THE ROLE OF EARLY CLAMPING OF UTERINE ARTERY AND DELAYED PLACENTAL SEPARATION IN REDUCING CONSEQUENCES OF PLACENTA ACCRETA SPECTRUM (PAS) DISORDER

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ABSTRACT

Background

Abnormal invasive placentation leads to massive intraoperative bleeding and maternal morbidity or death. The current study aimed to evaluate the role of systemic pelvic devascularization technique in reducing cesarean hysterectomy in pregnancies involved in PAS and its complication.

Objectives

To deterime role of early claming of uterine artery and delayed placental separation in reducing the consequences of placenta accreta spectrum disorders

Patients and Methods

Case series research was done in a Maternity Teaching Hospital as a single center study on twenty high-risk pregnant ladies at (32 to37 weeks) gestation diagnosed with placenta accrete through ultrasonography from the first of January 2021 to the first of November 2021.

All patients were managed through the technique of delayed delivery of the placenta and early clamping uterine artery at the level of the internal os of the cervix using two vascular clamps followed by immediate ligation of the anterior branch of the internal iliac artery (IIA) in the retroperitoneal space within 1-2 minutes which shows a significant reduction in blood loss at placental bed following placental delivery, neither of cases ended by cesarean hysterectomy, written consent has been taken from the enrolled patients. A college has approved the study of the medicine Ethical Committee /the University of Sulaimani. Data from the current study has been analyzed using "IBM SPSS statistics version 25".

Results

Among the patients who participated in the present study, the mean±SD of age was 37.1 ± 4.5 years range (30-48) years old, and the mean±SD gestational age was 36 ± 1.5 range (32 to 38) weeks, their mean ±SD of BMI (body mass index) was 28 ± 2.2 (range, 24 to 32). The mean±SD cesarean count was 2.8 ± 1.3 (range, 0-5). The mean±SD of patients' gravida and parity were 4.2 ± 1.6 (range,1-7) and 2.8 ± 1.4 (range,0-5), respectively. The mean±SD operation time varies 93 ± 25.6 range (60 to 120 minutes); neither of the cases ended by hysterectomy, hemoglobin levels were also taken as part of the investigation, and its level preoperatively means ± SD 11.4 ± 1.1(range, 9.9 to 13.9) and post-operatively mean ± SD level was 9.6 ± 1.2 (range, 7.2 to 11.1), significantly less blood loss seen intraoperatively and only 75% of them require blood transfusion and only one-day hospital stay after the operation, no one requires the second laparotomy. Therefore, there was no significant association between them; thence, the mentioned procedure is clinically beneficial.

Conclusion

This method did not need to cesarean hysterectomy, so it causes less blood loss and morbidity.

Keywords: *Placenta accrete, blood transfusion, cesarean hysterectomy.*

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INTRODUCTION

Placenta Accreta Spectrum (PAS) describes a broad range of pathologic morbidly adherent placenta (MAP), including placenta accreta, increta, and percreta. The most famous hypothesis about the etiology of endometrial-myometrial interface disruption (EMID) is a failure in the normal decidualization process in the area of the uterine scar. This process allows for abnormally deep anchoring villi and trophoblast infiltration [1, 2]. Degrees of severity are as follows:

A) Accreta; when the placenta firmly attaches to the outer layer of the uterus (myometrium) without invasion to the muscle.

B) Increta; when the placenta invades the myometrium.

C) Percreta; when the placenta invades the endometrial thickness and possibly other pelvic structures, most frequently the blade [3].

The incidence of PAS is rapidly increasing worldwide. However, following the rising trend of cesarean section (C-section), it is difficult to quantify the true incidence of placenta accreta; however, it complicates approximately 1 in 2500 deliveries, and the risk of placenta accreta is approximately 0.1% with previous cesarean section and close to 0.4%, 0.7%, 2-2.2% and nearly 3.5% with the previous two, three, four and five or more cesarean section respectively [4].

PAS has several risk factors, including previous cesarean delivery (the most prevalent one), Placenta previa (a crucial risk factor), curettage, multiparity, prior uterine surgeries, uterine myomectomy, Asherman syndrome, and advanced maternal age. Patients with these risk factors are more prone to need a hysterectomy during the postpartum phase or delivery. Therefore, these patients should stay at the hospital longer [5]. These factors are mainly seen in 3% of patients with placenta previa who did not have prior cesarean deliveries. Besides, this risk factor will significantly increase in women with placenta previa and one or more previous cesarean deliveries. Furthermore, the risk of placenta accreta condition in women with placenta previa will increase by their number of cesareans, so that the risk of this condition for the first, second, third, fourth, and fifth or more cesarean is 3%, 11%, 40%, 61%, and 67%, respectively [6]. USG is useful in assessing the placental invasion and has been combined with color Doppler imaging to determine placental vascularity.

When delivery happens at a level III or IV maternal care facility, diagnosis of PAS before birth is very effective as it yields optimized outcomes; however, to yield more favorable outcomes, it should be done before the onset of labor or bleeding with avoidance of placental disruption [6]. Maybe the most significant ultrasonographic relationship between the second and third trimesters in this spectrum of risk factors is the presence of placenta previa in more than 80% of accretes in most large series [7]. Other related abnormalities observed in the gray scale ultrasound are gaps and junctions of blood flow in the myometrium, the decrement of the thickness of retroplacental myometrium to less than 1 mm, damage in normal hypoechoic area/mass between the placenta and myometrium, vessels bridging the placenta to the uterine margin, any abnormalities in the uterine serosa-bladder wall interface, and placenta accreta, and multiple vascular lacunae in the placenta [8,9].

The most prevalent finding of the placenta accreta spectrum on color flow Doppler imaging is the bladder wall with turbulent lacunar blood flow, which commonly results in subplacental vascularity. Another tool for detecting the placenta accreta spectrum is magnetic resonance imaging (MRI) [10]. There is a need for a standardized approach combined with a multidisciplinary team (MDT) to achieve optimal management [12]. Relevant considerations to achieve better case optimization in planned PAS disorder studies include preoperative hemoglobin thresholds, availability of highly skilled surgical experts and resources during the operation, knowledge about the exact time and location of planned delivery, and patient blood management in postoperative care.

The main factor of management in placenta accreta cases is abdominal hysterectomy bringing an end to fertility and may cause serious social and psychological consequences. Leaving the placenta in situ approaches (LISA) maybe is one of the most crucial aspects of conservative treatment with a gradual shift toward its management. This approach involves uterine conservation by leaving the placenta in situ (LPIS) with Adjuvant therapy with methotrexate in some cases or by simply awaiting its spontaneous resorption. [12]

There is a need to balance maternal, fetus, or neonate risks and benefits to have an appropriate timing for decisions making. It seems that performing a C-section followed by a cesarean hysterectomy before the start of delivery improves maternal outcomes. However, the optimal timing is still not clear [12]. Based on the

decision analysis approach, it has been recommended that34th the week of pregnancy is the optimal time that gives a better ability to most large centers to handle newborn complications much better at that gestational age. Besides, the risk of bleeding will increase after week 36th [13,14].

Although individual factors are effective, a gestation period ranging from 35 0/7–35 6/7 weeks is recommended as the preferable gestational age for scheduled C-section or hysterectomy procedure (without Extenuating Circumstances (ECs)) in stable patients [15.16]. Many standard operating procedures (SOPs), such as using standard perioperative antibiotic prophylaxis (PAP), are still being used [17]. After the operation, they are at a higher risk of Intra-abdominopelvic hemorrhage, overload of fluid after resuscitation, other complications that occur after the operation, degree of blood loss, multiple organ failure (MOF) potential, and the need for supportive efforts. Therefore, conservative (expectant) management should not be frequent and considered publicly. The main complications of treating PAS disorder include loss of fertility in the future, hemorrhage, and significant trauma to other pelvic organs. Some researchers have suggested conservative (expectant) management in PAS patients to decrease these complications [18]. It seems that conservative (expectant) management has the least effect on subsequent fertility. However, it increases the risk of recurrence of PAS disorder. More than 30% of women monitored after expectant management desired subsequent pregnancy [19].

Although placenta praevia and placenta accreta lead to preterm delivery, with 40% of women delivering before 38+0 weeks of gestation [20], delivery cases are unpredictable. They could only be avoided by a delivery policy at 32 weeks gestation. This would be unacceptable due to neonatal morbidity [21].

It is a surgery that requires serious experience in emergencies. Operation time is longer than in other applications, and the risk of bladder injury is quite high. On the postpartum hysterectomy, Rossi et al. found 56% maternal morbidity and 2.6% maternal mortality in their study [22,23]. In addition, a study shows that 64% of patients with postpartum hysterectomy had posttraumatic stress disorder [24]. So, fertility-preserving surgical procedures and techniques have been used as effective options for treating placenta accrete in recent years [25,26]. These techniques include uterine artery embolization (UAE), balloon tamponade, pelvic devascularization/hysterectomy, and uterine compression sutures. Pelvic devascularization/ hysterectomy was performed in the form of IIA or connecting uterine artery.

PATIENTS AND METHODS

The approval for this study was obtained from a constituted Ethical Committee, which was done through case series study case sheets of 20 women reviewed having placenta accreta from January 2021 to November 2021 and who were referred for suspected placenta accreta were admitted to the Maternity Teaching Hospital, Sulaimani, Kurdistan Region – Iraq. Inclusion criteria are patients with a singleton pregnancy, Pregnant women with placenta accrete spectrum, and a gestational age of more than 28 weeks' history of any uterine surgery. Exclusion criteria: multifetal pregnancies patients, Patients with normally situated placenta, Women with hematological and vascular disorders, refusal to participate, and those with coagulopathy.

In this study, all women filled out outpatient examination and history-taking sheets, went under laboratory investigations (Preoperative, complete blood count, coagulation profile, liver functions, renal functions, blood glucose), Basic demographic and pregnancy information, including, (age, parity, gestational age) was also retrieved and information regarding morbidity associated with the surgical procedure, and use and volume of transfusion of blood products, planned operations were performed. All suspected patients were diagnosed by ultrasound with placenta accrete spectrum signs were loss of clear zone, placental lacunae, myometrial thinning, placental bulge, focal exophytic mass, and bladder wall interruption with the availability of more than three finding regarded as a highly suspicious and final diagnosis made during cesarean section.

All cases are performed by a senior obstetrician's expert, a consultant surgeon in the presence of an anesthesiologist expert in obstetric anesthesia, and a neonatologist. Surgical procedure: Before incising the lower uterine segment, we insert four misoprostol (prostaglandin E1 analog) rectally, followed by delivery of the fetus and clamping of the cord, leaving placenta, oxytocin boulus 20 units and infusion dose,1 gm cyclocaprone by infusion 1000 cc ringer lactate withing 15 minutes, applying two vascular clamps

at the level of the internal os of cervix, then ligating the internal iliac artery retroperitoneally from the division of IIA after identification of ureter laterally, placenta delivery and rapid two layers suture uterus with multiple anterior to the posterior wall of uterus transverse lower uterine segment compression suture no.2 vicryl, then Postoperative data were also recorded especially Intensive care unit admission> 24hr, pre and postoperative blood loss by hemoglobin level estimation with a time of operation individually.

These cases were admitted one day before at ER department; preoperatively, all have been preparing at least 4 pints of blood and fresh frozen plasma FFP, blood group, and cross-matching with reviewing all her ultrasound and counseling and written consent about consequences of operation and may be ended by hysterectomy, the consent including blood transfusion need and bladder injury. The next day at the emergency, they were the operating room consultant surgeon and anesthesiologist, with senior obstetricians working as a team. The primary outcome measures were: intraoperative blood loss, blood transfusion requirement, duration of surgery, and the need for hemostatic measures. Moreover, avoiding the need for a cesarian hysterectomy among them. All of them receive antibiotics perioperatively after cord clamping. We used "IBM SPSS statistics version 25" (Statistical Package for the Social Science) for the data analysis, and both descriptive and inferential statistics were used. Further, a P-value of ($\leq$0.05) was considered a statistically significant association. Besides, Fisher's Exact Test was used to determine the significance of associations between the independent and dependent variable pairs.

RESULTS

During 11 months study, which was done in Maternity Teaching Hospital (Sulaymaniyah, Kurdistan Region, Iraq), we enrolled 20 pregnant women diagnosed with placenta accreta. The mean age of patients who participated in this study was 37.1 years old, ranging from (30-48) years old. The average pregnancy age in the studied women was 36 weeks (253 days), ranging from (32 to 38) weeks gestation, with a mean BMI of 28. The mean number of the cesarean count was 2.8, ranging from (0 to 5) scar. The maximum number of pregnancies was 4.2, ranging from 1 to 7. (Table 1).

Note: None of the associations were statistically significant; thence, the procedure of early clamping uterine blood supply is clinically beneficial. The operation time varies between the groups, Mean±SD_93 ± 25.6 Ranges from (60 to 120 minutes) (Table 2) During the study, hemoglobin levels were also taken as part of the investigation and showed that the preoperative hemoglobin value between the study group was 11.4 and the postoperative hemoglobin level was 9.6 gm (Table 3). Among 20 cases, 75% needed a blood transfusion, while 25% ended without the need for a blood transfusion (Table 4). Among 20 cases, no hysterectomy was done (Table 5). Our results show that among 20 cases, two opened the bladder, and one developed a utero vaginal fistula, which closed after four months (Table 6).

Table 1. Demographic profile of patients.

Variables	Mean ± SD	Range
Age (year)	37.1 ± 4.5	30 to 48
Gestational age (week)	36 ± 1.5	32 to 38
BMI (kg/m2)	28 ± 2.2	24 to 32
Number of previous C/S	2.8 ± 1.3	0 to 5
Gravida	4.2 ± 1.6	1 to 7
Para	2.8 ± 1.4	0 to 5
Abortion	0.2 ± 0.4	0 to 1
Dead baby	0.3 ± 0.7	0 to 2
Preoperative Hb level (gm/dl)	11.4 ± 1.1	9.9 to 13.9
Postoperative Hb level (gm/dl)	9.6 ± 1.2	7.2 to 11.1

BMI = Body mass index; C/S = cesarean section; SD = standard deviation.

Table 2. The operation time varies between the groups.

Variables	Mean ± SD	Range
Operation time (minute)	93 ± 25.6	60 to 120

Table 3. Hemoglobin levels in study group g/dl .

Variables	Mean ± SD	Range
Preoperative Hb level (gm/dl)	11.4 ± 1.1	9.9 to 13.9
Postoperative Hb level (gm/dl)	9.6 ± 1.2	7.2 to 11.1

Table 4. blood transfusion percentage.

Blood transfusion	Frequency	Percent
Yes	15	75
No	5	25
Total	**20**	**100**

Table 5. Frequency of hysterectomy.

Hysterectomy	Frequency	Percent
No	20	100

Table 6. Complications of the operation.

Variables		Complications (%)				p-values#
		None	Bladder opened + uterovaginal fistula* + Retained placental tissue**	Bladder opened	Total (%)	
Age groups (year)	30-34	5 (25)	1 (5)	1 (5)	7 (35)	0.204
	35-39	9 (45)	0 (0)	0 (0)	9 (45)	
	40-44	1 (5)	0 (0)	1 (5)	2 (10)	
	45-48	2 (10)	0 (0)	0 (0)	2 (10)	
Residency	Sulaimani	14 (70)	1 (5)	1 (5)	16 (80)	0.509
	Kalar	2 (10)	0 (0)	1 (5)	3 (15)	
	Kirkuk	1 (5)	0 (0)	0 (0)	1 (5)	
Gestational age (week)	32	1 (5)	0 (0)	0 (0)	1 (5)	0.664
	33	1 (5)	0 (0)	0 (0)	1 (5)	
	35	4 (20)	0 (0)	0 (0)	4 (20)	
	36	5 (25)	0 (0)	0 (0)	5 (25)	
	37	5 (25)	1 (5)	1 (5)	7 (35)	
	38	1 (5)	0 (0)	1 (5)	2 (10)	
BMI group (kg/m2)	Normal BMI (18.5-24.9)	1 (5)	0 (0)	0 (0)	1 (5)	0.601
	Overweight (25-29.9)	13 (65)	1 (5)	1 (5)	15 (75)	
	Obese (30-40)	3 (15)	0 (0)	1 (5)	4 (20)	
Number of previous C/S	0	1 (5)	0 (0)	0 (0)	1 (5)	0.895
	1	2 (10)	0 (0)	1 (5)	3 (15)	
	2	3 (15)	0 (0)	0 (0)	3 (15)	
	3	5 (25)	1 (5)	0 (0)	6 (30)	
	4	5 (25)	0 (0)	1 (5)	6 (30)	
	5	1 (5)	0 (0)	0 (0)	1 (5)	
Total		**17 (85)**	**1 (5)**	**2 (10)**	**20 (100)**	—

BMI = Body mass index; C/S = cesarean section; * Closed after four months; ** Three cm in size and treated conservatively; # Measured by Fisher's Exact Test.

DISCUSSION

The true incidence of placenta accreta is challenging to quantify accurately, but it complicates approximately 1 in 2500 deliveries, and the risk of placenta accreta is about 0.1% with the previous one cesarean section and close to 0.4%, 0.7%, 2-2.2% and nearly 3.5% with previous two, three, four and five or more cesarean section respectively [4]. Our study also shows an increasing number of accrete with increasing CS, Gary C, Kenneth J, Steven L, John C, Catherine Y, et al.

Asherman's syndrome, curettage or prior uterine surgery, multiparity, and advanced maternal age are among the main risk factors [5]. The findings of our study were also in line with the results achieved by the study that investigated multiple cesarean deliveries (Marshall NE, Fu R, Guise JM. Impact of multiple cesarean deliveries Am J Obstet Gynecol 2011; 205: 262.e1). PAS patients are the main options for a hysterectomy at the time of delivery or during the fourth trimester and should stay at the hospital longer [5]; in contrast, our study shows all our cases conservatively keeping the uterus and only short hospital stay, so at this area disagree with Marshall. In their study, Am J Obstet Gynecol (2011) investigated the impact of multiple cesarean deliveries on maternal morbidity through a systematic review. In their study, antenatal diagnosis of PAS was very desirable as their outcomes were effective after the delivery at two levels of maternal care facility (III or IV). Besides, placental disruption should be prevented effectively before the start of labor or bleeding [6].

In this research, the studied cases were electively aligned with those presented by Jauniaux E, Collins S, and Burton GJ. The initial used diagnostic technique for prenatal testing was obstetric ultrasonography. However, placenta accreta features, visible using diagnostic ultrasound, may be present sooner than in the first trimester. Anyway, the diagnosis of women can be made better in the second and third trimesters. Besides, our findings revealed that only the ultrasonography imaging technique was used for diagnosis, which yielded precise outcomes. This study's findings align with Jauniaux E, Collins S, and Burton GJ. Am J Obstet Gynecol (2018) in this regard.

Optimal management can be achieved by applying a standardized approach and providing a multidisciplinary care team trained to manage PAS disorder [12]. This team should preferably include the maternal-fetal medicine sub-specialist and expert obstetrician-gynecologist, pelvic surgery expert, obstetrics and gynecology physician or gynecologic oncologists, and reconstructive surgery experts. We also co-operated with our team leader, a consultant surgeon who agreed with Silver RM, Barbour KD (PAS; accreta, increta, and percreta. Obstet Gynecol Clin North Am 2015; 42: 381). The findings of the decision analysis approach recommended 34 weeks of gestation as an optimal time that allows handling neonatal complications in most large centers at that gestational age [6,12,13,14].

However, our study's findings contrast with results achieved by Belfort MA (Am J Obstet Gyne & Angstmann T, Gard G, Harrington T, Ward E, Thomson A, Giles W. Placenta accreta. Publications Committee, Society for Maternal-Fetal Medicine). However, in our study, the cases were planned at an average of 36 weeks of pregnancy which is also in line with that recommended by Gyamfi-Bannerman C. Society for Maternal-Fetal Medicine (SMFM) Consult. Cesarean hysterectomy is the most appropriate approach and is generally accepted for treating PAS disorder. Through this approach, the placenta is left in situ after delivery of the fetus, as attempts to remove the placental increase the risk of hemorrhage significantly. However, our study's findings contradict their achievement because we did not do a hysterectomy while preserving the uterus through our original method. Therefore, many standard operating procedures, such as standard PAP, remained applicable [17]. Besides, we approve the usage of some antibiotics, such as prophylactic antibiotics, in labor and delivery (Practice Bulletin No. 120, American College of Obstetricians and Gynecologists).

Going straight through the placenta to achieve delivery is associated with more bleeding and a high chance of hysterectomy and should be avoided. Conservative management of placenta accreta when the woman is already bleeding is unlikely to be successful and risks wasting valuable time. (Rcog) (11) we also agree not to go through the placenta but, by our procedure, bleeding less. The main complications during treating PAS disorder are age-related loss of female fertility, hemorrhage, and damage to other pelvic organs. Some researchers have recommended conservative (expectant) management in PAS patients to decrease these complications [18]. Based on the limited published research and the advocated approach of hysterectomy for treating PAS disorder, conservative (expectant) management should be applied only for cases selected with high sensitivity after detailed counseling about

the risks, uncertain benefits, and effectiveness. This approach should be considered an investigational therapy; using our combined approaches, there is no need for a hysterectomy (Lee P, Turan OM, et al.). The findings of our study are in line with those presented by Michelet, D., Richbourg, A., Gosme, C., et al. (2015) in which 64% of patients with postpartum hysterectomy experience Posttraumatic Stress Disorder (PTSD) [(26)]. So, fertility-preserving surgical procedures have recently increased effectiveness in treating placenta accretion.

In cponclusion, since PAS disorder leads to increased C-sections, primary hysterectomy cannot always be utilized for women who desire to preserve their fertility. Besides, conservative (expectant) management techniques have been used in many centers to preserve the uterus worldwide. Consequently, achieving a more precise antenatal diagnosis of placenta positions and innovation to myometrium with a planned delivery by teamwork at a precise gestational age is crucial. Furthermore, with conservative treatment of intrapartum utilizing this approach, there will be no need for a cesarean hysterectomy, causing less blood loss and morbidity and increasing psychological satisfaction.

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