

Original Article

PLACENTA ACCRETA: IS PRIMARY ELECTIVE CAESAREAN SECTION A PREDISPOSING RISK FACTOR?

Saima Chaudhary¹, Shamsa Humayun², Sarwat Ahsan³, Nomia Ashraf⁴

Abstract:

Background: Placenta accrete spectrum is a fatal obstetrical condition associated with serious fetomaternal morbidity and mortality. It is associated with a variety of risk factors including primary elective caesarean section. The objective of this study is to determine the association of placenta accreta spectrum with primary elective caesarean section.

Materials & Methods: This case-control study was conducted over two years (June 2022 to May 2024) at Sir Ganga Ram Hospital, Lahore, including 100 pregnant women with placenta previa. Demographic and obstetric details were noted in all patients and their caesarean section and postoperative management were done as per hospital policy. Intraoperatively type of placenta previa and type of placenta accreta spectrum was noted. Based on intraoperative findings 50 women with placenta previa, adherent placenta, and one or more previous caesarean sections were enrolled in Group A (cases), while 50 women with placenta previa and previous caesarean sections were enrolled in Group B (controls). Maternal outcomes along with demographic and obstetric details were noted in preformed proforma and analyzed using SPSS. Results were considered statistically significant with a p-value less than 0.05.

Results: The number of elective primary lower segment caesarean section (LSCS) were higher in Group A (cases) 37 (74%) than 27 (54%) in Group B (controls) (P value= 0.037). Amongst women with placenta accreta spectrum in Group A (cases), the present study found placenta accreta in 64%, placenta increta in 22%, and placenta percreta in 14% of women.

Conclusion: Elective primary caesarean section is associated with a higher risk of placenta accreta spectrum.

Keywords: Placenta Accreta, Primary, Elective, Caesarean Section, Risk Factor.

doi: <https://doi.org/10.51127/JAMDCV06I03OA04>

How to site this:

Chaudhry S, Humayun S, Ahsan S, Ashraf N. Placenta Accreta: Is Primary Elective Caesarean Section a Predisposing Risk Factor? JAMDC, 2024; 6(3): 107-113

doi: <https://doi.org/10.51127/JAMDCV06I03OA04>

INTRODUCTION

Placenta accreta spectrum (PAS), a serious and potentially fatal complication of pregnancy, is marked by the abnormal attachment of the placenta to the uterine wall, resulting from the

absence or insufficiency of Nitabuch's layer in the decidua.^{1,2} Placenta accreta spectrum is categorized into three types: placenta accreta, where the placental tissue attaches to the decidual layer of the myometrium; placenta increta, where the placental villi infiltrate deeper into the myometrium; and placenta percreta, where the chorionic villi extend through the uterine serosa and may invade nearby structures, such as the bladder or broad ligament.³ This can cause considerable maternal morbidity including severe

^{1,4}Assoc. Prof. Gynae, FJMU

² Prof. Academic advisor CPSP, Former VC of FJMU, Lahore

³Asst. Prof. Gynae, FJMU

Date of Submission: 23-07-2024

Date of 1st Review: 07-08-2024

Date of 2nd Review 15-08-2024

Date of Acceptance: 30-08-2024

peripartum haemorrhage, renal failure, disseminated intravascular coagulation (DIC), adult respiratory distress syndrome (ARDS), massive blood transfusion, hysterectomy, intensive care unit (ICU) care, bladder damage and even maternal death.^{4, 5, 6, 7}

In the last 50 years, the incidence of PAS has increased 10-fold. Recently the frequency of PAS has been reported to be between 1:2500 and 1:540. It is currently the most commonly reported indication of peripartum hysterectomy. The incidence is mainly rising due to the increasing rate of caesarean delivery.^{3,7} The other important predisposing factors for this serious complication include advanced maternal age, increasing parity, smoking, vigorous curettage leading to Asherman syndrome, submucous fibroid, and myomectomy.^{3,8} M. Kamara et al. revealed that elective primary cesarean section influences the risk of placenta accreta. Their findings indicated that women who had a primary elective cesarean section were three times more likely to experience placenta accreta in the next pregnancy complicated by placenta previa, compared to those who had primary emergency caesarean section.⁷

Risk factors like advanced maternal age, increasing parity, and several caesarean sections, etc. have been proven to have an association with the placenta accreta spectrum in the literature but limited evidence is present to examine the association of the nature of caesarean section with placenta accreta. The objective of the present study was to determine the association of PAS with primary elective caesarean section. This study may identify yet another preventable risk factor for placenta accreta. The current study was based on the hypothesis that primary elective caesarean section increases the risk of placenta accreta spectrum in patients with placenta previa.

MATERIALS AND METHODS

It was a case-control study, conducted and completed in 2 years period (June 2022 to May

2024) in Labor room of Gynae Unit 1, Sir Ganga Ram Hospital Lahore, after obtaining permission from the institutional ethical review board (IRB # 67/CIERB). Hundred women with placenta previa, 20-35-year-old, para 1 or more, in their 2nd or 3rd trimester, and history of 1 or more caesarean sections presenting in the emergency labor room for caesarean section, were enrolled in the study after informed consent using a purposive convenient sampling technique. They were interviewed to gather demographic details on a proforma. Their caesarean section and postoperative management were done as per hospital protocol. Intraoperatively type of placenta previa and type of placenta accreta spectrum was noted. Based on intraoperative findings, 50 pregnant women with placenta previa, a history of 1 or more caesarean sections and adherent placenta were enrolled in Group A (cases). Similarly, 50 pregnant women with placenta previa and a history of 1 or more caesarean section were enrolled in Group B (controls). Morbidity including caesarean hysterectomy, B Lynch suture application, and mortality were also noted. All data was recorded in a preformed proforma.

Women with placenta previa without any caesarean section, primigravida, placenta accreta without placenta previa and women unaware of the nature of their primary caesarean sections were not included in the study.

A number of previous caesarean sections was kept equal in both groups to address this confounding factor. Confidentiality and anonymity were ensured.

The data analysis was done by using SPSS (Statistical Package for Social Sciences) version 26. Mean $\pm$ SD and range were given for quantitative variables i.e. age and gestational age, while, frequency and percentages were given for qualitative variables like parity, number of abortions, number of previous caesarean sections, vaginal deliveries before primary caesarean section,

nature of primary caesarean section, etc. Chi square test at 5% level of significance was used to assess the association for qualitative data. A p-value <0.05 was considered as statistically significant.

RESULTS

The study included an overall hundred patients with placenta previa, 50 in each group (Group A and Group B). The age of Group A (cases) ranged from 23- 40 (mean± SD: 30.29 ±1.13 years), while that of Group B (controls) ranged from 22-37 (mean± SD: 28.18 ±1.28 years). The mean± SD gestational age was 33.97 ±0.23 weeks in Group A (cases) compared to 35.84 ±0.25 weeks in Group B (controls). In Group A (cases) 37 patients were para 2–4, while 13 were para 5 or more, which was similar to Group B (controls) (p value 0.475). Both

groups had similar parity, number of abortions, and number of lower segment Caesarean section (LSCS). The two groups differed in the number of abortions and previous cesarean sections. (Table 1).

Our main outcome parameter was the number of elective primary LSCS in women with placenta accreta spectrum (Group A) compared to women with placenta previa (group B). It was observed that the majority (74%) of patients with placenta accreta spectrum (Group A) had pre-labor elective primary caesarean section, while in women with placenta previa (group B) number of elective primary LSCS was 54%, which was significantly lesser than group A (p value= 0.037) (Table 1).

Number of vaginal deliveries before primary caesarean section was not significantly different between groups (p value=0.65).

Table 1: Comparison of Demographic and Pregnancy Characteristics Between Placenta Accreta group A and B

Maternal age (Years)			
	Group A (Cases) (n=50)	Group B (Controls) (n=50)	P value
Mean age (Years)	30.29 ±1.13	28.18 ±1.28	0.001
Minimum age	23	22	
Maximum Age	40	37	
Gestational age (Weeks)			
	Group A (Cases)	Control (n=50)	p-value
Mean age (weeks)	33.97 ±0.23	35.84 ±0.25	0.001
Minimum age	24	24	
Maximum Age	40	39	
Parity			
	Group A (Cases) (n=50)	Group B (Controls) (n=50)	p-value
P (2 - 4)	37 (74%)	40 (80%)	0.475
P >5	13 (26%)	10 (20%)	
No. of Abortions			
	Group A (Cases)	Group B (Controls)	p-value
0	37 (74%)	34 (68%)	0.4825
1	8 (16%)	13 (26%)	
2	4 (8%)	3(6%)	
6	1 (2%)	0	
Number of Previous LSCS			
	Group A (Cases)	Group B (Controls)	p-value
1	12 (24%)	10 (20%)	0.934
2	26 (52%)	29 (58%)	
3	10 (20%)	10 (20%)	
4	2(4%)	1(2%)	

Nature of primary LSCS			
	Group A (Cases)	Group B (Controls)	p-value
Elective	37 (74%)	27 (54%)	0.037
Emergency	13 (26%)	23 (46%)	
Normal Delivery before primary LSCS			
	Group A (Cases)	Group B (Controls)	p-value
Yes	15(30%)	13(26%)	0.65
No	35 (70%)	37 (74%)	

It was observed that majority of patients had major degree placenta previa in both groups. Significantly higher number of patients with placenta accreta spectrum in group A ended up in hysterectomy as compared to patients with placenta previa group B (p-value = 0.000) (Table 2). Only one mortality was observed in study population, which was a woman with placenta accreta spectrum in group A.

Table 2: Maternal outcome

Type of Placenta			
	Group A (Cases) (n=50)	Group B (Controls) (n=50)	p- value
Minor ant	3 (6%)	3 (6%)	0.0068
Minor Post	0 (0%)	9 (18%)	
Major	47 (94%)	38 (76%)	
Hysterectomy			
	Group A (Cases) (n=50)	Group B (Controls) (n=50)	p- value
Yes	35 (70%)	5 (10%)	0.00
No	15 (30%)	45 (90%)	
B lynch			
	Group A (Cases) (n=50)	Group B (Controls) (n=50)	p- value
Yes	6 (12%)	7 (14%)	0.766
No	44 (88%)	43 (86%)	
Maternal Mortality			
	Group A (Cases) (n=50)	Group B (Controls) (n=50)	p- value
Yes	1 (2%)	0 (0%)	0.31
No	60 (98%)	50 (100%)	

Intraoperatively, it was noted that 64% of women with placenta accreta spectrum had

placenta accreta, while placenta increta and placenta percreta were noted in 22% and 7% respectively. (Table 3)

Table 3: Types of Placenta accreta spectrum among Group A (women with placenta accreta spectrum)

		(n=50)	Percentage
Abnormal Placentation	Accreta	32	64%
	Increta	11	22%
	Percreta	7	14%

DISCUSSION

The rising rate of caesarean section is paralleled by an increase in placenta accrete.⁹ This study highlights the role of primary elective caesarean section in contributing to placenta accreta spectrum. The uterine myometrium heals through the deposition of collagen and fibrin, instead of regenerating muscle cells. Scar tissue often shows edema, inflammation, and myofiber disarray, with apoptosis reducing myometrial volume and density. Scarring leads to permanent changes in vascularization and myometrium. In patients with repeated lower-segment caesarean sections (LSCS), there is a lower uterine segment composed mainly of fibrotic scar tissue and fewer myofibers, making it more prone to disruption of myometrium at the surgical site.¹⁰ The literature suggests that the mechanism behind placenta accreta in elective primary caesarean sections may be due to differences in incision level, size, and healing compared to emergency caesareans. In an elective caesarean, the quiescent uterus has a thicker myometrium, resulting in a higher and thicker lower uterine segment. This makes the incision, suturing, and hemostasis more difficult and traumatic.

Additionally, uterine contractions during labor may help shorten the wound, reduce endometrial damage, and facilitate healing. Another hypothesis suggests that the immunologically active environment in the laboring uterus promotes healing, and the absence of this activation in an elective caesarean might lead to abnormal placentation in future pregnancies.¹¹

In the present study women in Group A were older than Group B. Kamara et al and Qureshi et al reported no difference in maternal age between the two groups while, Shi XM et al reported women with placenta accreta spectrum to be younger.^{7,11,12} In current study, mean gestational age was lesser in Group A than Group B, which is comparable to other studies.^{11,12,13,14} Parity and number of abortions were comparable in both groups in current study. In current study, the number of previous caesarean sections are kept equal in both groups to remove the bias in the result as number of previous LSCS is itself a strong risk factor for placenta accreta spectrum. The current study observed a higher rate of elective primary caesarean sections in the women with placenta accrete spectrum (Group A) compared to women with placenta previa (Group B) (p-value = 0.037), consistent with findings from Shi XM et al, who also reported a greater frequency of elective primary caesarean section in women with PAS in comparison to women with placenta previa (Group B) (90.1% vs. 69.9%, $p < 0.001$).¹¹ This finding has also been reported by other researchers, who demonstrated a positive association between elective primary caesarean section and placenta accreta spectrum. Normal vaginal delivery before primary LSCS was not associated with placenta accreta in present study, which is consistent with the results of others.¹² Hu et al found patients having a primary elective section to be 2.11 times, more likely to have placenta previa (95% CI: 1.52–2.94), 2.11 times more likely to have placenta accreta (95% CI: 1.47–3.04), similar to our findings.¹⁴ Downes et al. reported 2 folds increased risk of placenta previa in patients with

Placenta accreta: is primary elective caesarean section a predisposing risk factor?

pre-labour cesarean section.¹⁵ This underscores the importance of labor about caesarean section and its role in the potential development of future placenta previa and subsequently placenta accreta. It also emphasizes that clinical decisions regarding primary caesarean section should be done very cautiously and strictly on medical grounds.¹⁶

The present study found placenta accreta (64%) to be the most common form of PAS in patients with placenta accrete spectrum followed by increta (22%) and percreta (14%). Kamara et al demonstrated a similar trend of placenta accreta spectrum in his study but Shi XM reported placenta increta to be most common type of placenta accreta spectrum followed by accreta and percreta.^{7,11} Another researcher has documented placenta accrete in 70.9%, placenta increta in 15.2% and placenta percreta in 10.8%, which are almost similar to our findings.^{5,6}

CONCLUSION

Elective primary caesarean section is associated with a higher risk of placenta accreta spectrum in later pregnancies with placenta previa.

Thus, obstetricians should decide on elective primary caesarean section very thoughtfully, only in women at unacceptable risk of complications due to vaginal delivery or an emergency caesarean. Additionally, one should anticipate the risk of placenta accreta spectrum when managing women with placenta previa with primary elective caesarean section.

CONFLICT OF INTEREST

None

SOURCE OF FUNDING

None

DISCLOSURE

All authors declare there was no financial facilitation by any pharmaceutical company or any other commercial institution.

AUTHOR'S CONTRIBUTION

SC: Conceptualization, study design, proforma design, Manuscript draft writing, review & editing

SH: Manuscript draft review & editing

SA: Data collection & confirmation

NA: data analysis& interpretation

REFERENCES

1. Jauniaux E, Jurkovic D. Placenta accreta: pathogenesis of a 20th-century iatrogenic uterine disease. *Placenta*. 2012 Apr;33(4):244-51. <https://doi.org/10.1016/j.placenta.2011.11.010>
2. Cahill AG, Beigi R, Heine P, Silver RM, Wax JR. Obstetric care consensus No. 7: placenta accreta spectrum. *Obstet Gynecol*. 2018 Dec;132(6):e259-75. <https://doi.org/10.1097/AOG.0000000000002983>
3. Goh W, Zalud I. Placenta accreta: a review of the etiology, diagnosis, and management. *Donald Sch J Ultrasound Obstet Gynecol*. 2016;10:352-63.
4. American College of Obstetricians and Gynecologists. Placenta accreta. ACOG Committee opinion no. 529. *Obstet Gynecol*. 2012;120:207-11.
5. Fan D, Li S, Wu S, Wang W, Ye S, Xia Q, et al. Prevalence of abnormally invasive placenta among deliveries in mainland China: a PRISMA-compliant systematic review and meta-analysis. *Medicine (Baltimore)*. 2017 Apr;96(16):e6636. <https://doi.org/10.1097/MD.0000000000000663>
6. Farquhar CM, Li Z, Lensen S, McLintock C, Pollock W, Peek MJ, et al. Incidence, risk factors, and perinatal outcomes for placenta accreta in Australia and New Zealand: a case-control study. *BMJ Open*. 2017 Oct;7(10):e017713. <https://doi.org/10.1136/bmjopen-2017-017713>
7. Kamara M, Henderson JJ, Doherty DA, Dickinson JE, Pennell CE. The risk of placenta accreta following primary elective cesarean delivery: a case-control study. *BJOG*. 2013 Jun;120(7):879-86. <https://doi.org/10.1111/1471-0528.12148>
8. Bartels HC, Walsh JM, Ní Mhuirheartaigh R. National clinical practice guideline: diagnosis and management of placenta accreta spectrum. NWIHP and IOG. 2022. Available at: <https://www.hse.ie>
9. Kong X, Kong Y, Yan J, Hu JJ, Wang FF, Zhang L. On opportunity for emergency cesarean hysterectomy and pregnancy outcomes of patients with placenta accreta. *Medicine (Baltimore)*. 2017 Sep;96(39):e7930. <https://doi.org/10.1097/MD.0000000000000793>
10. Jauniaux E, Bhide A, Burton GJ. Pathophysiology of accreta. In: *Placenta accreta syndrome*. Elsevier; 2017. p. 13-28.
11. Shi XM, Wang Y, Zhang Y, Wei Y, Chen L, Zhao YY. Effect of primary elective cesarean delivery on placenta accreta: a case-control study. *Chin Med J (Engl)*. 2018 Mar 20;131(6):672-6.
12. Qureshi AI, Anwar Z, Razzaq M, Taj N. The risk of placenta accreta following primary elective cesarean delivery. *Biol Clin Sci Res J*. 2023;2023:259. <https://doi.org/10.54112/bcsrj.v2023i1.259>
13. Jauniaux E, Fox KA, Einerson B, Hussein AM, Hecht JL, Silver RM. Perinatal assessment of complex cesarean delivery: beyond placenta accreta spectrum. *Am J Obstet Gynecol*. 2023 Aug;229(2):129-39. <https://doi.org/10.1016/j.ajog.2023.02.021>
14. Hu HT, Xu JJ, Lin J, Li C, Wu YT, Sheng JZ, et al. Association between first cesarean delivery and adverse outcomes in subsequent pregnancy: a retrospective cohort study. *BMC Pregnancy Childbirth*. 2018

- Jun;18(1):273.
<https://doi.org/10.1186/s12884-018-1895-x>
15. Downes KL, Hinkle SN, Sjaarda LA, Albert PS, Grantz KL. Previous prelabor or intrapartum cesarean delivery and risk of placenta previa. *Am J Obstet Gynecol*. 2015 May;212(5):669.e1-8.
<https://doi.org/10.1016/j.ajog.2015.01.004>
16. DynaMed. Placenta accreta. EBSCO Information Services. Accessed 25 Nov 2024.