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ORIGINAL ARTICLE

Association between Incidence of Invasive Placentation and Previous Deliveries Circumstances

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ABSTRACT

Background: A severe maternal complication known as placenta carries a significant risk of substantial haemorrhage, peripartum hysterectomy, and potentially difficult surgery. This study aimed to focus on association of incidence of invasive placentation with previous deliveries circumstances.

Patients and method: This Cross-sectional prospective the Faculty of Medicine at Zagazig University, Department of Obstetrics and Gynecology, from March 2022 until September 2022. 170 pregnant women of different gravidity and parity with documented ultrasound of abnormally invasive placenta were enrolled. **Result:** there was a statistically significant positive correlation between numbers the frequency of placenta and the number of prior caesarean sections (more than two prior caesarean sections) accrete. In addition, we reported that the incidence of placenta accrete statistically significant increased among women previously delivered in non-tertiary center. We proved that there was a statistically significant negative correlation between inter-pregnancy interval (less than 1.5 years) and incidence placenta accrete. Instead of caesarean hysterectomy (29.5%), caesarean sections (70.5%) were used to treat the majority of patients. By a margin of 55.8%, bilateral uterine artery ligation was the most often performed treatment to stop placental bed haemorrhage after placental separation. Bladder damage, which occurred in 5.9% of intraoperative complications in our study, was the most common one. On the other side, wound infection was the most common postoperative complication by a percentage of 2.9%. **Conclusions:** Cesarean section without medical cause or on maternal request should be avoided as possible as it is proved to be the major risk factor of placenta accrete.

Keywords: Cesarean section; Invasive Placentation; Previous Deliveries.

INTRODUCTION

Abnormally Invasive Placenta (AIP), also known as placenta accrete spectrum, or accreta, increta, and percreta, is a potentially fatal pregnancy condition that is becoming more common around the world, most likely as a result of the increasing prevalence of caesarean deliveries. Normal placental delivery is

impossible, and there is a significant danger of life-threatening bleeding. AIP has been linked to significantly higher maternal morbidity and reported maternal deaths of up to 7% [1,2].

The aberrant invasion of the chorionic villi into the myometrium, which results in placenta accreta or increta is the root cause of AIP. If the invasion affects additional organs including the bladder or

intestines, it may in extreme situations lead to placenta percreta. [3].

Depending on the depth of the abnormal invasion of the placental villi into the Placental invasion in the myometrium can be accreta, increta, or percreta [4].

It causes a number of serious side effects, including major obstetric haemorrhage, hysterectomy, and even death[5].

The number of prior caesarean sections (CS) and having a placenta previa are the two strongest risk factors for AIP; however, other known risk factors include advanced maternal age, pregnancies resulting from in vitro fertilisation, other prior uterine surgeries such as dilation and curettage, and hysteroscopic surgery for uterine anomalies[6].

Repeated uterine Incisions can result in the uterine wall becoming fibrotic and scarred, which impairs wound healing by reducing vascularity. The scar will heal completely in the majority of women, but there may be a uterine wall shortage in others. This has been demonstrated by pathologic analysis of the uterine scar, which points to the production of granulation tissue and fibrosis rather than myometrium regeneration. Because of this, another theory for the cause of AIP suggests that the avascular and acellular region of a fibrotic CS scar may actually be a preferred site for the growing embryo [7]. The purpose of this study was to concentrate on the relationship between the occurrence of invasive placentation and the conditions of previous deliveries.

PATIENT AND METHODS

This prospective Cross section the study was carried out in Faculty of Medicine at Zagazig University, Department of Obstetrics and Gynecology. Total of 170 pregnant women of different gravidity and parity with documented ultrasound of abnormally invasive placenta were enrolled. Before start the study, the Research Ethics Committee at the Faculty of Medicine, Zagazig University Hospitals approved this study. Written informed consent was obtained from all participants after the test procedures had been explained. The study was done according to The

Code (IRB Number; 9439-28-3-2022) of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Inclusion criteria: any age group. Gestational age: any gestational age ≥ 28 weeks. pregnancy in a singleton. Women who have previously undergone uterus surgery scarring (one or more caesarean sections, caesarean hysterotomy, myomectomy or uterine perforation). Women with a history of complicated vaginal deliveries i.e. difficult or incomplete placental delivery managed by manual removal of the placenta or cases that required urgent laparotomy. Women with documented ultrasound of abnormally invasive placenta (AIP) with placental lacunae, disruption of the bladder line, loss of the clear zone, Myometrial thinning, abnormal vascularity, placental bulge, exophytic mass. **Exclusion criteria:** All women with a history of uncomplicated vaginal birth. Women with normally located placenta with no signs of adhesion.

All women in this study were subjected to full detailed medical history and local examination. Routine investigations as complete blood picture, liver and kidney function tests, Prothrombin time (PT), partial thromboplastin time (PTT), and the international normalised ratio (INR) of the coagulation profile, as well as the viral hepatitis markers hepatitis B and C viruses, ABO blood group, and Rh.

Basic fetal biometry ultrasound examination, which included ultrasound measurements of classical fetal biometric parameters that included biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC) and femur length (FL), amniotic fluid index and placental position using Mindray DP-15 Digital Ultrasonic Diagnostic Imaging System, 2–5 MHz wide band convex, curved array transducer.

Sonography was used to diagnose placenta previa, and it was necessary to find echogenic homogeneous placental tissue over the internal cervical os. The diagnostic report specified how much (in millimetres) the placenta stretched across the internal cervical os. It's noteworthy that when the placental edge was < 2 cm from, but not

over, the placenta was referred to as "low-lying." when the placenta-cervix separation was ≤ 2 cm we used transvaginal sonography on transabdominal ultrasonography to diagnose and better identify placental position. Sonographic pictures in the sagittal, parasagittal, and transverse planes were taken with the patient's bladder about halfway full. To assure the accuracy of the examination results, all ultrasound examinations were performed by skilled and qualified medical experts.

Statistical analysis

Relative risk was represented by the odds ratio (OR). The OR and relative risk for this uncommon outcome were practically comparable. 95% confidence intervals were used to compute the prevalence and its OR (CI). By cross-tabulating the data from each background population with 95% confidence intervals, the OR ratios were obtained. Comparing risk factor profiles to background population profiles from the MBRs. A chi-square test or Fisher's exact test was employed, as applicable, for comparing dichotomous data. All information was controlled by SPSS program (Statistical Package for Social Science) version 27.0 (IBM, 2020).

RESULT

Maternal age was distributed as **31.9±4.71** and GA was **36.16±2.16**, majority were gravidity 3-5 and parity **>2** as shown table 1.

38.2% had antepartum hemorrhage, previous delivery were 77.6% CS, 58.8% had delivered in non tertiary center as shown table 2.

Interpregnancy interval was < one year in 46.4 % of the studied group, **1-1.5** year in 88.8%, **1.5-2** year in **98.2** and ≥ 2 year in 1.7% of the cases **table 3**.

Table 4; showed that there were agreement between US and Inter operative results in studied groups.

Table 5; showed that most of cases were managed surgically by caesarean sections by a percent of 70.5%.

Placenta was separated in 120 cases. Operators succeeded in conserving uterus by these procedures. This table showed that the most prevalent procedure was done to control bleeding from placental bed after placental separation was bilateral uterine artery ligation by a percent of 55.8% table 6. Internal iliac artery ligation was the most common procedure done to control pelvic hemorrhage after hysterectomy by a percent of 60% as showed table 6.

Table 7; showed that the most prevalent intraoperative complication is bladder injury by a percent of 5.9%. This was due to presence of excessive pelvic adhesions and difficult bladder dissection, also bladder was invaded by placenta in some cases. The included 170 women, 0.58% of cases developed DIC, 1.17%..

Table (1): Demographic data distribution among studied group (N=170)

Variable			
Maternal age	Mean ± SD	31.9±4.71	
GA by LMP	Mean ± SD	36.16±2.16	
		N	%
Gravidity	≤ 2	20	10
	3-5	117	70.6
	>5	33	19.4
Parity	PG	7	5.8
	≤ 2	63	35.4
	>2	100	58.8
	Total	170	100.0

Table (2): Characteristics of previous delivery among studied group

APH		65	38.2
Mode of delivery :	CS	132	77.6
	Vaginal	7	4.1
	VBAC	31	18.3
Place of delivery :	Non tertiary center	100	58.8
	tertiary center	70	41.2

Table (3): Interpregnancy interval between studied group

Interpregnancy interval	N	%
< one year	79	46.4
1-1.5 year	151	88.8
1.5 -2 year	167	98.2
≥2 year	3	1.7

Table (4): Ultrasound & intraoperative diagnosis of studied group:

Variable	Studied Group (n=170)					
	US		Intraoperative		Wrong diagnosis	
	No	%	No	%	No	%
Accreta	144	84.7	144	84.7	0	0
Increta	14	8.2	14	8.2	0	0
Percreta	12	7.1	10	5.9	2	1.2

Table (5): Type of surgery in studied population

Variable	(N=170)	
Surgical Management	N	%
C.S only	120	70.5
Caesarean hysterectomy	50	29.5

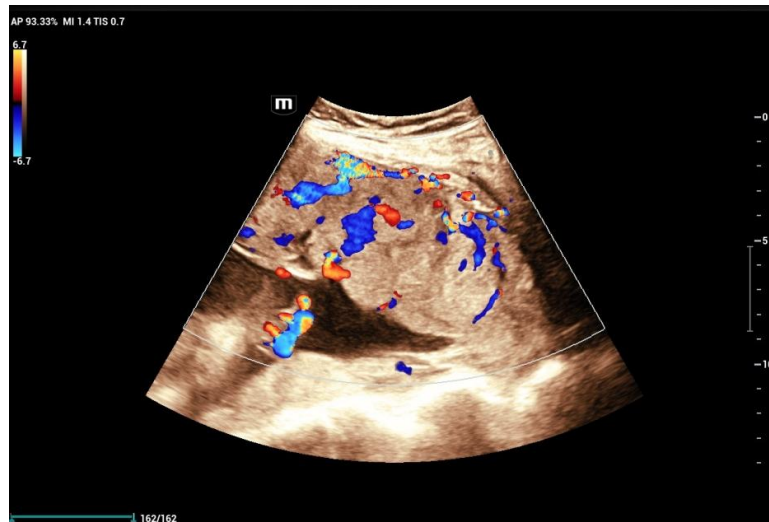
Table (6): Intraoperative procedures performed to control bleeding from placental bed after placental separation and pelvic hemorrhage after hysterectomy.

Variable	(N=120)	
Procedure	N	%
Bilateral uterine artery ligation	67	55.8
Uterine packing	12	10.0
Bilateral Internal iliac artery ligation	9	7.5
Hemostatic sutures in placental bed	32	26.7
pelvic hemorrhage after hysterectomy		
Internal iliac artery ligation	30	60
Pelvic packing	20	40

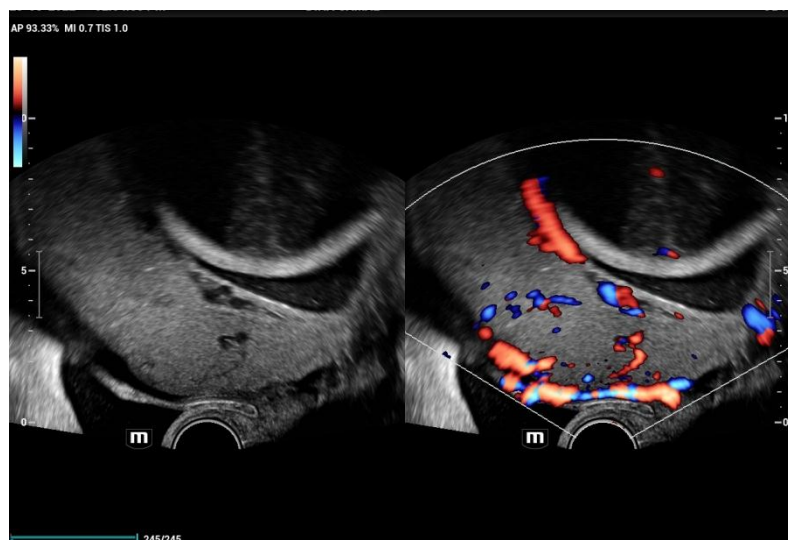
Table (7): Complications of the studied population.

Variable	(N=170)	
Injury	N	%
Intraoperative		
Non complications	150	88.2

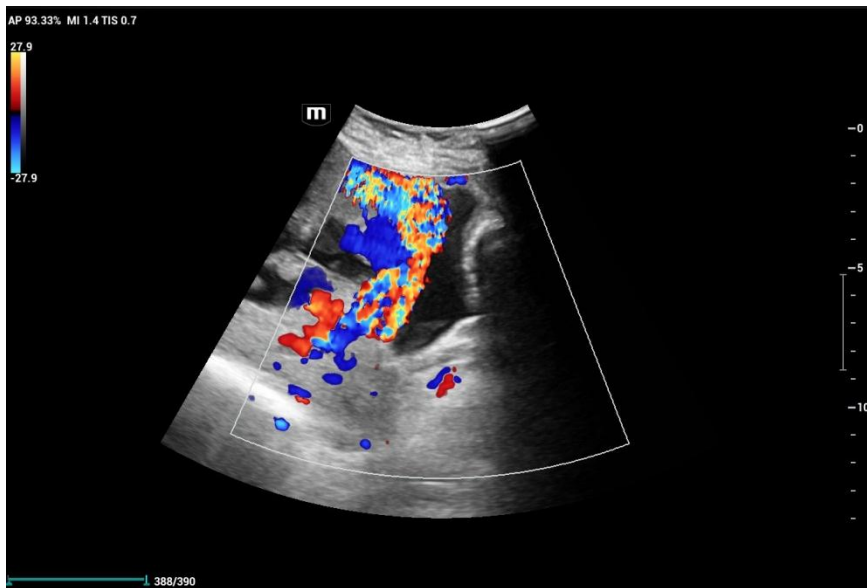
Complications	20	11.8
Variable	(N=170)	
Injury	N	%
Bladder injury	10	5.9
Ureteric injury	5	2.9
Intestinal injury	3	1.8
Vascular injury	2	1.2
Postoperative		
Non-complications	155	91.2
Complications	15	8.8
Wound infection	5	2.9
Reoperation	3	1.76
Postpartum collapse	3	1.76
ICU admission	2	1.17
DIC	1	0.58
Mortality	1	0.58
Duration of postoperative hospital stay (days):		
Range	1 - 7	
Median	4	



Placental lacunae



Abnormal vascularity, thinning myometrium, disruption of bladder line



Abnormal vascularity

DISCUSSION

We reported that women with **advanced age >30** years and **higher parity >3** had a significant higher incidence of invasive placentation.

We agreed with **(Mohammed and colleagues)** who conducted a prospective study on 100 pregnant women, placenta praevia or low lying placenta anterior with prior caesarean section were identified by ultrasonography. They stated that placenta praevia with a history of caesarean section was one of the risk factors for placenta accreta. Every case had a praevia placenta, at least one prior CS, and older maternal ages. (the mean age 32.60 ± 5.018 years in cases of placenta accrete), and 29.14 ± 4.889 Years in situations of multiparity and a normal placenta [the median parity was 3] (range: 1-6) [8].

Our study reported that, There was a statistically significant positive link between the frequency of placenta accrete and the number of prior caesarean procedures (more than two prior caesarean sections).

We agreed with **Yeni and colleagues** who aimed to ascertain the connection between the frequency of placenta accrete and a history of numerous caesarean sections. They established a strong correlation between previous history of multiple caesarean sections and placenta accrete

incidence, showing that multiple CS moms are 6 times more likely to experience placenta accrete. The results were based on 22 responders who had placenta accreta, of whom 18 had it in conjunction with a history of CS and four had it alone [9].

We proved that there was a statistically significant negative correlation between **inter-pregnancy interval** (less than **1.5 years**) and incidence placenta accrete.

In addition, **(McLaughlin and colleagues)** disagreed with us and stated that Short interpregnancy gaps in patients at risk for placenta accreta spectrum of <18 months or <12 Even after adjusting for the number of prior caesarean deliveries and previa, months were not linked to the placenta accreta spectrum. There is unlikely to be a significant independent modifiable risk factor for placenta accreta spectrum associated with a short interpregnancy period. 112 (42.7%) of 262 individuals with complete records who were at risk for placenta accreta spectrum had the condition. pregnant women with close spacing between pregnancies of <18 months were no more likely to have previa or placenta accreta spectrum than those with the best interpregnancy intervals. A short gestational period of <18 months was not connected to the spectrum of placenta accreta. Even after accounting for previa and the quantity

of prior caesarean deliveries, this connection persisted. An interpregnancy gap was used in a secondary analysis. of <12 months was not connected to the placenta accreta spectrum either [10].

We also noted that there was a strong agreement between preoperative ultrasound findings and intraoperative diagnosis results in studied cases.

We corresponded with **(Thiravit and colleagues)** who evaluated the placental bulge sign as well as the diagnostic accuracy and interobserver agreement of US and MRI findings for the diagnosis of severe PAS. They claimed that placental bulge performed well in identifying severe PAS on both US and MRI, with MRI potentially doing even better.

Interobserver agreement is still below ideal for both modes, though. 36/62 patients, or 58.1%, had severe PAS. On US, the placental bulge (85.5%), which had a sensitivity of 91.7% and a specificity of 76.9%, was the finding with the highest accuracy for severe PAS. Placental bulge (90.3%), which had a sensitivity of 94.4% and a specificity of 84.6%, was the MRI finding with the best accuracy. The results of an interobserver agreement analysis for placental bulge indicated kappa values of 0.48 for MRI and 0.40 for US. Differences between characteristics for a particular modality and differences between modalities were not statistically significant due to the broad 95% CIs [11].

In our study, **bilateral uterine artery ligation** was the most prevalent procedure done to reduce placental bed bleeding after placental separation by a percent of 55.8%.

(El Gelany and colleagues) reported different effective intervention compared with our study. They concluded that In order to reduce bleeding brought on by a divided placenta accreta, it is very successful and straightforward to combine bilateral uterine artery ligation with employing the cervix as a natural tamponade. It was a retrospective analysis that was conducted on 125 patients with morbidly adherent placenta who had elective CS at 35–38 weeks gestation. According to the intra-operative interventions used to control bleeding, the included patients were divided into

three groups: Group A (n = 42) had only balloon tamponade; Group B (n = 40) had both balloon tamponade and bilateral uterine artery ligation; Group C (n = 43) had all cases managed by bilateral uterine artery ligation, inversion of the cervix into the uterine cavity, and suturing of the anterior and/or posterior [12].

In contrast to caesarean hysterectomy (29.5%), caesarean sections accounted for 70.5% of surgical management of cases in our study. **The most prevalent intraoperative complication** in our study was **bladder injury** by a percent of 5.9%. Finally, the most prevalent **postoperative complication** was **wound infection** by a percent of 2.9%.

We agreed with **(Farquhar and colleagues)** who stated that women with placenta accreta were more likely to have a caesarean section (AOR: 4.6, 95% CI 2.7 to 7.6) and to have a cesarean hysterectomy (AOR: 209.0, 95% CI 19.9 to 875.0) [13].

We was in the same line with **(Mohamed and Ahmed)** who examined cases of prior caesarean sections with placenta previa anterior at Al Hussein University Hospital to determine the prevalence of placenta accreta and its consequences. 19 (47.5%) cases of bladder injury and 1 (2.5%) case of intestinal injury were documented. All cases got intraoperative blood transfusions, 38 (95%) cases had postoperative blood transfusions, and 25 (62.5%) cases required ICU stay.

On the other hand, and in opposition to our findings, they claimed that caesarean hysterectomy was carried out in every instance of placenta accreta, which could be related to various research methodologies [14].

Mohammed and colleagues indicated that due to significant placental bed haemorrhage and uterine atony, caesarean hysterectomy was done in 2 (5.4%) of the 63 cases with normal placentas as well as all 63 cases of placenta accrete. 31 cases (49.2%) of authorised placenta accreta, C.S. hysterectomy procedures, and bladder repair procedures involved bladder damage. Bowel damage was present in 2 instances (3.2%), all of

which had placenta accreta and had C.S. hysterectomy[8].

The current study's strengths stem from the fact that every effort was made to ensure that all follow-up data were recorded, that only complete information was used in data analysis, and that all clinical evaluations and evaluations of study results were carried out by the same team. The current study's shortcomings stemmed from the accuracy of the results being affected by the very small sample size.

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CONCLUSIONS

Cesarean section without medical cause or on maternal request should be avoided as possible as it is proved to be the major risk factor of placenta accrete. In women with risk repeated previous sections, advanced maternal age, short inter-pregnancy interval, surgeon should suspect abnormal invasive placentation.

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