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

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Abstract

Objective: To evaluate the impact of previous lower segment cesarean section on maternal and fetal outcomes of patients with non-adherent placenta previa

Methods: This is a retrospective study of all patients who delivered at a tertiary referral university hospital by lower uterine cesarean section with non-adherent placenta previa, over a 10-year period. Data were obtained through hospital registry and medical records. The differences in demographic, obstetric characteristics, peripartum complications, and fetal outcome between patients with no previous cesarean and those with previous cesarean section were analyzed.

Results: Ninety patients with non-adherent placenta previa were included, 54 patients with no previous cesarean and 36 patients with previous cesarean section. Patients with previous cesarean section were significantly more likely to incur inadvertent organ injury, transfusion of 4 or more units of packed red blood cells, transfusion of fresh frozen plasma, uterine brace compressive sutures, uterine artery ligation, and peripartum hysterectomy.

Conclusion: There is a significant increase in the incidence of inadvertent neighboring viscus injury, transfusion of 4 units or more of packed red blood cells, transfusion of fresh frozen plasma, uterine brace compressive sutures, uterine artery ligation, and peripartum hysterectomy in patients with non-adherent placenta previa and previous cesarean section, compared to those with non-adherent placenta previa and no previous history of cesarean section, with no difference in perinatal outcome.

Keywords: Cesarean section, Non-adherent placenta, Placenta previa, Previous cesarean

Introduction

Although the etiology of placenta previa (PP) remains unclear, many studies show that the incidence of PP has been rising in parallel with the increasing rate of cesarean delivery [1–7]. Worldwide, the rate of primary and overall cesarean sections (CS) has been steadily and significantly rising. This increase has been attributed to multiple factors including increased maternal requests and obstetricians' preference [8, 9]. This rise is despite

its associated morbidities and the increased incidence of PP in future pregnancies [10–12].

Placenta previa is associated with the increased risk of maternal and perinatal morbidity and mortality [13, 14]. This risk is more pronounced in the case of morbidly adherent placenta previa (MAPP) accreta, increta, and percreta. While the maternal risk related to morbidly adherent placenta previa is well established [14–16], few studies have explored the outcome of non-adherent placenta previa in patients with previous one or more lower uterine segment cesarean section (LUSCS).

This study was conducted to determine the impact of previous cesarean section on the maternal and fetal

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outcomes among patients with non-adherent PP, compared to patients with non-adherent PP and no previous LUSCS.

Materials and methods

This retrospective study was conducted over a period of 10 years (January 2007–December 2017), of patients with non-adherent PP at a tertiary care referral hospital that is affiliated to the Jordan University of Science and Technology. This hospital serves a 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-h blood transfusion services with surgical and medical teams available on request. Delivery is usually performed by specialists or trained senior resident staff members. Hospital registry was searched for all women who 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 computerized medical records. Patients with MAPP were excluded from the study. Operative notes were double checked to ascertain placental localization. Intra- and postoperative complications that included organ injury, uterine brace sutures, uterine artery ligation, peripartum hysterectomy, blood transfusion, transfer to the ICU, and postoperative hospital stay were 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). Differences in demographic, obstetric characteristics, peripartum complications, and fetal outcome between PP patients with no previous CS and those with previous CS were analyzed using *t*-test or chi-square test as appropriate. A *p* value of less than 0.05 was considered statistically significant.

The study was approved by the institutional review board of the Jordan University of Science and Technology.

Results

This study included 119 patients with PP. Of those, 29 were excluded because of morbidly adherent placenta. There were 90 patients with non-adherent placenta previa, of which 54 patients were with no previous CS and 36 patients with previous CS. Of the latter group, 15 were with previous one CS, 12 with previous two CSs, and 9 with previous three CSs or more. The highest number of previous CS in the

study group was 6. Patients with previous CS were significantly older, had higher number of deliveries, and were more likely to have previous miscarriages and evacuations compared to patients with no previous CS (Table 1). Anterior and central placental locations were more common in patients with previous CS. The two groups of patients did not differ significantly in relation to antenatal hemorrhage, indications for delivery, and gestational age at delivery.

Patients with previous CS were significantly more likely to experience organ injury (all were bladder injury), transfusion of 4 units or more of packed red blood cells, transfusion of fresh frozen plasma, uterine brace compressive sutures, uterine artery ligation, and peripartum hysterectomy than those with no previous CS. Both groups had similar rates of ICU admissions and postoperative hospital stay (Table 2).

There was no statistically significant difference between the two groups in relation to gestational age at delivery, Apgar scores, birth weight, and admission to NICU (Table 3).

Discussion

Placenta previa complicates 0.4% of all deliveries, with a significant increase in incidence in the last two decades, mainly due to the increased rate of cesarean sections worldwide [2, 13, 16]. International concerns over this increase prompted the WHO to address this subject [17]. In addition, the adverse health outcomes associated with cesarean birth for mothers and newborns are well-documented [11, 12, 18].

Furthermore, the rate of MAPP has increased as a result of more previous cesarean sections with higher rates of maternal and perinatal complications [14, 15, 19, 20]. Past studies have heavily focused on the relationship between previous CS and MAPP, but not much so on the impact of previous cesarean section on PP that is not adherent.

This study demonstrated that patients with prior LUSCS were more likely to incur intraoperative organ injury, transfusion of 4 or more units of PRBC, transfusion of FFP, and hysterectomy. These findings are comparable to the results of other studies of patients with previous CS but without PP, where complications did progressively increase by each additional CS [14, 16, 21]. This finding was not confirmed by this study.

Ayaz et al., in a relatively smaller sample size study of multiparous patients with previous CS and PP, demonstrated an increased risk of blood transfusion, coagulopathy, and prolonged length of hospital stay. Unlike this study, they did not find a higher risk of hysterectomy or organ injury in patients with PP and previous CS [22]. Similar to this study, there was no significant difference

Table 1 The demographic and obstetric characteristics of patients with cesarean section history

Maternal characteristics	No CS (N = 54)		Previous CS (N = 36)		p value
	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%	
Labor	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 and 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

in gestational age at delivery, mean Apgar score, rate of admission to the NICU, and perinatal outcome between the two groups, having in mind possible confounding effects due to a significant difference in age and parity between the two groups.

One of the limitations of this study is the lack of multivariate regression analysis due to the small number of some peripartum complications. Perhaps, future studies with larger sample size could confirm the findings of this study.

Conclusion

There is a significant increase in the incidence of neighboring viscus injury, transfusion of 4 or more units of packed red blood cells, transfusion of fresh frozen plasma, uterine brace compressive sutures, uterine artery ligation, and hysterectomy in patients with non-adherent PP and previous CS, compared to those with non-adherent PP and no previous CS, with no statistically significant difference in perinatal outcome between the two groups of patients.

Table 2 Peripartum complications among patients and cesarean section history

Peripartum complications	No CS (N = 54)		Previous CS (N = 36)		p value
	n	%	n	%	
Peripartum complications					
Viscus injury	0	0.0%	2	5.6%	< 0.005
Blood transfusion					
Packed red blood cells	27	50.0%	23	63.9%	0.194
Fresh frozen plasma	2	3.7%	6	16.7%	0.034
≥ 4 units packed red blood cells	2	3.7%	6	16.7%	0.034
Hysterectomy	0	0.0%	4	11.1%	< 0.005
Other procedures (brace suture, uterine artery ligation)	2	3.7%	3	8.3%	< 0.005
ICU admission	1	1.9%	2	5.6%	0.446
Postoperative hospital stay					0.079
≤ 4 days	47	87.0%	16	72.2%	
> 4 days	7	13%	10	27.8%	

CS Cesarean section, ICU Intensive care unit

Table 3 Perinatal complications among patients with cesarean section history

Fetal outcomes	No CS (N = 54)		Previous CS (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 5 min, mean (SD)	8.9 (1.0)		8.8 (1.1)		0.495
Weight below 10th 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
Administration of surfactant	4	7.4%	2	5.6%	0.730

CS Cesarean section, NICU Neonatal intensive care unit

Abbreviations

CS: Cesarean section; LUSCS: Lower uterine segment cesarean section; MAPP: Morbidly adherent placenta previa; PP: Placenta previa

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Authors' contributions

AS: Design, concept, data collection and analysis, and manuscript writing. NO: Data analysis and manuscript writing. OA-A: Data collection and analysis. HH: Manuscript writing and analysis. All authors read and approved the final manuscript.

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Availability of data and materials

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

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

Competing interests

The authors declare no competing interests.

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