CAESAREAN DELIVERY: INCREASES SUBSEQUENT RISK OF PLACENTA PRAEVIA

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ABSTRACT

This case control study was conducted in the Department of Obstetrics and Gynecology, Chittagong Medical College Hospital, in the period from April 07 to March 08. A total of 232 multiparous pregnant women were included in this study; among them 51 were cases (with placenta praevia) and 181 were similar matched control. Past mode of delivery were explored in both the groups and analyzed statistically.

Out of 232 subjects, prior caesarean delivery had 25.5% (n=13) in cases and 44.2% (n=80) in controls. After statistical analysis, caesarean section was considered as a risk factor for placenta praevia in subsequent pregnancy. The odds ratio = 0.43 (CI 0.22 – 0.86) and chi square test = 5.80 (df =1; p= 0.016).

***Key words**: Placenta praevia; caesarean section.*

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INTRODUCTION

The placenta praevia may be a serious life threatening obstetric complication by loosing a lot of blood. There is a risk of death for mother and/or her baby; yet an understanding of its etiology has remained illusive. Certain associations have been established by different studies, such as advanced maternal age, higher parity, higher gravidity, multiple pregnancy, smoking, abortions etc[1-5]. One major theory proposes that damage to the endometrium or/and myometrium may alter the implantation site of placenta[6]. However, the role of past caesarean delivery has been inconsistent in several studies[3,4,7-19]. In addition, this procedure of delivery has been rising world wide[4,20-23]. The varying and confusing opinions regarding the role of caesarean section and ongoing overuse of it have prompted the investigators to assess the risk of development of placenta praevia in subsequent pregnancy with past history of caesarean delivery.

MATERIALS AND METHODS

The study was a retrospective case control one, conducted in the Department of Obstetrics and Gynaecology, Chittagong Medical College and Hospital, during the period from April 2007 to March 2008.

The multiperous pregnant women who were admitted during last trimester were the study population. Those who had singleton pregnancy, between 20 and 35 years of age, with ≥ 32 weeks of gestation and gravidity ≤ 4 were included in this study. On the other hand, the study excluded primigravida, smoker, Rh –ve blood group, and who had Diabetes Mallitus, or past history of uterine injury (eg. hysterotomy, myomectomy, spontaneous or induced abortion, manual removal of placenta etc).

Those who had placenta praevia were placed in group-A as case (n=51). The controls were the matched women without praevia (n = 181), and were placed in group-B. Both the cases and controls were selected purposively after matching the selection criteria through a search of files of all admitted patients. Data were collected in case record form after getting the informed written consent of each potential candidate.

This study accepted per operative findings for the diagnosis of placenta praevia. Clinical evidences of placenta praevia such as antepartum haemorrhage or mal presentation or positive trans-abdominal sonography were crosschecked with per operative findings.

All the data were compiled and statistical analysis was done by SPSS version-12. The result <0.05% probability was accepted as significant**.**

RESULTS

A total of 13,135 delivery cases were admitted during the study period. Out of them, 668 cases had placenta praevia, i.e 5.08% of the total delivery cases. This case-control study was performed among 232 subjects.

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Regarding maternal age, no statistically significant difference was observed between group-A and group-B (27± 0.54 years vs. 27.1± 0.24 years). But significant higher parity (1.80 ± 0.10 vs. 1.51 ± 0.05) and lower gestational age (36.12 ± 0.35 vs. 38.99 ± 0.11 weeks) were observed in placenta praevia groups [table-I].

Table-I

Maternal Age, Parity and Gestational age in the study groups.

	Group-A Mean ± SD (n = 51)	Group – B Mean ± SD (n =181)	P – value
Age of mother	27.7 ± 0.54	27.1± 0.24	0.258
Range	(21 – 30)	(21 –30)	
Parity	1.80 ± 0.10	1.51 ± 0.05	0.005
Range	(1 – 3)	(1 – 3)	
Gestational age	36.12 ± 0.35	38.99 ± 0.11	0.001
Range	(32 – 40 weeks)	(34 – 42 weeks)	

On stratification of maternal age into three classes (21-25/ 26-30/31-35), no significant difference was observed in both the groups. But the prevalence of praevia was more marked among the age group of 26-30 years (56.9%) while 21-25 years fell in common group (27.5%) [Table-II].

Table – II

Maternal age in class distribution among study groups

	Group–A (n= 51)	Group B (n=181)	P –value
21 – 25 years	14 (27.5%)	65 (35.9%)	
26 – 30 years	29 (56.9%)	91 (50.3%)	P 0.258
31 – 35 years	08 (15.7%)	25 (13.8%)	

This study evaluated the past history of caesarean section as one of the risk factors for the development of placenta praevia in subsequent pregnancy/ies. The odds ratio OR 0.43 (CI 0.22 – 0.86) and the chi square test 5.80 (df – 1; p = 0.016) were statistically found significant [Table-III].

Table-III

Risk assessment of past caesarean section for the development of placenta praevia in subsequent pregnancy.

	Group-A	Group-B	Results
Exposed to past C/S	13 (25.5%)	80 (44.2%)	OR=0.43 CI (0.22 – 0.86)
Exposed to	38 (74.5%)	101 (55.8%)	χ^2=5.80 df=1; p=0.016

DISCUSSION

As the etiology of placenta praevia remains controversial, studies are still going on to establish the risk factors associated with it. Although advance maternal age[3,6,7,16-18,24-27] [table-B], higher gravidity and higher parity[3,4,7,15,24,28,29] [table-C] are established risk factors for placenta praevia, others are still inconsistent. One of such inconsistent risk factors is past caesarean section [table-A].

A reduced blood supply to the placental bed was observed as age advanced[6]. About 2.6 folds greater risk were noticed for women over 40 years of age than those in the age group of 25- 29 years; it was nearly 9 folds greater than < 25 years as reported by Ananth CV and associates[24].

Another study observed that there were more than twice the chance of development of praevia in >30 years as compared with those falling in the age group of 20 to 29 years [29]. Another study revealed that majority of cases of praevia were in the age group of 26 to 30 years of age[27], which was similar to present study (54.9%; n = 28). Others identified 35 years or more as an independent risk factor[3,11]; but another group of researchers mentioned that was 30 years or more [17]. Thus this study restricted the age within 21 to 35 years.

Parity acts as a potential modifier of uterine circulation and subsequent placental localization[3,6,7,11,13,29]. About 7 folds higher risk were noticed with >5 pregnancies and more prevalence of praevia were observed in >3 parity[3]. Similar opinion was given by couple of studies [17, 30]. Too many, too early and too frequent pregnancies are the norms of our society. For that reason our study restrict the sample to parity <4 and gravidity <5th.

Nearly 68% of sonographically diagnosed praevia cases were resolved by the gestational age of 29 weeks[31]. In order to reduce the false diagnosis this study restricted the gestational age at and beyond 32 weeks, when the chance of positional change of placenta was less than 10% [2].

The diagnostic accuracy of transabdominal sonography is about 75% with a high false positive rate of 23% [3]. Full bladder technique as was first described by Donald I et al in 1968 [32] is still being used conventionally. Most false positive results are due to over -distended bladder and/ or myometrial contraction. Myometrial contraction displaces the edge of placenta low down; whereas over-distended bladder approximates the anterior and posterior walls of uterus, giving a false impression of praevia [33]. That's why the present study diagnosed the praevia by direct observation during caesarean sections.

A scared uterus can predispose the development of placenta praevia in subsequent pregnancy/ies. This is possibly due to lack of resolution of low laying placenta at third trimester[24] or due to implantation of placenta in the area of uterine scar[11].

One study revealed higher incidence of praevia in scared uterus in comparison to unscarred uterus (1.31% vs. 0.75%; RR 1.64). They further opined that the risk increased with the increasing number of prior caesarean section (RR1.53 for 1, 2.63 for 2 or more)[10]. Another study also reported previous caesarean section as an independent risk factor and the intensity of risk was directly related with the number of previous sections (without section 0.3%, with 1 section 0.8%, with 2 2% and 3 or more sections 4.2%)[11].

A strong association was noticed between past caesarean section and present praevia in a large meta analysis. The authors of that study also reported that the risk had increased with increased number of sections (OR 4.5 for one; 7.4 for two; 6.5 for three; 44.9 for 4 or more caesarean sections)[4]. Some other studies could not find any relation between past caesarean section and present praevia[16,17-19].

Past caesarean section cases were likely to have praevia than those without. However the joint effects of parity and caesarean section on the development of praevia were greater than either variable alone[15]. The past caesarean section cases had a two-fold greater risk of development of praevia. A significant higher risk was observed with two or more sections, but no significant difference at the level of one section[3].

The present study found a significant association between past caesarean section and subsequent praevia (chi square 5.799; df-1; p<0.05%). On measuring the strength of association calculated odds ratio was also found statistically significant (OR 0.43;CI 0.22 – 0.865) [table –C].

Table-A

Risk assessment of past caesarean delivery in the development of placenta praevia in subsequent pregnancy/ies.

Series of studies	Type of studies	Comments
Rose et al [6]	Case control	Significant association was found between past c/s and subsequent praevia.
Laughon et al [7]	,,	
Aziz et al [8]	,,	
Khouri et al [9]	,,	
To www et al [10]	Case control	Significantly higher risk was noticed with past c/s and subsequent praevia;
Ananth et al [4]	Meta-analysis	the risk was increased proportionately with higher number of c/s.
Miller et al [11]	Case control	
Hendrick et al [12]	Case control	
Tuzovic et al [3]	Case control	Significant risk of praevia was found with 2 or more past c/s. But at the level of one it was insignificant.
Getahum et al [13]	Cohort study	Significantly higher risk of praevia was found with first two or more c/s cases than with 2 or more vaginal delivery cases.
Hershkowitz et al [14]	Case control	Significant risk with past c/s cases; but the risk did not increase with the number of c/s.
Gillium and associates [15]	Case control	One c/s didn't increase the risk of praevia. The risk increased with more than 1 c/s and that was thought to be the mixed effects of c/s and parity.
Ogueh et al [16]	Case control	Significantly higher risk of praevia was not noted with past history of c/s.
Hossain et al[17]	Case control	
Ciemniski et al[18]	Case control	
Tuzovic et al[19]	Case control	

c/s caesarean section.

Table- B

Maternal age in series of studies of placenta praevia.

Series of studies	Results	Comments
Laughon et al [7]	Mean ±SD [years] *31.6±6.7 vs. 28.7 ±6.5	Praevia cases were significantly older than Controls.
Ogueh et al [16]	Mean ±SD [years] *31.3 ± 4.8 vs. 30.7 ± 5	
Tuzovic et al [3]	>30 yrs [*62.9% vs.38.9%] <30 yrs [*37.1% vs. 61.1%]	
Rose et al [6]	Mean age *31.3 vs. 31.1yrs	
Ananth et al [24]	*≥ 40 yrs [1.39%] *≤ 35 –40yrs[0.61%]	Higher incidence of praevia was noted among older age group.
Hossain et al[17]	***>**40 yrs [1st] *31 –40 yrs [2nd]	
Willium et al [25]	*≥ 30 yrs had >twice risk than ≤29 yrs of age.	Praevia was noted among
Ciemniski et al[18]	***>** 35 yrs - 0.8% *<25yrs – 0.7%	older age group.
Zhang et al[26]	*≥ 34 yrs risk was 2-3 times.	
Calder R[27]	*26-30 yrs[1st] *31-35 yrs [2nd]	Praevia cases were noted among younger age group.

Table – C

Effects of number of pregnancy /ies and delivery/ies on placenta praevia

Series of studies	Gravidity/parity	Results	Comments
Laughon et al[7]	Parity	*1.48 vs. 0.99	Praevia cases had significantly higher parity.
Bhide R et al[28]	Multigravida: primi gravida	12:1	Prevalence of praevia higher among multigravida.
Tuzovic et al[3]	Gravidity….Parity……	[4th] *15.3% vs.6.8% [≥3] *16.3%vs.6.7%	Prevalence of praevia higher among multigravidas and multiparous.
Ananth et al[4]	Gravidity…… [In number]	[2nd] *2.7% [3rd] *3.5% [4th] *4.3% [5th] *5.8%	Increasing prevalence of praevia was noted with increasing gravidity.
Ananth et al[24]	Parity……. [In number]	[1] *0.45% [2] *0.58% [≥3] *0.73%	More than 3 parities had 2.6 folds higher risk of praevia than nuliparity.
Ogueh et al[16]	Parity……	Median (rang) * 1(0- 11) vs. 1(0-12)	Cases of praevia and controls were similar in terms of parity.
To www et al[10]	Parity…….	Mean (±SD) *1.5(± 0.79) vs. 0.89(± 1.09)	Insignificant difference in terms of parity among cases and controls.
Gillium and associates[15]	Parity…… [In number]	[1] *39.56%vs. 53.9% [2] *31.96%vs. 29.16% [3] *15.19% vs. 11.17% [≥ 4] *13.29 vs. 6.78%	Increasing incidence of praevia in higher parity.

* Placenta praevia cases.

The result of present study is consistent with the hypothesis that caesarean section increases subsequent risk of development of placenta praevia. So the patient can be counseled in terms of risk profile when she demands it and also the patient who has past caesarean delivery deserves appropriate medical attention for the same reason.

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