

Abnormal Placentation Following Previous Caesarean Section Delivery - A Ten Years Study in Peripartum Hysterectomy Cases

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ABSTRACT

BACKGROUND

Caesarean section delivery, in spite of its popularity has its short- and long-term complications like infections, haemorrhage, adhesions, abnormal placentation, uterine rupture and hysterectomy. Many studies have shown an increasing incidence of abnormal placentation which includes placenta previa, placenta accreta, placenta increta and placenta percreta to be related with the rising trend of caesarean section delivery. Again, abnormal placentation is a life-threatening condition often associated with massive postpartum haemorrhage and in recent studies it is the most common indication for peripartum hysterectomy. Deliveries by caesarean section are also increasing in our institute.

METHODS

In this hospital based cross-sectional study, 91 peripartum hysterectomy cases received in the Department of Pathology, Regional Institute of Medical Sciences (RIMS), Imphal, Manipur, during a ten-year study period (January, 2009 to December, 2018) were included in the study. The gross and microscopic histopathological findings were statistically analysed in relation to age, parity, number of previous caesarean sections using SPSS software. Significance of the risk of abnormal placentation between cases of previous caesarean section and vaginal deliveries was evaluated by chi-square test (p -value of ≤ 0.05) and odds ratio (OR).

RESULTS

During the ten years study period, 91 peripartum hysterectomy cases were selected and studied. The overall rate of peripartum hysterectomy was 1.27 per 1000 births. The age of the cases ranged from 20 to 45 years and 81.3 % were multiparous (parity two and above). The main pathological lesions were abnormal placentation- 41 (45.05%), ruptured uterus- 16 (17.58%), uterine atony- 21 (23.07%) and retained product of conception- 13 (14.28%). In 32 (35.16%) cases, there was history of previous caesarean section once in 14 and twice in 18, of which 23 (71.88%) cases had abnormal placentation pathology comprising of placental praevia 12 (37.50%), placental accreta 4 (12.5%), placental increta 5 (15.62%) and 2 (6.25%) placental percreta.

CONCLUSIONS

Abnormal placentation which includes placenta praevia, placenta accreta, placenta increta and placenta accreta is one of the most important causes of intractable postpartum haemorrhage necessitating a peripartum hysterectomy. Previous caesarean delivery has a 5.82 times higher risk of developing placentation abnormalities in subsequent pregnancies than previous vaginal delivery.

KEYWORDS

Abnormal Placentation, Placenta Praevia, Caesarean Section, Morbidly Adherent Placenta

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BACKGROUND

Today, caesarean section is accepted as a fairly safe procedure; however, compared with vaginal delivery, caesarean section is associated with increased risk not only of short term maternal complications such as infection, haemorrhage, hysterectomy, but also long term complications like adhesion development, abnormal placentation, uterine rupture and hysterectomy.¹ Peripartum hysterectomy although rare in modern obstetrics, is one of the lifesaving surgical procedure specially in case of obstetrical haemorrhage fail to respond by conservative treatment. In the past uterine atony and uterine rupture were the more common cause for emergency peripartum hysterectomy, however more recent reports list abnormal placentation which include placenta praevia, placental accreta, placenta increta and placenta percreta being the most common indication which is most likely related to the increase number of caesarean section.²

Abnormal placental adherence can be classified into 3 distinct conditions: placenta accreta, in which placental tissue invades the decidual surface of myometrium, placenta increta, in which placental villi invades more deeply into the myometrium and placenta percreta where chorionic villi penetrates through the uterine serosa and may invade surrounding organs.³ Morbidly adherent placenta (MAP) which includes placenta accreta, placenta increta and placenta percreta is a life threatening condition often associated with massive post-partum haemorrhage and sometimes need hysterectomy and is most commonly associated with placenta previa in women previously delivered by caesarean section.⁴ The aetiology of abnormal placentation remains unknown however epidemiological studies have consistently shown an increase in older age and history of previous caesarean section delivery. Increasing numbers of previous caesarean section magnify the risk with an eight-fold increase in the incidence of adherent placenta after two or more caesarean section.⁵ Placenta accreta was first described nearly 90 years ago as a clinico- pathological condition in which the placenta fails to separate partially or totally from the uterine wall. Several concepts have been proposed to explain why and how it occurs. In the past it was thought that a primary defect of the biological function of the trophoblast would lead to excessive invasion of the myometrium by placental tissue beyond the physiological decidual myometrial zone.⁶ The current prevailing hypothesis is that a defect of the endometrium-myometrial interface, typically at the site of a prior hysterotomy, leads to a failure of normal decidualisation in the corresponding uterine area. This allows extra villous trophoblastic infiltration and villous tissue to developed deeply within the myometrium.⁷ The term abnormal placentation (AP) is colloquially used for the three known variants of placenta accrete, increta and percreta.⁸ Adherent placenta is a potentially life- threatening complication of pregnancy characterised by an abnormal adherence to the uterine wall, secondary to an absence or deficiency of Nitabuch's layer of the decidua.⁹ A deficit in the uterine wall thickness due to a scarred uterus or an abnormal placentation site in lower segment is a major risk factor.¹⁰ An increasing incidence of

abnormal placentation has been considered most likely related to much higher rates of caesarean section delivery.¹¹ Caesarean section delivery rates have risen significantly in the recent years. The percentage of caesarean section delivery has been increased from 24.42% in 2009 to 34.61% in our institute.

The aim of the present study is to estimate the rate of occurrence of abnormal placentation in peripartum hysterectomy cases and also to correlate its association with previous caesarean section delivery.

METHODS

The study is a cross sectional study on 91 cases of perinatal hysterectomy cases received in the department of Pathology, Regional Institute of Medical Sciences (RIMS), Imphal, a tertiary health care centre, Manipur state, India during the period between January, 2009 to December, 2018. The hysterectomy cases during the elective/emergency caesarean section delivery and post-partum period upto 3 days after the delivery were included in the study. Detailed medical records of admission note, operative record, and obstetric history including age, parity, number and type of previous caesarean sections, information on placental sites and also difficulties in manual removal of placenta with no cleavage plane, incomplete removal or leaving entire placenta in situ are all recorded. Out of the 91 cases 32 had previous caesarean delivery of which 14 had once and 18 twice and rest 59 by vaginal delivery. Details of associated complication in particular post-partum haemorrhage and indication of hysterectomy were collected from the obstetric department. The gross and microscopic histopathological findings were analysed statistically in relation to age, parity, number of previous caesarean sections. Morbidly adherent placenta was defined based on histopathological findings of adherent placental tissue whether on inner or outer myometrium or through serosa as placental accreta, placental increta and placenta percreta respectively. Analysis of data is carried out by using frequency count and whole data process and analysis is carried out by using SPSS software. Chi-square test is performed to see whether there is risk of abnormal placentation between previous caesarean and vaginal delivery. Also, odd ratio (OR) is also calculated to find out the amount of risk factor between the types of previous delivery and frequency of caesarean delivery.

RESULTS

During the study period there were 71,601 births of which the 22,557 (31.50%) were delivered by caesarean section, rest by normal vaginal delivery. The overall percentage of caesarean delivery is 31.50% ranging from 24.42% in 2009 to 34.61% in 2018. There were 91 cases of peripartum hysterectomy, the overall rate is 1.27 per 1000 birth and ranges from 0.71 to 2.24 per 1000 birth. (Figure 1) Of the

91 cases 20 (21.97%), 66 (72.52%) and 5 (5.49%) cases were during caesarean section, within 24 hours after delivery (primary post-partum period) and up to 3 days after delivery respectively. The age ranges from 20 to 45 years and the commonest age group was 30-39 years (52.74%) and mean age was 31.72 years. P3 was found to be commonest parity (36.26%) followed by P2 (30.76%). The main pathological lesions in the 91 cases were 41 (45.05%) abnormal placentation (figure 2 and 3) comprising 17 (18.68%) placenta praevia, 24 (26.37%) MAP, 16 (17.58%) ruptured uterus, 21 (23.07%) uterine atony and 13 (14.28%) retain product of conception (Table 1). In 32 (35.16%) cases, there were history of previous caesarean section, once in 14 and twice in 18, of which 23 (71.88%) cases had placental pathology comprising of placenta praevia 12 (37.50%), placenta accreta 4 (12.5%), placenta increta 5 (15.62%) and 2 (6.25%) placenta percreta. The other findings were 3 (9.37%) of uterine rupture, 4 (12.5%) uterine atony and 2 (6.25%) retain product. Placenta praevia (37.50%) was found to be the most common pathology in those who had previous caesarean delivery, whereas it was uterine atony in previous vaginal delivery cases. The comparative incidence in placenta praevia in previous caesarean and vaginal delivery were 37.50% and 8.46% respectively and 15.62% and 5.08% for placenta increta (Table 2). Out of 32 previous caesarean delivery cases, the incidence of abnormal placentation in those with previous caesarean and vaginal delivery were 71.88% and 30.51% respectively. (Table 2) The incidence of abnormal placentation in previously twice caesarean delivery and once are 72.22% and 71.43% respectively (Table 3). The incidence of abnormal placentation in 40 years and above was 75.00%, 44.90% in 30-39 years and 33.33% in 20-29 years (Table-4). The overall percentage of caesarean section delivery was 31.50% and ranges from 24.42% to 34.61%. The rate of abnormal placentation ranges from 0.16 to 1.08 per 1000 birth and overall rate was 0.57 per 1000 birth.

Lesions	Previous Caesarean Delivery (n=32)		Previous Vaginal Delivery (n=59)		Total	
	n	%	n	%	n	%
Placenta praevia	12	37.50	5	8.47	17	18.68
Placenta accreta	4	12.50	8	13.55	12	13.18
Placenta increta	5	15.62	3	5.08	8	8.79
Placenta percreta	2	6.25	2	3.38	4	4.39
Uterine rupture	3	9.37	13	22.03	16	17.58
Uterine atony	4	12.50	17	28.81	21	23.07
Retained product	2	6.25	11	18.64	13	14.28
Total	32	100	59	100	91	100

Table 1. Pathological Lesions in Peripartum Hysterectomy Cases (n=91)

Type of Delivery	Placenta		Total (%)	Chi-Square (p-Value)
	No abnormal Placentation (%)	Abnormal Placentation (%)		
Vaginal	41 (69.49%) (69.49%)	18 (30.51%)	59 (64.84%)	14.341 (<0.001)
Caesarean	9 (28.13%) (28.13%)	23 (71.88%)	32 (35.16%)	
Total	50 (54.95%) (54.95%)	41 (45.05%)	91 (100.00%)	

Table 2. Abnormal Placentation in Relation to Previous Type of Delivery

OR = 5.82, lower bound = 0.220, upper bound = 4.909, CI (confidence interval) = 95%, p<0.001

No. of Caesarean Delivery	Placenta		Total (%)	Chi-square (p-Value)
	No Placental Abnormality (%)	Abnormal Placentation (%)		
1	4 (28.57%)	10 (71.43%)	14 (43.75%)	0.002
2	5 (27.78%)	13 (72.22%)	18 (56.25%)	
Total	9 (28.13%)	23 (71.88%)	32 (100.00%)	

Table 3. Abnormal Placentation in Relation to Number of Previous Caesarean Delivery

Age-Group (in years)	Placenta		Total (%)	Chi-square (P-value)
	No Abnormality (%)	Abnormal Placentation (%)		
Less than 29	20 (66.67%)	10 (33.33%)	30 (32.97%)	0.049
30-39	27 (55.10%)	22 (44.90%)	49 (53.85%)	
40 and above	3 (25.00%)	9 (75.00%)	12 (13.19%)	
Total	50 (54.95%)	41 (45.05%)	91 (100.00%)	

Table 4. Age Factor for Abnormal Placentation

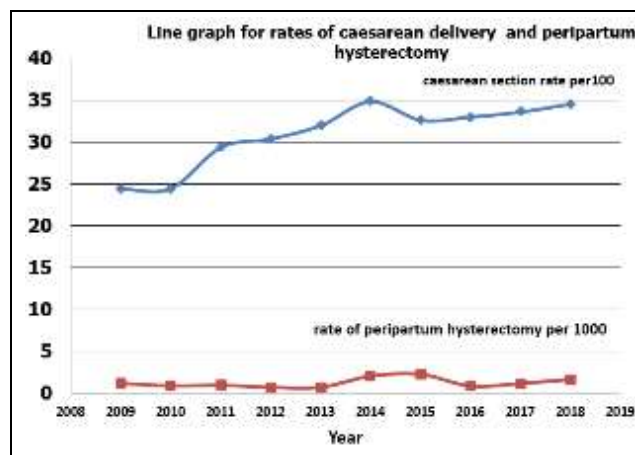


Figure 1. Showing Year Wise Increasing Trend of Caesarean Section Rate and also the Rate of Peripartum Hysterectomy



Figure 2. Gross Picture of Uterus Showing Abnormal Placentation in the Lower Uterine Segment with Adherence of Placental Tissue

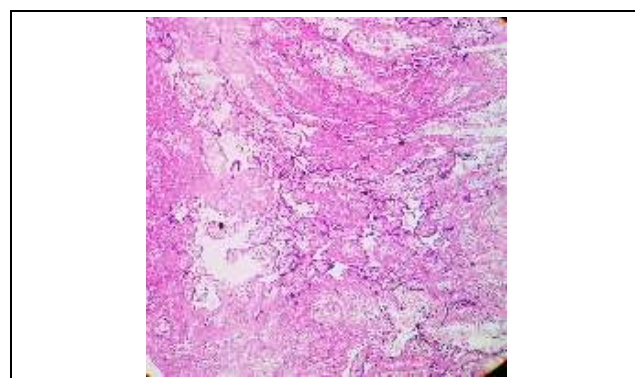


Figure 3. Section Showing Features of Placenta Increta (Chorionic Villi Infiltrating Myometrium). H & E X 10

Abnormal placentation in the lower uterine segment (Placenta praevia -37.50%) was the most common pathology in those who had previous caesarean delivery and uterine atony in those with vaginal delivery. The risk of abnormal placentation was 5.8 times higher in those cases with previous history of caesarean section than those cases with previous vaginal delivery. (OR 5.8, CI 95%, $p < 0.001$).

DISCUSSION

During the study period of ten years a total of 71,601 women delivered of which 49044 (68.49%) were delivered vaginally, 22557 (31.51%) by caesarean section. There were 91 peripartum hysterectomy with a rate of 1.27 per 1000 birth and rate per caesarean section of 4.03 per thousand birth. The rate of hysterectomy and caesarean delivery are higher than the similar study of Kashani E and Azarhous R with report of peripartum hysterectomy rate of 0.37 per 1000 delivery and rate per caesarean section of 1.2 per thousand.² The difference could be because only emergency hysterectomy within 24 hours only were included in their study, however present study included all peripartum hysterectomy up to 3 days after delivery. The commonest age groups is 30 -39 years for all the lesions together, however for placental abnormalities it is in older ones (40 years and above). Similar findings are reported in many studies.¹² However in a study of Balalau DO et al, 55% of the placental abnormalities were in the age group of 25-35 years.¹³ The percentage of caesarean delivery was found to be increased yearly from 24.42% in 2009 to 34.61% in 2008 and also the rate of hysterectomy almost proportionately with the rate of caesarean section. The caesarean delivery rate of 23.70% was lower than ours in a study of Cheng KKN and Lee MMH, however increasing trends in subsequent years is similar.⁴ Higher rates could be because of being a tertiary centre, complicated and difficult cases to manage at peripheral centres are referred here. Uterine atony (23.07%) is found to be most common indication for hysterectomy, followed by placenta praevia (18.68%). However abnormal placentation which includes placenta praevia and MAP is the most common with 45.05%. This is similar with the published reports of Kashani E and Azarhous R.² Twelve (70.58%) out of 17 cases of placenta praevia had previous caesarean delivery once in 5 and twice in 12. Most of the study reports previous caesarean delivery being one of the common causes for placenta praevia in multiparous women. Ananth C V et al, reported that women with at least one prior caesarean delivery were 2.6 times at great risk for development of placenta praevia in subsequent pregnancy which is in agreement our study with a comparative relative risk of 4.41.¹⁴ Out of 41 cases of abnormal placentation, there were 24 (58.54%) cases of MAP and 17 (41.46%) placenta praevia. The incidence of placenta praevia and MAP are 0.23 and 0.33 per 1000 birth respectively in the present study, is found to be much lower than report of wide range from 0.28% to 2%. The incidence of MAP in the study is also found to be lower than the finding of 1.06 per 1000

birth in the study of Kamara M et al.⁵ The cause of lower incidence in the study could be because of lesser number of cases and also confined to only hysterectomised cases. Out of 24 cases of MAP, 11 (45.83%) had previous caesarean delivery. The incidence rate of MAP in previous caesarean delivered women (34.37%) is higher than that of previously vaginally delivered women (22.03%). Our finding is similar with Kamara M et al and comparable with the reports of Bowman ZS et al.^{5,15} Previous caesarean section delivery is found to be a significant risk factor of abnormal placentation with 78.88% incidence over 28.12% in previously vaginally delivered cases. Previous caesarean delivery has got 5.8 times more risk of developing abnormal placentation in subsequent pregnancies than previous vaginally delivered. This finding is statistically significant. (OR 5.8, CI 95%, $p < 0.001$) The other risk factors include advancing maternal age and multiparity. Our findings are consistent with many reports including Wu S et al and Creanga AA et al.^{11,16}

Fourteen cases had previous caesarean delivery once and twice in 18, the incidence of abnormal placentation is 72.22% in twice caesarean and 71.43% in only once. Though the incidence is slightly higher in twice caesarean cases, however statistically not significant. (OR 1.04, CI 95%, $p = 0.96$). Our findings are differed from other similar studies of Bowman ZS et al (OR 34.9, $p < 0.001$) and of Thurn L et al which reported seven fold risk with additional number of caesarean delivery.^{15,17,18} The probable reason for the difference could be the lesser number of samples and also the study being confined only to histopathologically confirmed cases in hysterectomy specimens only. Studies^{19,20} have also found that gestational trophoblastic diseases could arise in previous caesarean scars but in the present study, no such case was encountered. The current study highlights that these placental aberrations threaten maternal life because of the risk of massive haemorrhage at the time of delivery. In many cases, a life-saving peripartum hysterectomy is the only option and henceforth loss of fertility and increased risk of postsurgical complications. So, prenatal screening and proper counselling regarding the choice of caesarean section and its consequences would improve the outcome of these abnormal and aberrant placentations.

CONCLUSIONS

Abnormal placentation which includes placenta praevia, placenta accreta, placenta increta and placenta percreta is one of the most important causes of intractable obstetric haemorrhage warranting a peripartum hysterectomy. The risk of development of placental abnormalities in subsequent pregnancies is 5.82 times more in those with previous caesarean delivery than previous vaginal delivery. The findings of the present study would be beneficial for clinician during counselling and management of women for whom caesarean section is an option.

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