

Maternal and Fetal outcomes in Second Child Birth: Comparison of first birth vaginal vs first birth caesarean delivery

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Abstract

Background: Caesarean section, being such a common but major surgery that can have many adverse effects on the health of a woman in the present pregnancy and also in the subsequent pregnancies, this study was performed to find out to what extent a prior caesarean section affects subsequent pregnancies. Both maternal and fetal outcomes of second pregnancy were assessed in those women who normal vaginal delivery in comparison to those who had elective caesarean delivery during first pregnancy.

Methods: It was hospital based cohort study conducted in the Department of Obstetrics & Gynaecology (O & G), of a Medical College in Kolkata. A total of 2500 second gravida pregnant women with period of gestation (POG > 20 weeks) were enrolled for the study. They were divided into two cohorts based on the modes of delivery: those after a vaginal first birth and after a caesarean first birth. There were 6.5% preterm births in first caesarean delivery as against 4.5% in women with first vaginal delivery (p=0.034). Percentage of cases of very preterm birth (< 32 weeks) was almost double in the first caesarean delivery cohort

compared to first vaginal delivery cohort (3.03% and 1.71% respectively) (p=0.04).

Results: The odds of having placenta praevia is 2.4 times more in pregnant women with first caesarean delivery (p=0.046). Percentage of cases of placental abruption was more in the first caesarean delivery cohort but it was statistically not significant (p 0.622).

Conclusion-The current study shows that caesarean section as the mode of first birth is associated with increased risks in the next birth for adverse obstetric and perinatal outcomes

Keywords: Caesarean, Vaginal Delivery, Perinatal Outcome, Maternal Outcome.

Introduction

Maternal and perinatal outcomes of childbirth have always been a concern for gynecologists. The natural process of childbirth insinuates women to have a vaginal mode of delivery, where a vast majority of women can have safe, normal childbirths.¹ However, there are health conditions where a caesarean birth is necessary for the well being of the mother or her baby. These days, more and more mothers are giving birth by caesarean section for non-medical reasons.²

A caesarean delivery poses risks as well as benefits for mother and baby, and should not be undertaken lightly. Still, caesarean section rates are currently above 20% in many countries raising concerns in subsequent pregnancies that could be substantial at population level.³⁻⁹ A growing interest in the outcomes of caesarean delivery has been fuelled by rising rates of the delivery in many countries together with the trends towards “informed choice” for pregnant women and clinicians making decisions in partnership with women.¹⁰

Caesarean delivery rates have been rising for all women regardless of medical condition, age, race or gestational age of the women. While the number of first caesareans performed without medical indication is increasing, no evidence supports the belief that these elective caesareans represent maternal request caesareans or medically indicated elective first caesareans.¹¹

Elective first caesarean at physician’s request may, however, play a significant role in increasing the caesarean delivery rate¹² and the rise in elective repeat surgeries, which has climbed by more than 40% in the last ten years.¹³ There is no denial of the fact that a caesarean section can be a lifesaving operation and some babies would not be born vaginally under any circumstances; however, it is still a major surgery that has potentially life threatening complications and has adverse effects on subsequent pregnancies.¹⁴

With a prior caesarean section, women and their babies are more likely to experience serious complications during subsequent pregnancies and during birth regardless of whether they plan repeat caesarean or vaginal birth. The likelihood of serious complications increases with each additional operation.¹⁵

Caesarean section is associated with an increased risk of disorders of placentation in subsequent pregnancies,

but effects on the rate of antepartum stillbirth are unknown.⁴ There are studies which have concluded that delivery by caesarean section in the first pregnancy could increase the risk of unexplained stillbirth in the second.⁴

Caesarean section, being such a common but major surgery that can have many adverse effects on the health of a woman in the present pregnancy and also in the subsequent pregnancies, this study was performed to find out to what extent a prior caesarean section affects subsequent pregnancies. Both maternal and fetal outcomes of second pregnancy were assessed in those women who normal vaginal delivery in comparison to those who had elective caesarean delivery during first pregnancy.

Material and Methods

It was hospital based cohort study conducted in the Department of Obstetrics & Gynaecology (O & G) , of a Medical College in Kolkata.

A total of 2500 second gravida pregnant women with period of gestation (POG > 20 weeks) were enrolled for the study. They were divided into two cohorts based on the modes of delivery: those after a vaginal first birth and after a caesarean first birth.

Inclusion criteria: Second singleton births.

Exclusion criteria: Pregnancies terminated before 20 completed weeks.

After enrolling eligible participants, written informed consent was taken. The required informations were gathered from Labour log book records, Bed Head Tickets (BHTs) of patients and relevant history taking from patients.

The particulars that were studied are as follows-
Maternal outcomes: Placenta previa, Placental abruption, APH, Malpresentations, Uterine rupture, Placenta accreta, Hysterectomy, Maternal death & Fetal

outcomes: Preterm birth, Very preterm birth, Small for gestational age (SGA), Low birth weight (LBW), Stillbirth, Unexplained stillbirth, Neonatal death.

The study was approved by Institution Ethics Committee. Privacy and confidentiality of all enrolled participants was assured.

Statistical Analysis

The statistical analysis was done by the MedCalc software version 9.3.0 (2007). The odds ratios (OR) were calculated along with 95% confidence interval (95%CI) and P value. P value if less than 0.05 was considered to be statistically significant. Chi square test to assess difference between categorical variables and Student t test for studying difference of means between two independent groups were also applied and the results were calculated along with 95% CI and P value.

Results

Socio-demographic profile of the participants: Of the total 2500 participating pregnant women, majority of the women in both the cohorts were aged below 25 years. The mean ages in the two cohorts were almost same. About 70.4% women were residents of rural areas. (Table 1)

Clinical profile of the participants: There were 51.1% (n=1278) participants who were booked while 22.9% (n=572) were unbooked and 26% (n=650) referred cases. There was no significant difference between the two cohorts. There were 56.8% (n=1421) pregnant women who conceived within 24 months of their first pregnancy in both the cohorts. There was no statistically significant difference between the two cohorts as far as pregnancy interval was concerned. (p=0.29). About 71.8% (n=1794) women had normal BMI. There was no statistically significant difference between the two cohorts in regards to BMI (p=0.078). (Table 1)

Maternal Outcomes

The odds of having placenta praevia is 2.4 times more in pregnant women with first caesarean delivery (p=0.046). Percentage of cases of placental abruption was more in the first caesarean delivery cohort but it was statistically not significant (p 0.622). The percentage of cases of APH in the first caesarean delivery cohort was almost double when compared to first vaginal delivery cohort (4.34% and 2.1% respectively) and this difference was statistically significant (p=0.0026). Women with a first caesarean delivery had increased percentage of cases of malpresentations compared to women with first vaginal delivery (6.22% and 4.31% respectively) (p=0.047). Percentage of cases of caesarean delivery in the first caesarean delivery cohort was much more than the first vaginal delivery cohort (97.97% and 13.71% respectively) (p<0.001). There was no single case of rupture uterus in the first vaginal delivery cohort whereas four cases of rupture uterus were documented in the first caesarean delivery cohort (p=0.034). Six cases of placenta accreta during performing repeat caesarean section in women with first caesarean delivery were reported as against no cases of placenta accreta in the first vaginal delivery cohort (p=0.016). Four cases of emergency hysterectomies were performed in the women with first caesarean delivery cohort enrolled in the study (p=0.034) and out of this two died. One woman died in the first vaginal delivery cohort due to HELLP Syndrome (p=0.18). (Table 2)

As vaginal birth after caesarean (VBAC) is rarely performed in the institute it was not possible to get the true picture of prolonged labour in the women with first caesarean delivery cohort.

Fetal outcomes: There were 6.5% preterm births in first caesarean delivery as against 4.5% in women with first vaginal delivery ($p=0.034$). Percentage of cases of very preterm birth (< 32 weeks) was almost double in the first caesarean delivery cohort compared to first vaginal delivery cohort (3.03% and 1.71% respectively) ($p=0.04$). The study did not find any increased risk of SGA, stillbirths, neonatal death and LBW in women with prior caesarean delivery. However, proportion of unexplained stillbirth were significantly higher in women with first caesarean delivery ($n=15$; 2.17%; $p=0.046$). (Table 3)

Discussion

The current study shows that caesarean section as the mode of first birth is associated with increased risks in the next birth for adverse obstetric and perinatal outcomes.

The women with a previous caesarean delivery had increased risk of placenta previa. This finding is similar to the findings a number of earlier studies.¹⁶⁻¹⁸ Shi et al have suggested several reasons for this phenomenon.¹⁹ In elective CS, hysterotomy is made more cephalad and it incises “thick” uterine portion. More simply, “thick” incision, i.e. the higher degree of “scar,” may more distort uterine integrity, and is more likely to cause thinner lower uterine segment and placenta previa in subsequent pregnancy. Morbidly adherent placenta is more common in the post-caesarean pregnancy group which has already been demonstrated in previous studies.^{16,17} And this may be hypothesized for increased risk of malpresentations as well as indicated in other studies also.²⁰

As far as placental abruption is concerned, this study did not find any increased incidence of placental abruption in the first caesarean delivery cohort. However several previous studies did find significant

association between prior caesarean delivery and placental abruption.^{6,8,15} This may have been due to under diagnosis of the cases of placental abruption, in our series.

In the category of APH due to indeterminate causes, the cases which were included had either no USG done in the ante-natal period or no operative note was available (in case of caesarean section) or the cases where no identifiable cause of APH was found. Prior caesarean delivery increases the incidence of unexplained APH in second pregnancy as per this study’s findings. This finding is consistent with some of the prior studies.²⁰

All four women with rupture uterus had history of a prior caesarean delivery and were referred from peripheral hospitals and underwent emergency laparotomy. Among the previous vaginal delivery cohort no case of rupture uterus was found. So, this study demonstrates that the incidence of rupture uterus is increased with prior caesarean section as has already been shown in several previous studies.^{16,20}

There were four emergency hysterectomies done in the previous caesarean delivery cohort and none in the previous vaginal delivery cohort. Among the four cases, three were done due to placenta accreta and one due to rupture uterus. It can be concluded that previous caesarean delivery puts a woman to increased risk emergency hysterectomy, in a subsequent pregnancy. There are studies which have shown similar findings.^{17,21}

As far as maternal death is concerned there were two cases in the previous caesarean delivery cohort and one case in the previous vaginal delivery cohort. Since death is a relatively rare event, our study was not powered enough to draw statistically significant conclusions.

Now when we look at the percentage of cases with a preterm birth we can see, that prior caesarean delivery increases the risk of preterm birth and very preterm birth in subsequent pregnancy and is consistent with previous studies.^{3,20}

The incidence of both small for gestational age (SGA) babies and low birth weight babies did not show any association with previous mode of delivery, caesarean or vaginal. Smith et al in their landmark study found that prior caesarean delivery increases the risk of unexplained stillbirth in subsequent pregnancy.³ In our study we found that unexplained stillbirth is increased in a woman with a prior caesarean delivery

This study also did not find any increased risk of neonatal death in any of the two cohorts.

There are few limitations of the study. This study, being a hospital based study and not a population based one, may have not reflected the exact picture of risks that are imposed on a woman by a prior caesarean section. Moreover it was not possible to know the exact indication of primary caesarean in all the cases or the type of incision performed for the primary caesarean delivery; therefore, the increased risk cannot be exactly interpreted. Some increased risk may be due to confounding factors related to the indication for the first caesarean delivery. While first information available to us may be accurate, we cannot be sure whether outcomes in the second birth are caused by confounding factors in the first birth, due to our inability to link births longitudinally to the same woman. Although there was no significant difference between the two cohorts of our study in respect to general characteristics, an observational study such as this is unable to assess other important ways the women might have been different, such as values, beliefs and attitude towards birthing.²⁰

Limitations notwithstanding, it can be concluded that caesarean delivery is associated with increased risks for adverse obstetric and perinatal outcomes in subsequent birth. However, some risks may be due to confounding factors related to the indication for the first caesarean. Therefore, a population based study may be conducted, by obtaining the exact informations regarding the complications in the first birth, indications of the first caesarean section, detecting any comorbid condition that may complicate the present pregnancy independently.

Conclusion

The current study shows that caesarean section as the mode of first birth is associated with increased risks in the next birth for adverse obstetric and perinatal outcomes

References

1. Moscucci O. Holistic obstetrics: the origins of “natural childbirth” in Britain. *Postgrad Med J* 2003; 79: 168-173.
2. Walker R, Turnbull D, Wilkinson C. Strategies to address global cesarean section rates: a review of the evidence. *Birth* 2002; 29: 28-39
3. Smith GCS, Pell JP, Bobbie R. Caesarean section and risk of unexplained stillbirth in subsequent pregnancy. *Lancet* 2003; 362: 1779-1784.
4. Thomas J, Paranjyhy S. Royal College of Obstetricians and Gynaecologists Clinical Effectiveness Support Unit. National sentinel caesarean section audit report. London: RCOG Press, 2001.
5. National Center for Health Statistics. Health, United States 2002. With Chartbook on Trends in the Health of Americans. Hyattsville: NCHS, 2002.
6. Bilizan JM, Athabe F, Barros FC, Alexander S. Rates and implications of caesarean sections in

- Latin America: ecological study. *BMJ* 1999; 319: 1397-1400.
7. Lin H-C, Xirasagar S. Institutional factors in cesarean section rates: policy and research implications. *Obstet Gynecol* 2004; 103: 128-136.
 8. Koc I. Increased cesarean section rates in Turkey. *Eur J Contracept Reprod Health Care* 2003; 8: 1-10.
 9. Chanrachakul B, Herabutya Y, Udomsubpayakul U. Epidemic of cesarean section at the general, private and university hospitals in Thailand. *J Obstet Gynaecol Res* 2000; 26: 357-361.
 10. Raheem M, Salloum M. Clinical audit: obstetric performance after cesarean section. *J Obstet Gynaecol* 2003; 23: 503-6.
 11. MacDorman MF, Menacker F, Declercq E. Cesarean birth in the United States: Epidemiology, trends, and outcomes. *Clin Perinatol* 2008; 35(2): 293-307.
 12. Kalish RB, McCullough L, Gupta M, Thaler HT, Chervenak FA. Intrapartum elective cesarean delivery: A previously unrecognized clinical entity. *Obstet Gynecol* 2004; 103(6): 1137-1141
 13. Repeat c-sections climb by more than 40 percent in 10 years. . (April 15, 2009). AHRQ News and Numbers Retrieved 11/13/09, from <http://www.ahrq.gov/new/nn/nn041509.htm>
 14. Coalition for Improving Maternity Services. Step 2: Provides accurate, descriptive, statistical information about birth care practices. *J Perinat Educ* 2007; 16(1): 20S-22S
 15. Goer H, Sagady LM, Romano A. Step 6: Does not routinely employ practices, procedures unsupported by scientific evidence. *J Perinat Educ*; 16(1): 32S-64S.
 16. Bettgowda VR, Dias T, Davidoff MJ, Damus K, Callaghan WM, Petrini JR. The relationship between cesarean delivery and gestational age among us singleton births. *Clin Perinatol* 2008; 35(2): 309-323.
 17. Guise JM, Eden K, Emeis C, Denman MA, Marshall N, Fu R, Janik R, Nygren P, Walker M, McDonagh M. Vaginal birth after cesarean: New insights. Evidence Report/Technology Assessment. Number 191. AHRQ Publication No. 10-E003 March 2010.
 18. Getahun D, Oyelese Y, Salihu HM, Ananth CV. Previous Cesarean Delivery and Risks of Placenta Previa and Placental Abruption. *Obstet Gynecol* 2006; 107(4): 771-778.
 19. Shi XM, Wang Y, Zhang Y, Wei Y, Chen L, Zhao YY, et al. Effect of primary elective cesarean delivery on placenta accreta: A case-control study. *Chin Med J*. 2018;131:672–6. doi: 10.4103/0366-6999.226902.
 20. Kennare R, Tucker G, Heard A, Chan A. Risks of adverse outcomes in the next birth after a first cesarean delivery. *Obstet Gynecol* 2007; 109(2 Pt 1): 270-276.
 21. Liu S, Liston RM, Joseph KS, Heaman M, Sauve R, Kramer MS. Maternal mortality and severe morbidity associated with low-risk planned cesarean delivery versus planned vaginal delivery at term. *CMAJ* 2007; 176(4): 455-460

Legends Tables

Table 1: Socio-demographic and clinical profile of study participants

Variables	First caesarean delivery (n=691) (%)	First vaginal delivery (n=1809) (%)	Total (n=2500) (%)	P value
Age				0.46
Less than 25 years	427 (61.8)	1119 (61.9)	1546 (61.8)	
25-29 years				
30 years or more	210 (30.4)	523 (28.9)	733 (29.3)	
	54 (7.8)	167 (9.2)	221 (8.9)	
Residence				0.46
Urban	196 (28.4)	544 (30)	740 (29.6)	
Rural	495 (71.6)	1265 (70)	1760 (70.4)	
Booking status				0.49
Booked	361 (52.2)	917 (50.7)	1278 (51.1)	
Unbooked	150 (21.7)	422 (23.3)	572 (22.9)	
Referred	180 (26.1)	470 (26.0)	650 (26)	
Pregnancy interval				0.30
Less than 24				
More than 24	373 (54)	1048 (57.9)	1421 (56.8)	
	318 (46)	761 (42.1)	1079 (43.2)	
Body Mass Index (BMI)				0.078
Less than 18.5	151 (21.8)	401 (22.2)	552 (22.1)	
18.5-24.9	498 (72.1)	1296 (71.6)	1794 (71.8)	
25-29.9	18 (2.6)	42 (2.3)	60 (2.4)	
30-34.9	24 (3.5)	70 (3.9)	94 (3.7)	
35-39.9	0 (0)	0 (0)	0 (0)	
40 or more	0 (0)	0 (0)	0 (0)	

Table 2: Maternal outcomes of study participants

Complications	First caesarean delivery (n=691) (%)	First vaginal delivery (n=1809) (%)	Odds Ratio (OR) 95% CI	P value
Placenta previa	10 (1.4)	11 (0.6)	2.4 (1.01-5.68)	0.046*
Placental abruption	5 (0.7)	10 (0.5)	1.3 (0.45-3.85)	0.66
Antepartum hemorrhage	30 (4.3)	38 (2.1)	2.1 (1.30-3.44)	0.003*
Malpresentations	43 (6.2)	78 (4.3)	1.5 (1.00-2.16)	0.047*
Caesarean section	677 (97.9)	248 (13.7)	304.4 (176.3-525.4)	<0.001*
Rupture uterus	4 (0.6)	0 (0)	23.7 (1.27-440.6)	0.034*
Placenta accreta	6 (0.9)	0 (0)	34.3 (1.93-609.99)	0.016*
Hysterectomy	4 (0.6)	0 (0)	23.7 (1.27-440.6)	0.034*
Maternal death	2 (0.3)	1 (0.1)	5.2 (0.47-57.9)	0.18

*p value<0.05

Table 3: Fetal outcomes of study participants

Complications	First caesarean delivery (n=691) (%)	First vaginal delivery (n=1809) (%)	Odds Ratio (OR) 95% CI	P value
Preterm births	45 (6.5)	81 (4.5)	1.5 (1.02-2.16)	0.039*
Very preterm births	21 (3.0)	31 (1.7)	1.8 (1.03-3.15)	0.040*
Small for gestational age	52 (7.5)	139 (7.7)	1.1 (0.82-1.6)	0.44
Low birth weight	76 (11)	164 (9.1)	1.2 (0.93-1.65)	0.14
Still births	20 (2.9)	42 (0.33)	1.3 (0.73-2.15)	0.41
Unexplained still births	15 (2.2)	20 (1.1)	1.9 (1.01-3.9)	0.046*
Neonatal death	5 (0.7)	26 (1.4)	0.5 (0.19-1.3)	0.15

*p value<0.05