

Study of Placental Location and Pregnancy Outcome with Previous Caesarean Delivery

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ABSTRACT

Background: With the globally emerging trend of Caesarean deliveries, there arises a more pressing matter of subsequent pregnancy outcomes with previous caesarean deliveries. Especially, the physiology of Placental localisation being a poorly understood phenomena, question arises, whether a previous caesarean scar can influence the site of placental implantation, subsequent migration and pregnancy outcome. The objective of present study is placental localisation and study of maternal and foetal outcome in previous caesarean delivery patients. **Methods:** A prospective longitudinal study on 100 previous caesarean patients was conducted over a period of 20 months at Department of obstetrics and gynaecology at JNIMS. Placental location was determined ultrasonographically between 28 to 42 weeks gestation, Patients followed up and fetomaternal outcomes analysed. **Results:** In most, placenta located fundus-anterior and fundus-posterior (30% each) and five (5%) patient reported placenta previa. The study suggests that maternal complications like postpartum haemorrhage (60% vs 6.3) and requirement for interventions (40% Vs 11.6%) were higher among praevia patients. Foetal complications like low Apgar (40% Vs 9.5%) were higher in patients with placenta praevia w.r.t. normal placentation. Low birth weight was 57 fold higher, Preterm birth 10.9 fold higher and NICU admissions were 1.7 fold higher among placenta praevia. **Conclusion:** A caesarean first birth is associated with increased risks of low lying placentation, previa and abruption, intraoperative blood loss, perioperative morbidity and increased operative time in subsequent pregnancy.

Keywords: Placenta praevia, Placental localization, Post caesarean patient, Maternal outcome, Foetal outcome, Pregnancy.

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INTRODUCTION

The major clinical forms of placental disorders, placenta previa and abnormal adhesive placental disorders are challenging to diagnose and treat. Placenta previa complicates approximately 1 in 200 deliveries, and is one of the leading causes of vaginal bleeding in the second and third trimesters. It is associated with increased risks of maternal and infant morbidity and mortality. Placenta previa is a condition where the placenta lies in the lower uterine segment and partially or completely obstructs the internal cervical os. Placenta previa is associated with serious maternal complications, including haemorrhages requiring blood transfusions, and gravid hysterectomies and with adverse perinatal outcomes including preterm delivery and neonatal mortality.

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A recent temporal increase in these placental disorders has been reported and an association with prior caesarean delivery has been suggested in the context of the increasing caesarean delivery rates worldwide. With the increase in primary CS there is increase in repeat CS. CS accounts for one of the major indications for CS. In India it ranges from 8.48 to 41.9%. The secondary increase in repeat CS delivery has been associated with increase in the complications particularly those due to abnormal placentation. Surgical disruption of the uterine cavity is a potential risk factor for placenta previa and placental adhesion. The long-term maternal morbidity and the obstetric future of women who have had previous caesarean birth needs further evaluation. Majeed1 et al found a significant higher frequency of placenta praevia was found among the patient with previous scarred uterus. There is a dose response pattern in the risk of placenta praevia with increasing number of prior caesarean deliveries. Although some case-control and cohort studies have identified previous CS as a risk factor for diverse placental disorders, the results are isolated and ambiguous at most. The potential for dramatic sequels of placental disorders and the rising

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caesarean delivery rates thus provides the rationale to conduct further such study to corroborate findings of previous researchers.

MATERIALS & METHODS

100 Antenatal Patients with a history of having undergone at least one caesarean section, and who attended the Department of Obstetrics and Gynaecology in JNIMS in Imphal, Manipur were enrolled into a prospective longitudinal study. Smokers, patients with birth order more than four, multiple gestation and patients with superimposed Hypertension and Preterm Premature Rupture of Membranes were excluded from our study. The study was conducted over a period of two years. Placentation was determined by trans abdominal ultrasonography starting 28 weeks of period of gestation and reassessed as 36 weeks of period of gestation, or when patient presents with labour or bleeding per vaginum. The Abnormal placentation would be defined as placenta previa, low lying placenta or any placental implantation in which there is abnormally firm adherence of placenta to the uterine wall characterized by loss of normal hypochoic retroplacental myometrial zone. Placenta previa would be defined as a placenta that on ultrasound was located over or very near the internal os, < or =2 cm from the internal os. Low lying placenta would be defined as placenta in the lower uterine segment i.e >2cm and <6cm from the internal os.

The patients were followed up to delivery and the maternal and fetal outcomes are noted. The maternal outcome like vaginal/caesarean delivery, postpartum hemorrhage, interventions required (B Lynch suture, internal iliac, internal base iliac artery ligation or placental bed suturing), intraoperative finding of placenta accreta, postpartum hysterectomy and need for blood transfusions are noted. The fetal outcomes like preterm baby (<37 weeks), low birth weight baby (<2.5 kg), low Apgar score, need for NICU admission, still birth or neonatal death are analyzed. Descriptive statistics of the placental location and the abnormal placentation proportion in previous caesarean delivery patients was analyzed. Chi-square test will be used to find the association between abnormal placentation and the pregnancy outcome in previous caesarean delivery patients. All data was analyzed through SPSS 20 software.

RESULTS

There were a total of 100 patients participated in the study. The socio-demographic details show the mean (SD) age of the participants was 32 (5.3) years. Almost one third (31%) of the participants belonged to 31-35 years and 29% of them above 35 years of age. All the participants were educated and almost half of them (56%) were educated up to primary

level. Almost 2/3rd (68%) of the participants are home makers and 10% were depending on daily waged works for earnings.

Table 1: Distribution of socio-demographic details (N=100)

Variable	Frequency	Percentage
Age group (in years)		
≤ 25	15	15
25-30	25	25
31-35	31	31
> 35	29	29
Educational status		
0-7	13	13
8-10	43	43
11-12	30	30
Graduation and above	14	14
Occupational Status		
Home Maker	68	68
Govt Salaried	5	5
Pvt salaried	17	17
Daily waged	10	10

Most of the participants had not reported any family history of risk factors and 3 % reported equally asthma, DM, hypertension and thyroid. Most of the participants reported no history of co-morbidities and 10% reported any kind of co-morbidity such as DM (4%), hypertension (5%) and thyroid(1%). Most of the participant's reason for previous caesarean delivery was CPD (43%) followed by oligohydramnios (24%) and non-progression of labour (15%).

Table 2: Distribution of Intra operative Placental Localisation findings (N=100)

Intra operative findings	Frequency	Percentage
Fundo anterior	30	30
Fundo posterior	14	14
Anterior	21	21
Posterior	30	30
Placenta previa	5	5

The distribution of intra operative finds shows that around one third (30%) of the participants findings were fundo anterior or posterior. One among the twenty (5%) of the participants reported placenta previa.

Table 3: Distribution of hysterectomy, peritoneal adhesions and blood transfusion (N=100)

Maternal outcome	Frequency	Percentage
Hysterectomy	2	2
Peritoneal Adhesions	11	11
Blood transfusion	6	6

Six (6%) patients required blood transfusion during caesarean sections, two underwent hysterectomy and 11% reported peritoneal adhesions. The mean duration of hospital stay was 4.9 (2.7) days.

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Table 4: Distribution of Maternal Outcome (N=100)

Maternal outcome	Frequency	Percentage
PPH	9	9
Intervention	13	13
Normal	78	78

The maternal outcomes shows that most of the patients (78%) were normal and 9% undergone post-partum haemorrhage. The remaining 13% of the participants required any kind of intervention during the intraoperative period.

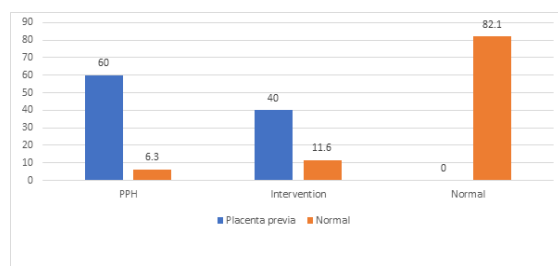


Figure 1: Association of maternal outcomes with intraoperative findings

Majority (90%) of the participants period of gestation was above 37 weeks and 2% reported less than 34 weeks. The association of maternal outcomes with intra operative findings shows that the maternal outcome is significantly associated with intraoperative findings ($p < 0.001$). Similarly gestational age is significantly ($p < 0.001$) associated with maternal outcomes.

Table 5: Distribution of Neonatal Outcomes (N=100)

Neonatal outcome	Frequency	Percentage
Preterm	11	11
Low birth weight	4	4
NICU admission	12	12
Low APGAR score	11	11

Distribution of neonatal outcomes shows that around one tenth of the neonatal outcome required NICU admissions(12%), 11% each were with low APGAR score, preterm delivery and 4% reported low birth weight. More than two third (68%) of the participant's child's birth weight reported as above 3 kgs.

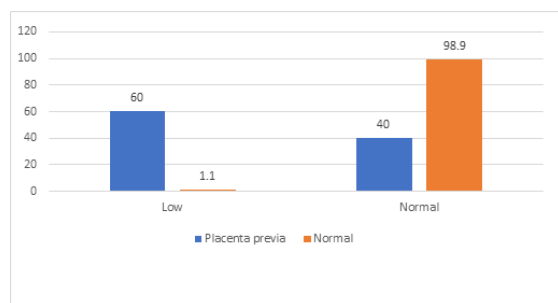


Figure 2: Association of maternal outcomes with birth weight

Maternal outcome and birth weight are significantly associated ($p < 0.001$) and compared to normal mother, placenta previa mothers have 54.5 times higher risk for low birth weight babies. In this study 20 % of the placenta previa mothers babies were admitted in NICU and 11.6% of the normal mothers babies admitted in the same. The study finds shows that the intra operative findings are not significantly associated with NICU admissions.

DISCUSSION

Over a period of 20 months, a total of 268 patients with a history of previous c section were admitted in our hospital for safe confinement. Of these, 11 patients had multifetal gestation and excluded from study to reduce bias. 54 patients had a history of more than 2 caesarean sections, and increasing parity independently increases risk of placenta praevia as highlighted by study of Martinelli.^[2] 38 patients had a chronic co existing medical condition complicating pregnancy, and as such were excluded from study.

Of the 100 cases included in study pool, 5 had placenta previa(5%). Arul rose et al,^[3] reported the incidence of placenta previa was 1.59% and 0.55% in patients with scar and without scar respectively. It is statistically significant ($p < 0.05$). The risk was 3 times higher in women with scarred uterus than in women with unscarred uterus. The incidence of placenta praevia considerably increased in the study conducted by Kollmann et al,^[4] from 0.36% in 2003 to a maximum of 0.74% in 2011, paralleled by a raise of caesarean deliveries from 24.2 to 31.9%. Chen et al,^[5] concluded that previous antepartum CD was associated with 2-fold increased risks of placenta previa i.e, following vaginal birth is 0.9%; antepartum CD, 2.0%; intrapartum CD, 1.6% ($P < 0.001$). Yang et al,^[6] noted that in multiparous singleton births, previous cesarean section was associated with 79% increased risk on placenta previa but only 46% increased risk on placental abruption. The study by Gurol-Urganci et al,^[7] placed the rate of placenta previa at second birth for women with vaginal first births at 4.4 per 1000 births, compared to 8.7 per 1000 births for women with CS at first birth. In the meta-analysis of 37 previously published studies from 21 countries, the overall pooled random effects odds ratio was 2.20 (95% CI 1.96-2.46). Our study also suggests similar results with a statistically significant association between previous caesarean delivery and placenta previa.

The condition is frequently complicated by invasion of placental villi beyond the decidua basalis causing placenta accreta or increta. In our study, Placenta Accreta was seen in 3 (0.55%) Cases, similar to the incidence reported by Chaudhuri et al,^[8] where, incidence of morbidly adherent placenta was 1.32 per 1000 pregnancies; 90 % of the patients in this

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study had previous Caesarean section and co-existing placenta praevia was diagnosed in 63 %.

Our study suggests that maternal complications like post partum hemorrhage (9%) and requirement for interventions (13%) were higher among patients with placenta praevia. In this study, from the 5 patients found to have PPA, 2(60.00%) - 12.00% of the study population - had undergone caesarean hysterectomy. In the remaining 3(40%) cases the placenta was removed piecemeal. There was significant association between PPA and the rising rate of caesarean hysterectomy ($P < 0.001$). This corroborates the finds of Liang-Kun M et al,^[9] and Milosević et al,^[10] and Cheng et al,^[11] who found that the risk of caesarean hysterectomy was 66% among those with previous scars and PPA. Palolva et al,^[12] found an even higher association between PPA and combined risk factors of previous cs and previa. Our study suggests that requirement for interventions (13%) were higher among patients with placenta praevia. In our study, 6% of patients developed PPH and received blood. The mean number of units of blood given was 2. Among those with P.P.A, 100% of them developed PPH. Significant association between P.P.A and PPH was found ($P < 0.001$). The study by Belachew et al,^[13] put overall incidence of PPH at 11.0% and of retained placenta 3.5%.

As regards to complications, Zhou et al,^[14] found that in patients with P.P.A the estimated blood loss was more than 3 litres. 11% of subjects had peritoneal adhesions. The association of maternal outcome and APGAR score shows that the placenta praevia cases have 10 times higher risk for low APGAR score compared to normal cases ($p=0.03$).

Maternal outcome and birth weight are significantly associated ($p < 0.001$) and compared to normal mother, placenta praevia mothers have 54.5 times higher risk for low birth weight babies. In this study 20 % of the placenta praevia mothers babies were admitted in NICU and 11.6% of the normal mothers babies admitted in the same. The study finds shows that the intra operative findings are not significantly associated with NICU admissions. In a similar study by Senkoro et al,^[15] Infants delivered by mothers with placenta praevia were more likely to have Apgar scores of < 7 at the 1st [OR < 2.68], 5th [OR 3.83], and 10th [OR 3.07] minutes after birth, low birth weight [OR 5.62], admission to neonatal intensive care unit/NICU [OR 2.53], stillbirth [OR 2.58], and early neonatal death [OR 3.75].

Hence this study brings into limelight that previous caesarean delivery has a significant association with placenta praevia. It also concludes that maternal and fetal complications were also higher among the individuals with history of previous caesarean delivery and abnormal placentation in the present pregnancy. Having proved thus, health care professional are morally obliged to create awareness on the perinatal and maternal morbidity associated

with caesarean delivery among the general population.

CONCLUSION

From this study, it is concluded that a caesarean first birth is associated with increased risks of low lying placentation, previa and abruption in the subsequent pregnancy. The study suggests that maternal complications and fetal complications were higher in the patients with placenta praevia. The study also suggests that maternal complications like post partum hemorrhage and interventions were higher in patients with placenta praevia and previous history of previous caesarean delivery.

The study shows that fetal complications like low birth weight, preterm births and NICU admissions were higher in patients with placenta praevia and history of previous caesarean delivery. The risk of placental myometrial adhesion increases marginally, as does the incidence of intraoperative blood loss, perioperative morbidity and operative time. Ominously positive association was found between previous caesarean delivery and risk of scar dehiscence in subsequent pregnancy.

Limitations:

The current study was limited to post caesarean patients only. A better model would be to compare placentation between previous vaginal delivery patients vs. post caesarean patients. Further studies might be conducted on external validation of the present study. The present study might also have been applied on a more generalised population with the inclusion of a segment on a systematic review on similar such studies. Further prospective studies including other sonographic markers of massive hemorrhage or adherence of placenta such as extensive vascular lakes, heterogeneity of placenta, loss of myometrial zone, sponge-like cervix and marginal sinus could have been incorporated to give us more information about the relationship of anterior placenta with accreta or massive bleeding such that it will enable more tailored approach to previous c-section patients.

Conflict of interest: Author Dr. Vinod Kumar Suresh Basavaradder, Author Prof. Ch. Manglem Singh, Author Prof. Ng. Indrakumar Singh and Author Ipsita mohanty declare that they have no conflict of interest.

Ethical Approval:

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and /or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards .The letter of approval was

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obtained college ethics committee vide letter number AC/06/IEC/JNIMS/2017.;82(38)P dated on 24 August 2017.

Informed Consent Informed consent was obtained from all patients for being included in the study.

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