

# The impact of previous cesarean section on the outcome in patients with non-adherent placenta previa

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## Research Article

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# Abstract

**Background:** to evaluate the impact of lower segment cesarean section (LSCS) on the maternal and fetal outcomes of women with non-adherent placenta previa (PP).

**Methods:** This is a retrospective study of all women who delivered at our hospital by LSCS with non-adherent PP over a period of 10 years. Data were obtained through hospital registry and medical records search. Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 20). The differences in demographic and obstetric characteristics, peripartum complications, and fetal outcomes between women with no previous CS and those with previous CS were analyzed using t test or chi-square test wherever appropriate. A p-value of less than 0.05 was considered statistically significant.

**Results** A total of 90 women with non-adherent placenta were included, 54 women with no previous CS and 36 women with previous CS. Women with previous CS were significantly more likely to experience organ injury ( $p$ -value  $<0.005$ ), transfusion of  $\geq 4$  units of PRBC ( $p$ -value = 0.034), transfusion of FFP ( $p$ -value = 0.034), and hysterectomy or other procedure ( B Lynch, Uterine artery ligation) use ( $p$ -value  $<0.005$ )

**Conclusion:** There is a significant increase in the incidence of maternal morbidities such as hysterectomy, blood transfusion and organ injury in patients with non-adherent PP with previous CS, with no difference in perinatal outcome in the same group of patients.

## Background

Although the etiology of placenta previa (PP) remains unclear, many studies showed that the incidence of PP has been rising in parallel with the increasing rate of cesarean delivery.(1-6) The rate of primary and overall cesarean section (CS) has been steadily and significantly rising for the last decades in all developed countries with worldwide variation; In the USA, the rate increased from 21.5% in 1996 to 32.9% in 2006 .(7) This increase has been attributed to multiple factors, including increased maternal request and obstetrician's preferences for CS.(8, 9) In addition to its associated risk of short term maternal morbidities like wound infections, postpartum hemorrhage, and endomyometritis, (10-12) CS is associated with PP in future pregnancies.

PP is a major obstetric emergency associated with increase in the risk of maternal and perinatal morbidity and mortality, because of massive hemorrhage, risk from emergency delivery, hysterectomy and the serious risk from massive blood transfusion(13, 14).Furthermore, there is increased risk of morbidly adherent placenta previa (MAPP) accreta, increta and percreta, a life-threatening condition often associated with significant maternal morbidity and mortality. While the serious maternal risk related to the morbidly adherent placenta previa is well established (14-16), few studies have explored the outcome of non-adherent placenta previa in women with previous one or more lower transverse cesarean section (LTCS).

This study was conducted to determine the impact of previous cesarean section on the maternal and fetal outcomes among women with non-adherent PP.

## Material And Methods

A retrospective study was conducted over 10 years from (January 2007- December 2017) to evaluate the impact of previous cesarean section on the outcome in patients with non-adherent PP in a tertiary care hospital in the North of Jordan: King Abdullah University Hospital (KAUH). This study was approved by the institutional review board in the Jordan University of Science and Technology, no consent form was required. KAUH is a tertiary referral hospital serving wide geographical area in the North of Jordan with a current delivery rate of 3000 per year. Ultrasonography for diagnosis of PP is basically performed by properly trained obstetric consultants. Doppler studies are used in suspected MAPP. The hospital has 24 hours blood transfusion services available with surgical and medical teams available on request. Delivery is usually performed by specialists or trained senior residents staff member. Hospital registry was searched for all women delivered during the study period because of PP by CS or cesarean hysterectomy (both elective and emergency). The demographic and obstetric characteristics were collected from their medical records, also the antenatal course of the pregnancy. Patients with MAPP were excluded from the study. Operative notes were reviewed to confirm placental site clearly. Any intraoperative complications like organ injury, blood transfusion, hysterectomy or other interventions such as uterine artery ligation B-Lynch were recorded. Transfer to ICU and post-operative hospital stay were also recorded. The perinatal outcome included all the following: GA at delivery, Apgar scores, NICU admissions, birth weight and the need for Surfactant.

Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 20). The differences in demographic and obstetric characteristics, peripartum complications, and fetal outcomes between women with no previous CS and those with previous CS were analyzed using t test or chi-square test wherever appropriate. A p-value of less than 0.05 was considered statistically significant.

## Results

This study included a total of 119 women with PP. Of those women, 29 were excluded because they had morbidly adherent PP. Ninety women with non-adherent placenta were included, 54 women with no previous CS and 36 women with previous CS (15 were with previous one CS, 12 with previous two CS and 9 with previous  $\geq$  three CS). The highest number of previous CS in the study group was 6. Women with previous CS were significantly older, had higher number of deliveries, and were more likely to have previous miscarriages and evacuations compared to women with no previous CS (Table 1). Anterior and central placental locations were more common in women with previous CS. The two groups of women did not differ significantly in other characteristics including bleeding during pregnancy, the indications for delivery, and gestational age at delivery.

Table 2 shows the peripartum complications among women with no previous CS and those with previous CS. Women with previous CS were significantly more likely to experience organ injury, transfusion of  $\geq 4$  units of packed red blood cells (PRBC), transfusion of fresh frozen plasma (FFP), and hysterectomy. Both groups had similar rates of ICU admissions and postoperative hospital stay.

Table 3 shows the differences in perinatal outcomes between the two groups. Both groups of women did not differ significantly in gestational age at delivery. The means of Apgar score and birth weight were similar in both groups. The rate of admission to NICU was almost similar in both groups.

## Discussion

PP complicated 0.4% of all deliveries, with significant increasing trend in its incidence in the past two decades, which is mainly due to an increasing rate of cesarean sections (CSR) worldwide.(2, 13, 16) International concerns over such increases have prompted the World Health Organization to suggest that CSR should not exceed 15%; (17) additionally, there are well-documented adverse health outcomes associated with cesarean birth, both for the woman and her infant.(11, 12, 18) In addition, the rate of MAPP has increased as a result of more previous caesarean sections with its major maternal and perinatal complications which are well documented by many studies.(14, 15, 19, 20) Those studies concentrated on the relationship between previous CS and MAPP but unfortunately to our knowledge, no studies focused only on the impact of cesarean section on PP that is not adherent.

Our study demonstrated that maternal morbidity was higher in the group of women with prior LTCS, they were more likely to experience intraoperative organ injury, transfusion of  $\geq 4$  units of PRBC, transfusion of FFP, and hysterectomy. These findings are comparable to the results of some studies which were conducted only on women with previous CS but without PP. Studies demonstrated that complications were progressively increased by each additional CS, which is not reported in our study.(14, 16, 21)

Ayaz et al., in their study of women with previous CS and PP,(22) demonstrated increased risk of blood transfusion, coagulopathy and prolonged length of hospital stay, but unlike our study they didn't demonstrate higher risk of hysterectomy or organ injury in those patients with PP and previous CS. In addition, they showed higher risk of coagulopathy and one maternal death which were not found in our study. That study, was carried out only on multiparous women and had relatively smaller sample. Both studies did not show any significant difference in the perinatal outcomes between the two groups, both groups of women did not differ significantly in gestational age at delivery. The means of Apgar score and birth weight were similar in both groups, also the rate of admission to NICU.

However, one has to be cautious in the interpretation of the study findings because of possible confounding effects due to age and parity that were significantly different between the two groups. We were unable to conduct multivariate and regression analysis because of the small number of some peripartum complications in the two groups. Future studies with larger sample size are necessary to confirm the study findings.

## Conclusion

The study demonstrated a significant increase in the incidence of maternal morbidities such as hysterectomy, blood transfusion and organ injury in those patients with non-adherent PP with previous CS, on the other hand there is no difference in perinatal outcome in the same group of patients. So proper counseling of those patients for possible complications and planning of delivery in properly equipped centers ready to handle these urgent situations is recommended.

## Abbreviations

CS: Cesarean section

LSCS: lower segment cesarean section

MAPP: Morbidly adherent placenta previa

PP: Placenta previa

## Declarations

- **Ethics approval and consent to participate**

The study method and protocol were approved by the Institutional Review Board (IRB) of the University Hospital/ Jordan University of Science and Technology

- **Consent for publication**

Not applicable

- **Availability of data and material**

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

- **Competing interests**

The authors declare that they have no competing interests.

- **Funding**

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- **Authors' contributions**

1. **Amer Sindiani:** Design, concept, data collection and analysis, and manuscript writing

2. **Nail Obeidat:** Data Analysis and manuscript writing
3. **Omar Abu-Azzam:** Data collection and analysis
4. **Heba Hijazi:** Manuscript writing and analysis

**All authors read and approved the final manuscript**

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## Tables

Table 1. The demographic and obstetric characteristics of women with no previous CS and those with previous CS.

	No C/S (N = 54)		Previous C/S (N = 36)		p-value
<b>Maternal characteristics</b>	n	%	n	%	
Age, mean (SD)	31.0 (4.8)		33.1 (4.9)		0.042
Parity, mean (SD)	2.0 (1.7)		3.1 (1.6)		0.003
Previous miscarriage	12	22.2%	16	44.4%	0.025
Previous evacuation	8	14.8%	13	36.1%	0.026
Bleeding during pregnancy	28	51.9%	13	36.1%	0.142
Indication for delivery					0.078
Timed	27	50.0%	27	75.0%	
Labour	11	20.4%	2	5.6%	
Bleeding	15	27.8%	7	19.4%	
Others	1	1.9%	0	0.0%	
Placental location					0.003
Anterior + central	20	37.0%	25	69.4%	
Posterior	34	63.0%	11	30.6%	
Gestational age at delivery, mean(SD)	36.6 (1.8)		36.6 (1.8)		0.953

CS: cesarean section, p value of < 0.05 is significant

Table 2. Peripartum complications among women with no previous CS and those with previous CS.

	No C/S (N = 54)		Previous C/S (N = 36)		p-value
	n	%	n	%	
<b>Peripartum complications</b>					
Organ Injury	0	0.0%	2	5.6%	<0.005
Blood transfusion					
PRBC	27	50.0%	23	63.9%	0.194
FFP	2	3.7%	6	16.7%	0.034
≥ 4units PRBC	2	3.7%	6	16.7%	0.034
Hysterectomy	0	0.0%	4	11.1%	<0.005
Other procedure( B Lynch, Uterine artery ligation, Bakri balloon)	2	3.7%	3	8.3%	<0.005
ICU admission	1	1.9%	2	5.6%	0.446
Postoperative hospital stay					0.079
≤4	47	87.0%	16	72.2%	
>4days	7	13%	10	27.8%	

CS: cesarean section, PRBC: packed red blood cells, FFP: fresh frozen plasma, ICU: intensive care unit, *p* value of < 0.05 is significant.

Table 3: Perinatal complications among women with no previous CS and those with previous CS

Fetal outcomes	No C/S (N = 54)		Previous C/S (N = 36)		p-value
	n	%	n	%	
Age at delivery in weeks					0.197
<34	3	5.9%	1	3.3%	
34-36	15	29.4%	4	13.3%	
≥37	33	64.7%	25	83.3%	
Apgar score at 5min, mean (SD)	8.9 (1.0)		8.8 (1.1)		0.495
Weight below 10 <sup>th</sup> centile	4	7.4%	4	11.1%	0.545
Birth weight, mean (SD)	2932.1 (475.0)		2856.1 (529.4)		0.482
Admission to NICU	9	16.7%	9	25.0%	0.333
Surfactant	4	7.4%	2	5.6%	0.730

CS: cesarean section, NICU: neonatal intensive care unit, *p* value of < 0.05 is significant.