in pregnancy, and offering a good prenatal care, to curtail the adverse maternal and neonatal outcome.

In India, the incidence of Abnormal Placentation among previous history of Lower Segment caesarean Section has been increasing over past two decades.<sup>[3]</sup> The risk of abnormal placentation is around 4 times higher among the cases of placenta previa cases than normal placentation. This study aims to estimate the incidence of abnormalities of placenta in previous caesarean section and determine fetomaternal outcome in subjects with abnormal placenta in previous caesarean section.

## MATERIALS AND METHODS

This study was conducted as an observational cross sectional study on antenatal subjects with previous LSCS presenting to Department of Obstetrics and Gynaecology, N.S.C.B. Medical College and Hospital Jabalpur [MP] during the study period of 18 months. All antenatal subjects with previous Lower Segment Caesarean Section who delivered at the study area during the study period were included whereas patients with history of only previous normal vaginal deliveries were included.

Sample size was estimated using the formula,  
 $n = Z^2pq / d^2$

Where Z = 1.96 at 95% class interval

P = 3%

p = 0.03

Z = 1 - p

= 1 - 0.03 = 0.97

d = 3% absolute error.

n = 124.71 = 125

Sample size was thus estimated to be 125

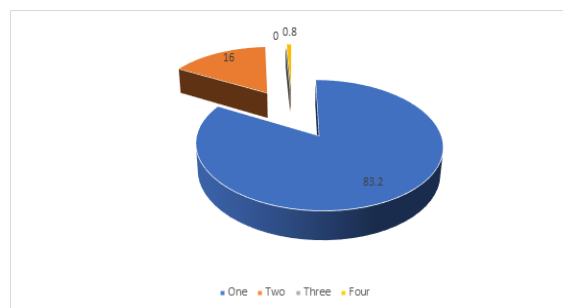
All antenatal subjects with previous Lower segment caesarean section who received antenatal care and underwent lower segment caesarean section in obstetrics department of N.S.C.B MCH, Jabalpur (M.P.) and were willing to participate in the study were included after obtaining written consent. Detailed history was obtained and necessary investigations were done. Subjects were followed up through-out their postnatal period and their intra operative and post-operative findings were evaluated and the fetomaternal outcome of these subjects was studied.

**Statistical Analysis:** The data was recorded in the predesigned proforma and then entered in the MS excel and eventually analyzed by using statistical software -SPSS version 23. Association and correlation of qualitative data was tested by Chi Square Test and Fischer Exact Test; Student T Test was applied in quantitative data. A p value <0.05 was considered to be significant.

## RESULTS

In the present study, the majority of participants (47.2%) were aged 25-30 years, with a mean age of 28.10 years, reflecting the typical reproductive age group in this cohort. Majority of study participants (91.2%) come from rural areas and are still lacking

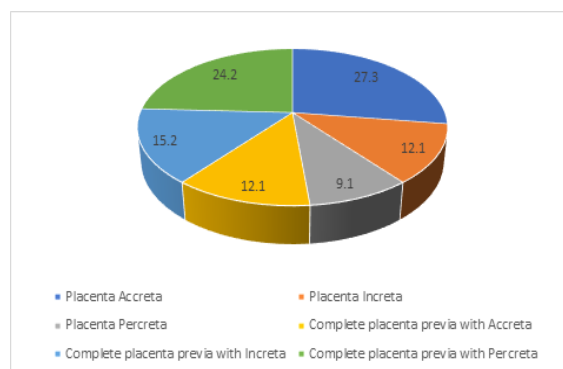
behind and not utilizing the available health care facilities, hence resources need to be focused to create awareness. A significant proportion (82.4%) of participants belong to the lower socioeconomic status, which could be correlated with access to healthcare and health outcomes. The majority of participants (88.0%) were un-booked, suggesting a gap in prenatal care utilization that might impact maternal and neonatal outcomes. 3 patients (2.4%) had hemorrhage in the first trimester, 9 patients (7.2%) in the second trimester, and 7 patients (5.6%) in the third trimester. In total, 19 patients experienced antepartum hemorrhage, representing 15.2% of the sample. Anemia is the most common co-morbidity, affecting 39.2% of the patients, followed by hypertension (18.4%) and hypothyroidism (12.8%). Other conditions like diabetes are less common, and there were no cases of tuberculosis, asthma, or epilepsy reported in our study subjects [Table 1].



**Figure 1: Number of previous of cesarean section**

The majority (83.2%) of participants had one Cesarean section, indicating a high prevalence of cesarean deliveries in this cohort, Cesarean section predisposes to abnormal placental attachment, risk unreleases as the number of Cesarean section increases [Figure 1].

The majority of placentas (93.6%) were located in the lower segment, which may be associated with higher risks of placenta previa and related complications. The most common was Type IV (Complete placenta previa), with 46 cases, followed by Type III (Partial placenta previa) with 31 cases. Type II (Marginal placenta previa) and Type I (Low lying placenta previa) had 21 and 16 cases, respectively. were 68 cases of anterior placental localization and 57 posterior, out of a total of 125 participants [Table 2].



**Figure 2: Conditions of Morbidly adherent placenta**

Morbid adhesions of placenta were present in 26.4% of participants, which can complicate surgeries and affect pregnancy outcomes, necessitating careful surgical planning. The spectrum of morbid adhesions is documented in [Figure 2]. Bladder invasion was noted in 19.2% of cases, a serious complication that

requires careful surgical management, with immediate access to blood transfusion, neonatal ICU by a senior multidisciplinary team, including obstetrician, anesthetist and a gynaecologist with expertise in complex pelvic surgery.

**Table 1: Baseline characteristics of study participants.**

| Baseline characteristics            |                    | Frequency (n=125)         | Percent |     |
|-------------------------------------|--------------------|---------------------------|---------|-----|
| Age (years)                         | 18-20              | 0                         |         |     |
|                                     | 21-25              | 29                        | 23.2    |     |
|                                     | 26-30              | 59                        | 47.2    |     |
|                                     | 31-35              | 35                        | 28.0    |     |
|                                     | 36-40              | 2                         | 1.6     |     |
| Locality                            | Rural              | 114                       | 91.2    |     |
|                                     | Urban              | 11                        | 8.8     |     |
| Socioeconomic status                | Lower              | 103                       | 82.4    |     |
|                                     | Middle             | 22                        | 17.6    |     |
|                                     | Upper              | 0                         | 0       |     |
| Booking status                      | Booked             | 15                        | 12.0    |     |
|                                     | Unbooked           | 110                       | 88.0    |     |
| History of APH in present pregnancy | Yes                | 1 <sup>st</sup> Trimester | 3       | 2.4 |
|                                     |                    | 2 <sup>nd</sup> Trimester | 9       | 7.2 |
|                                     |                    | 3 <sup>rd</sup> Trimester | 7       | 5.6 |
|                                     | No                 | 106                       | 84.8    |     |
| Comorbidities                       | Diabetes           | 4                         | 3.2     |     |
|                                     | Hypertension (HTN) | 23                        | 18.4    |     |
|                                     | Tuberculosis       | 0                         | 0       |     |
|                                     | Hypothyroidism     | 16                        | 12.8    |     |
|                                     | Asthma             | 0                         | 0       |     |
|                                     | Epilepsy           | 0                         | 0       |     |
|                                     | Anemia             | 49                        | 39.2    |     |
| None                                | 33                 | 26.4                      |         |     |

**Table 2: Distribution according to site and localization of placenta.**

| Placenta                 |                                    | Frequency (n=125) | Percent |
|--------------------------|------------------------------------|-------------------|---------|
| Site                     | Lower Segment                      | 117               | 93.6    |
|                          | Upper Segment                      | 8                 | 6.4     |
| Localization of placenta | Type I (Low lying placenta previa) | 16                | 12.8    |
|                          | Type II (Marginal placenta previa) | 21                | 16.8    |
|                          | Type III (Partial placenta previa) | 31                | 24.8    |
|                          | Type IV (Complete placenta previa) | 46                | 36.8    |
|                          | Fundal                             | 11                | 8.8     |

**Table 3: Maternal outcome in study subjects with abnormal placentation**

| Maternal outcome             |                                | Frequency (n=125) | Percent |
|------------------------------|--------------------------------|-------------------|---------|
| Intrapartum complications    | Scar Tenderness                | 83                | 66.4%   |
|                              | Scar Dehiscence                | 6                 | 4.8%    |
|                              | Premature Rupture of Membranes | 15                | 12.0%   |
| PPH                          | No                             | 102               | 81.6%   |
|                              | Mild                           | 7                 | 5.6%    |
|                              | Moderate                       | 9                 | 7.2%    |
|                              | Severe                         | 7                 | 5.6%    |
| Post operative complications | Ventilatory Support            | 44                | 35.2    |
|                              | Maternal death                 | 3                 | 2.4     |
|                              | Re-exploration                 | 4                 | 3.2     |
|                              | Blood transfusion              | 84                | 67.2    |

Scar tenderness was the most common complication, affecting 66.4% of the participants, highlighting the importance of managing this issue to ensure proper healing and patient comfort. Scar dehiscence, though less common, was observed in 0.8% of the participants and represents a serious complication requiring immediate medical intervention. Premature rupture of membranes (PROM) was reported in 12.0% of the participants, underscoring the need for timely management to mitigate risks such as infection

and preterm labor. Overall, the high incidence of these complications emphasizes the necessity for vigilant monitoring and effective treatment strategies to improve maternal and fetal outcomes. The severity of postpartum hemorrhage varied, with 7.2% experiencing moderate hemorrhage and 5.6% severe hemorrhage, highlighting the need for preparedness in managing bleeding. Ventilatory support was required for 35.2% of the participants. Maternal death and re-exploration were each observed in 2.4% of the

cases. Blood transfusion was needed in 67.2% of the participants, indicating a high incidence of this intervention in post-operative care [Table 3].

**Table 4: Association of degree of placental abnormality with neonatal outcome.**

| Degree of Placental Abnormality | Term N (%) | Preterm N (%) | IUGR N (%) | Total N (%)  |
|---------------------------------|------------|---------------|------------|--------------|
| Normal                          | 52 (56.5%) | 40 (43.5%)    | 0 (0.0%)   | 92 (100.0%)  |
| Accreta                         | 5 (38.5%)  | 8 (61.5%)     | 0 (0.0%)   | 13 (100.0%)  |
| Increta                         | 6 (66.7%)  | 3 (33.3%)     | 0 (0.0%)   | 9 (100.0%)   |
| Percreta                        | 5 (45.5%)  | 4 (36.4%)     | 2 (18.2%)  | 11 (100.0%)  |
| Total                           | 66 (52.8%) | 53 (42.4%)    | 6 (4.8%)   | 125 (100.0%) |
| P value                         | 0.003      |               |            |              |

Among the 92 participants with normal placental conditions, 53 (56.5%) resulted in term deliveries, 40 (43.5%) in preterm deliveries, and none for IUGR. For the 13 participants with placenta accreta, 5 (38.5%) had term deliveries, 8 (61.5%) had preterm deliveries, and none had IUGR. Among the 9 participants with placenta increta, 6 (66.7%) had term deliveries, 3 (33.3%) had preterm deliveries, and none had IUGR. For the 11 participants with placenta percreta, 5 (45.5%) had term deliveries, 4 (36.4%) had preterm deliveries, and 2 (18.2%) had IUGR. Overall, out of 125 cases, 66 (52.8%) were term, 53 (42.4%) were preterm, and 6 (4.8%) were IUGR. The Pearson Chi-Square value of 20.617 with a P-value of 0.003 indicates a significant association between the degree of placental abnormality and neonatal outcomes.<sup>69</sup> (55.2%) neonates required ICU admissions. Neonatal mortality was observed in 25 (20%) cases and among them, Early Neonatal Death, Intrauterine Death (IUD) and Late Neonatal Death were reported in 12 (9.6%), 8 (6.4%) and 5 (4%) neonates respectively.

## DISCUSSION

The primary aim of this study was to determine the abnormalities of placenta in patients with previous lower segment cesarean section (LSCS) and correlate these abnormalities with fetomaternal outcomes. The age distribution of the participants showed that the majority (47.2%) were aged 26-30 years, reflecting the typical reproductive age group. This aligns with the findings of Guttmacher et al., who reported similar age distributions in cesarean deliveries.<sup>14</sup> Most participants came from rural areas (91.2%), and 82.4% belonged to the lower socioeconomic status. These findings highlight the demographic and socioeconomic barriers to accessing adequate prenatal care, as previously reported by Iyasu et al.<sup>15</sup> The high percentage of unbooked participants (88.0%) further emphasizes the gap in healthcare utilization, which is a common issue in rural areas. The study's findings regarding the socioeconomic and demographic factors are also in line with previous research. Iyasu et al. highlighted the significant impact of low socioeconomic status and rural residency on access to healthcare and prenatal care utilization.<sup>15</sup> The high percentage of unbooked participants in this study further underscores

the need for targeted interventions to improve healthcare access and utilization in rural areas.

Antepartum hemorrhage (APH) was experienced by 15.2% of the participants, with the highest occurrence in the second trimester (7.2%). This finding is consistent with previous studies that have identified APH as a critical complication associated with abnormal placental attachment in patients with a history of LSCS.<sup>61</sup> Tantbirojn et al. found that abnormal placentation, particularly in patients with prior cesarean sections, significantly increases the risk of APH, which can lead to severe maternal and fetal complications.<sup>61</sup>

Our study identified anemia as the most common comorbidity, affecting 39.2% of participants, followed by hypertension (18.4%) and hypothyroidism (12.8%). These findings are in line with the research by Strickland and Richards, who reported similar prevalence rates of anemia and hypertension among pregnant women with a history of cesarean sections. The presence of these medical conditions underscores the importance of comprehensive prenatal care and monitoring in this high-risk population. The high prevalence of anemia, hypertension, and hypothyroidism among the participants is consistent with previous studies. Strickland and Richards reported similar findings, highlighting the importance of comprehensive prenatal care and monitoring in patients with a history of cesarean sections.<sup>17</sup> The presence of these comorbidities increases the risk of complications during pregnancy and delivery, underscoring the need for specialized care for this high-risk population. Various types of placental abnormalities were identified, with Type IV (Complete placenta previa) being the most common (36.8%). The high prevalence of complete placenta previa in this study is comparable to the findings of Miller et al., who reported that complete placenta previa is more frequent in patients with a history of multiple cesarean sections.<sup>18</sup> This study also identified significant associations between the degree of placental abnormality and neonatal outcomes, with higher rates of preterm deliveries and neonatal intensive care unit (NICU) admissions in cases of severe placental abnormalities. The prevalence and types of placental abnormalities observed in this study are consistent with previous research. For instance, Tantbirojn et al. and Miller et al. both

identified high rates of placenta previa and accreta in patients with a history of multiple cesarean sections.<sup>[6,8]</sup> The association between prior cesarean sections and increased risk of placental abnormalities has been well-documented, emphasizing the need for careful monitoring and management in subsequent pregnancies. The severity of postpartum hemorrhage (PPH) varied, with 7.2% experiencing severe hemorrhage. Obstetric hysterectomy was required in 26.4% of the cases, indicating a high rate of severe complications necessitating this procedure. These findings are in agreement with the study by Hull and Resnik, which highlighted the increased risk of severe PPH and the necessity of hysterectomy in cases with abnormal placental attachment.<sup>[9]</sup> The high rates of PPH and hysterectomy in this study underscore the critical need for preparedness in managing these high-risk pregnancies.

Neonatal outcomes were significantly impacted by the degree of placental abnormality. Preterm deliveries were more common in cases with placenta accreta (61.5%) and placenta percreta (36.4%). The need for neonatal ICU admission was high (55.2%), emphasizing the critical nature of these pregnancies. Wehrum et al. reported similar patterns of neonatal outcomes in pregnancies complicated by placenta accreta spectrum disorders.<sup>[10]</sup> The findings of this study further highlight the importance of specialized care and monitoring for neonates born to mothers with placental abnormalities. The study's findings on neonatal outcomes, particularly the high rates of preterm deliveries and NICU admissions, align with previous research. Wehrum et al.<sup>[10]</sup> and Tantbirojn et al.<sup>[6]</sup> both reported similar patterns of neonatal outcomes in pregnancies complicated by placenta accreta spectrum disorders. These findings highlight the critical need for specialized neonatal care and monitoring in these high-risk pregnancies.

The findings of this study have significant implications for clinical practice. The high prevalence of placental abnormalities in patients with a history of LSCS underscores the need for careful monitoring and management of these pregnancies. Early diagnosis and intervention can help mitigate the risks associated with abnormal placentation, reducing the incidence of severe complications such as APH, PPH, and the need for obstetric hysterectomy. Improving access to prenatal care, particularly in rural areas, is crucial for reducing the incidence of placental abnormalities and their associated complications. Targeted interventions to increase healthcare utilization and awareness among rural and low-SES populations can help address the gaps in prenatal care identified in this study. Specialized care and monitoring for high-risk pregnancies, particularly those with a history of cesarean sections, are essential for improving maternal and neonatal outcomes. This includes regular ultrasound evaluations to monitor placental location and attachment, as well as comprehensive management plans for patients identified with placental abnormalities. Preventive strategies, such as reducing

the primary cesarean section rate and encouraging vaginal birth after cesarean (VBAC) in eligible patients, can help reduce the incidence of placental abnormalities. Education and awareness programs on the risks associated with multiple cesarean sections and the benefits of VBAC can help patients make informed decisions about their delivery options. Our study had certain limitations, the study was conducted as a single center study with a sample size of 125 participants. While statistically adequate, a multicentric study with larger sample size would provide more robust and generalizable results. The study did not include long-term follow-up of the participants. Long-term maternal and neonatal outcomes, especially those related to future pregnancies and health conditions, were not assessed. Postpartum data were limited to the immediate post-operative period, without extended monitoring of maternal and neonatal health outcomes. Potential confounding factors such as maternal comorbidities, genetic predispositions, and environmental influences were not fully controlled or accounted for in the analysis. The study exclusively focused on patients with previous lower segment cesarean sections, excluding those with vaginal deliveries. This limits the applicability of the findings to all pregnant women.

## CONCLUSION

The study provides valuable insights into the prevalence and impact of placental abnormalities in patients with a history of LSCS. The findings highlight the significant impact of placental abnormalities on maternal and neonatal health, emphasizing the need for careful monitoring, early diagnosis, and specialized care for high-risk pregnancies. The comparison with previous research further underscores the critical importance of addressing socioeconomic and demographic barriers to healthcare access and utilization. The study found a high incidence of placental abnormalities in patients with a history of LSCS, particularly Type IV (Complete placenta previa). The study found significant associations between the degree of placental abnormality and neonatal outcomes. Higher rates of preterm deliveries and NICU admissions were observed in cases with severe placental abnormalities, underscoring the need for specialized neonatal care and monitoring.

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