

# Association of first Birth Cesarean Delivery and Placental Abruption or Previa at Second Birth

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## Abstract

**Objective:** To evaluate the strength of association of cesarean delivery for first birth with placenta previa and placental abruption in second pregnancy.

**Design:** Retrospective cohort study.

**Setting:** Hospital based (Birth register)2004-2008. A total of 1638 pregnancies were available for the final analysis after excluding missing information.

**Methods:** Multiple logistic regressions were used to describe the relationship between cesarean section for first birth with placenta previa and placental abruption in second birth singletons.

**Main outcome measures:** Placenta previa and placental abruption

**Results:** Placenta previa was present in 10 per 1000 second-birth singletons whose first births delivered by cesarean section and 9 per 1000 second-birth singletons whose first births delivered vaginally. The corresponding figures for placental abruption were 5 per 1000 in the previous cesarean delivery group and 5 per 1000 in the previous vaginal delivery group. The adjusted odds ratio (95% confidence intervals) of previous cesarean section for placenta previa in following second pregnancies was 1.10 (0.39 to 3.10) after adjusting for confounders including maternal age and interval between births. The corresponding figure for placental abruption was 1.0 (0.24 to 4.19).

**Conclusion:** Cesarean section for first birth is associated with 10% increased risk of placenta previa and no risk of placental abruption in second pregnancy with a singleton.

**Keywords:** Placenta previa, placental abruption, previous cesarean section.

## INTRODUCTION

Cesarean delivery has increased steadily, with one in four delivery occurring by cesarean section. It has been associated with increased risk of placental abruption and previa in subsequent births, conditions resulting in increased likelihood of low birth weight, preterm delivery and perinatal death.<sup>1-8</sup>

A meta-analysis reported that women with at least one prior cesarean delivery had a 2.6 fold increased risk of placenta previa in subsequent pregnancy.<sup>2</sup> The studies have reported that the risk of placental abruption increased by 30% in second pregnancies in women who had first born cesarean delivery.<sup>9,10</sup> The association between previous cesarean birth and placenta previa or placental abruption in subsequent pregnancy is inconsistent and is not confirmed in two studies.<sup>11,12</sup>

## MATERIALS AND METHODS

We conducted a retrospective study using data from KLES Shree Prabhakar kore hospital birth register, Belgaum (2004-2008). This hospital is a tertiary care center with approximately 2500 to 3000 deliveries annually.

The study cohort included all second gravidas who delivered in our hospital from January 1,2004 through June 31, 2008. The register gave information on maternal age, marital status, obstetric history, complications associated with pregnancy, labor and delivery. Women with previous history of abortions, placenta previa, placental abruption and present pregnancies with multiple pregnancy or medical complications (such as cardiac disease, diabetes, chronic hypertension, renal disease, pregnancy induced hypertension, eclampsia) were excluded from the study.

After the exclusions were made, 1810 subjects remained for analysis. Subjects were classified into previous vaginal delivery and previous cesarean delivery groups according to the method of delivery for the first birth. Placental abruption was defined as premature separation of normally situated placenta from uterus while placenta previa was defined as implantation of the placenta over or near the internal os of the cervix.

We compared the important characteristics of the two groups. Adjusted odds ratios(ORs) for previous cesarean delivery associated with placenta previa and placental abruption were estimated using multiple logistic regression. Potential

confounding variables included maternal age (< 20, 20-24, 25-29, 30-34, 35-39, > 40) and interval between the births (< 1, 1-2, 2-3, 3-4, > 4). All analysis were performed using SPSS software version 10.

## RESULTS

A total of 1810 second born singletons were included initially. We excluded 35 women with missing information on maternal age, 95 women with missing information on interval between births and 42 women with missing information on previous mode of delivery. After these exclusions, 1638 pregnancies were available for the final analysis.

Both the previous vaginal and previous cesarean delivery groups had similar age and birth interval distribution (Tables 1 and 2).

About 10 per 1000 second-birth singleton pregnancies were complicated with placenta previa among first births delivered by cesarean section, while 9 per 1000 second-birth singleton pregnancies were complicated with placenta previa among first births delivered vaginally (Table 3). The corresponding figures for placental abruption were 5 per 1000 in the previous cesarean delivery group and 5 per 1000 in the previous vaginal delivery group (Table 4). The crude OR (95% confidence intervals) of previous cesarean section for placenta previa in following second pregnancies was 1.11 (0.39-3.12), however, the OR remained same after adjusting for confounders, including maternal age and interval between births. The corresponding crude and adjusted OR (95%CI) for placental abruption were 0.99 (0.24-4.18) and 1.0(0.24-4.19) (Table 5).

## DISCUSSION

Several studies done to determine the risks of placenta previa and placental abruption have showed potential risk factors as maternal age, race, marital status, parity, prenatal care, cocaine use and smoking during pregnancy.<sup>1,2,11-19</sup> AS the cesarean deliveries are increasing, the incidence of placenta previa and placental abruption is expected to rise. The association between the number of previous cesarean section and subsequent placenta previa and placental abruption is not consistent.<sup>4,20,21</sup> Our study includes second singleton births as it represents a homogenous population which eliminates potential confounding effects of parity and multiple gestation.

Our study showed that women with one cesarean delivery have 10% increase in risk of placenta previa in subsequent pregnancy than are those without such a history. However, the magnitude of the risk was lower compared to Washington State Birth Events Record Data based study<sup>9</sup> and 1989 to 1997 Missouri longitudinally linked data based study.<sup>10</sup> There are few previous studies that have examined the association between previous cesarean delivery and placental abruption. Our study did not show increased risk of placental abruption unlike increased shown by Norwegian birth registry-linked cohort study,<sup>8</sup> a Swiss birth registry study,<sup>22</sup> Washington State Birth Events Record Data based study<sup>9</sup> and 1989 to 1997 Missouri longitudinally linked data based study.<sup>10</sup>

An association between lower segment uterine scar with placenta previa and placental abruption is plausible as the uterine scar impairs placental blood supply in anterior placenta.<sup>8</sup> Uterine scar leads to pathological changes in the myometrium

**Table 1:** Shows similar maternal age distribution between the previous vaginal and previous cesarean delivery group

Second birth character Maternal age(years)	Vaginal delivery n	Vaginal delivery %	Cesarean delivery n	Cesarean delivery %	Total n	%
< 20	18	1.8	13	2.1	31	1.9
20-24	571	55.8	338	54.9	909	55.5
25-29	337	30.0	208	33.8	545	33.3
30-34	82	8.0	45	7.3	127	7.8
35-39	11	1.1	12	1.9	23	1.4
> 40	3	0.3	0	0	3	0.1
Total	1022	100	616	100	1638	100

**Table 2:** Shows similar distribution of birth interval between previous vaginal and previous cesarean delivery group

Second birth character Interval between birth(y)	Vaginal delivery n	Vaginal delivery %	Cesarean delivery n	Cesarean delivery %	Total n	%
<1	33	3.2	12	1.9	45	2.8
1-2	461	45.1	253	41.1	714	43.6
2-3	366	35.8	226	36.7	592	36.1
3-4	90	8.8	83	13.5	173	10.6
> 4	72	7.0	42	6.8	114	6.9
Total	1022	100	616	100	1638	100

**Table 3:** Displays prevalence of placenta previa in previous vaginal and previous cesarean delivery group

Type of delivery	Placenta previa present (n)	Placenta previa present %	Placenta previa absent(n)	Placenta previa absent %	Total n
Vaginal delivery	9	0.9	1013	99.1	1022
Cesarean delivery	6	1.0	610	99.0	616
Total	15	0.9	1623	99.1	1638

**Table 4:** Displays prevalence of placental abruption in previous vaginal and previous cesarean delivery group

Type of delivery	Placental abruption present(n)	Placenta abruption present %	Placenta abruption absent(n)	Placenta abruption absent %	Total
Vaginal delivery	5	0.5	1017	99.5	1022
Cesarean delivery	3	0.5	613	99.5	616
Total	8	0.5	1630	99.5	1638

**Table 5:** Association of placenta previa and placental abruption in second pregnancy after previous cesarean delivery

Complications in second pregnancy and mode of previous delivery	Number (%) of outcomes	Crude OR (95% CI)	Adjusted Crude OR (95% CI)*
Placenta previa	9 (0.9)	Reference	Reference
Vaginal delivery			
Cesarean delivery	6 (1.0)	1.11(0.39, 3.12)	1.10 (0.39, 3.10)
Placental abruption	5 (0.5)	Reference	Reference
Vaginal delivery			
Cesarean delivery	3 (0.5)	0.99 (0.24, 4.18)	1.0 (0.24, 4.19)

\*OR and 95% CI with adjustment for maternal age and interval between births.

and endometrium of the uterus which includes polyp formation, lymphocyte infiltration, capillary dilatation and infiltration of the endometrial tissue that surround the scar by free red blood cells.<sup>23</sup> These changes cause increased vascular malformations and increased fragility of vessels. Uterine artery ligation during cesarean section may further increase the risk.<sup>7</sup> According to Hershkowitz et al uterine incision interfered with its physiological stretching and prevented placental migration to the upper uterine segment.

The strengths of our study was that analysis was confined to women with second singleton births, eliminating potential confounding effects of parity and multiple gestation. We excluded women with women with previous placental abruption or previa, which could have predisposed them to cesarean delivery and recurrence of uteroplacental bleeding.<sup>8, 24-26</sup> Also placental abruption might be attributable to high-risk medical or pregnancy conditions rather than method of delivery, so we included only women without medical or pregnancy complications.

Our retrospective study has some limitations, since it is a hospital based study, its results are not applicable on the whole population of Indian pregnant women. Hence more prospective and population based studies should be initiated to avoid under-reporting.

## CONCLUSION

Cesarean section for first birth is associated with 10% increased risk of placenta previa and no risk of placental abruption in second pregnancy with a singleton.

## REFERENCES

1. Ananth CV, Berkowitz GS, Savitz DA, Lapinski RH. Placental abruption and adverse perinatal outcomes. *JAMA* 1999;282:1646-51.
2. Ananth CV, Smulian JC, Vintzileos AM. The effect of placenta praevia on neonatal mortality: A population -based study in the United States, 1989 through 1997. *Am J Obstet Gynecol* 2003;188:1299-304.
3. Hemminki E. Pregnancy and birth after caesarean section: A survey based on Swedish based register. *Birth* 1987;11:7-12.
4. Hershkowitz R, Fraser D, Mazor M, Leiberman JR. One or multiple caesarean sections are associated with similar increased frequency of placenta praevia. *Eur J Obstet Gynecol Reprod Biol* 1995;62:185-88.
5. Hemminki E, Merilainen J. Long-term effects of caesarean section: Ectopic pregnancies and placental problems. *Am J Obstet Gynecol* 1996;174:1569-74.
6. Neilsen TF, Hagberg H, Ljungblad U. Placenta praevia and antepartum haemorrhage after previous caesarean section. *Gynecol Obstet Invest* 1989;27:88-90.

7. Taylor VM, Kramer MD, Vaughan TL, Peacock S. Placenta praevia and prior caesarean delivery: How strong is the association? *Obstet Gynecol* 1994;84:55-57.
8. Rasmussen S, Irgens LM, Dalaker K. A history of placental dysfunction and risk of placental abruption. *Paediatr perinat Epidemiol* 1999;13:9-21.
9. Lydon-Rochelle M, Holt VL, Easterling TR, Martin DP. First birth caesarean and placental abruption or praevia at second birth. *Obstet Gynecol* 2001;97:765-69.
10. Getahun D, Oyelese Y, Salihu HM, Ananth CV. Previous Caesarean delivery and risks of placenta praevia and placental abruption. *Obstet Gynecol* 2006;107:771-78.
11. Cieminski A, Dlugolecki F. Relationship between placenta praevia and maternal age, parity and prior caesarean deliveries. *Ginekol Pol* 2005;76:284-89(abstract).
12. Hossain GA, Islam SM, Mahamood S, Chakraborty RK, Akhter N, Sultana S. Placenta Praevia and its relation with maternal age, gravidity and caesarean section. *Mymensingh Med J* 2004;13:143-48(abstract).
13. Faiz AS, Ananth CV. Etiology and risk factors for placenta praevia: An overview and meta-analysis of observational studies. *J Matern Fetal Neonatal Med* 2003;13:175-90.
14. Ananth CV, Demissie k, Smulian JC, Vintzileos AM. Placenta praevia in singleton and twin births in the United States, 1989 through 1998: A comparison of risk factor profiles and associated conditions. *Am J Obstet Gynecol* 2003;188:275-81.
15. Lavery JP. Placenta praevia. *Clin Obstet Gynecol* 1990;33:414-21.
16. Ananth CV, Savitz DA, Williams MA. Placental abruption and its association with hypertension and prolonged rupture of membranes: A methodological review and meta-analysis. *Obstet Gynecol* 1996;88:309-18.
17. Rasmussen S, Irgens LM, Dalaker K. The effect on the likelihood of further pregnancy of placental abruption and the rate of its recurrence. *Br J Obstet Gynaecol* 1997;104:1292-95.
18. Ananth CV, Wilcox AJ. Placental abruption and perinatal mortality in the United States. *Am J Epidemiol* 2001;153:332-37.
19. Ananth CV, Smulian JC, Vintzileos AM. The association of the placenta praevia with history of caesarean delivery and abortion: A meta-analysis. *Am J Obstet Gynecol* 1997;177:1071-78.
20. Clark SL, Koonings PP, Phelan JP. Placenta praevia/accreta and prior caesarean section. *Obstet Gynecol* 1985;66:89-92.
21. Chattopadhyay SK, Kharif H, Sherbeeni MM. Placenta praevia and accreta after previous caesarean section. *Eur J Obstet Gynecol Reprod Biol* 1993;52:151-56.
22. Rageth JC, Juzi C, Grossenbacher H. Delivery after previous caesarean: A risk evaluation. Swiss Working Group of Obstet and Gynecologic institutions. *Obstet Gynecol*.
23. Morris JA. Surgical pathology of the lower segment caesarean section scar: Is the scar a source of clinical symptoms? *Int J Gynecol Pathol* 1995;14:16-20.
24. Salas M, Hofman A, Stricker BH. Confounding by indication: An example of variation in the use of epidemiologic terminology. *Am J Epidemiol* 1999;149:981-83.
25. Karegard M, Gennser G. Incidence and recurrence rate of abruptio placentae in Sweden. *Obstet Gynecol* 1986;67:523-28.
26. Misra DP, Ananth CV. Risk factor profiles of placental abruption in first and second pregnancies: Heterogenous etiologies. *J Clin Epidemiol* 1999;52:453-61.