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Study of patients with placenta accreta spectrum in a tertiary care hospital

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Abstract
Introduction: Placenta accreta spectrum refers to range of pathological adherence of the placenta including placenta accreta, placenta increta and placenta percreta. It is a disorder of abnormal placentation that causes significant morbidity and mortality.
Incidence is increasing mainly due to increased number of uterine surgeries such as caesarean sections, myomectomy.
Aim: To evaluate the maternal and fetal outcome of placenta accreta spectrum in a rural tertiary care hospital.
Methods: This retrospective study was conducted in the department of Obstetrics and Gynaecology, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly during the period from January 2022 to June 2023. Patients presenting during this period with placenta accreta spectrum were included in the study. The maternal outcome was studied in terms of the amount of intrapartum blood loss, ICU admissions, prolonged hospital stay, bladder injury and disseminated intravascular coagulation.
Results: Total eighteen patients were included in the study who were diagnosed as placenta accreta spectrum either preoperatively or intraoperatively. Out of eighteen, six were placenta accreta, seven were placenta increta and five were placenta percreta. All of these patients underwent peripartum hysterectomy. Seven patients required ICU admission. Internal iliac artery balloon occlusion was performed in four patients. There were two maternal mortalities in the study.
Conclusion: There is significant increase in rate of placenta accreta in patients with history of previous caesarean section. Thorough counseling of the patient regarding morbidity of caesarean section and need for peripartum hysterectomy should be done. Antenatal diagnosis along with multidisciplinary team with planned delivery helps to improve maternal and neonatal outcome.

Keywords: Placenta accreta spectrum, peripartum hysterectomy, internal iliac artery balloon occlusion

Introduction
Placenta Accreta Spectrum (PAS) is a significantly grave obstetrical condition which can lead to massive haemorrhage. PAS was reported as 1:30,000 deliveries in 1950 and has dramatically increased to 1:700 [1]. PAS includes both abnormally adherent placenta where implantation of villi are in direct contact with myometrium without obvious plane of separation and abnormally invasive placenta where villi invade into the myometrium and even nearby organs. It usually occurs when placenta implants at area of defective decidualisation due to defect in endometrial-myometrial interface resulting in absence of normal plane of cleavage preventing placental separation after delivery.
PAS is a growing obstetric issue because of rising incidence of its risk factors like previous caesarean section, placenta previa, prior uterine surgery, pregnancy resulting from assisted reproductive techniques (ART), increasing maternal age and parity [2]. It is associated with major pregnancy complications, including life-threatening maternal haemorrhage, large-volume blood transfusion, and peripartum hysterectomy.
The present study was done to evaluate maternal and fetal outcomes of placenta accreta spectrum in a rural tertiary care hospital.

Materials and Methods
The present study was done in the department of Obstetrics and Gynaecology of a rural tertiary care hospital. The data was retrospectively collected of all women diagnosed with placenta accreta spectrum from January 2022 to June 2023.

Inclusion criteria: All women with singleton pregnancy from 28 weeks of gestation diagnosed with PAS. Diagnosis was made antenatally through ultrasound or MRI assessing depth of myometrial involvement or intra-operatively. Exclusion criteria: Cases with focal placenta accreta.

Data was collected regarding patient's characteristics (Age, parity, gestational age, any history of previous surgery, risk factors, mode of antenatal screening), treatment characteristics (Whether internal iliac artery balloon occlusion done or not, any intra operative complication, amount of blood loss, blood transfusion), and post treatment evaluation (hospital stay, any morbidity or mortality, post-operative complication and neonatal outcome). Further, histopathology was correlated with pre-operative diagnosis of placenta accreta.

Statistical Analysis

The data were presented using frequencies and percentage for categorical variables, means, and standard deviations for continuous variables using basic descriptive statistics. All data analysis was performed using IBM SPSS Statistics for Windows, Version 24.0 (IBM Corp., Armonk, NY).

Results

In the retrospective data collected from January 2022 to June 2023, total number of caesarean sections were 1784 out of which 18 patients were diagnosed as PAS, incidence being 0.01%.

Table 1: Demographic Characteristics

		Number of patients	Percentage
Age	< 25 years	2	11.1%
	25- 35 years	12	66.7%
	>35 years	4	22.2%
Gravida	Primigravida	1	5.5%
	2-3	9	50%
	≥4	8	44.5%
Gestational age	< 34 weeks	1	5.5%
	34– 37 weeks	12	66.7%
	> 37 weeks	5	27.8%
Booking status	Booked	11	61.1%
	Unbooked	7	38.9%
Diagnosis	Antenatal	14	77.8%
	Intrapartum	4	22.2%

Most of the patients belonged in age group of 25-35 years. Mean maternal age was 29.4 years. 94.5% patients were multigravida while only one patient (5.5%) was primigravida who did not have previous history of any uterine surgery. 71.2% patients were preterm who were electively terminated before 37 weeks due to better prognosis in elective termination. 61.1% patient were booked, diagnosed antenatally by ultrasound or MRI and were under regular follow-up. Forteen patients were antenatally diagnosed while four patients were referred from outside. (Table 1)

Table 2: Risk Factors

		Number of patients	Percentage
Previous caesarean section	Previous 1	12	66.7%
	Previous 2	5	27.8%
	Previous 3	0	0%
Previous dilatation & curettage		10	55.5%
Concurrent placenta previa		9	50%
Twin gestation		1	5.5%
IVF conception		2	11.1%

Commonest risk factor predisposing to PAS in present study was previous caesarean delivery accounting for 94.4% followed by previous history of dilatation and curettage (55.5%) followed by concurrent placenta previa (50%). Placenta previa is also an important risk factor for PAS. Five patient in the present pregnancy initially presented as placenta previa but were diagnosed as PAS after an MRI was done. (Table 2)

All of the patients recruited underwent caesarean section in present pregnancy. 77.8% had elective caesarean section while 22.2% landed in emergency caesarean section. Internal iliac artery balloon occlusion was done pre-operatively in four patients (22.2%).

Table 3: Maternal Outcomes

		Number of patients	Percentage
Blood transfusion	1-2 units	9	50%
	3-4 units	4	22.2%
	≥5 units	5	27.8%
Sepsis		8	44.4%
Prolonged hospital stay	(> 7 days)	10	55.5%
ICU admission		7	38.8%
Febrile morbidity		4	22.2%
DIC		4	22.2%
ARDS		6	33.3%
Bladder/ bowel injury		2	11.1%
Mortality		2	11.1%

All the patients required blood transfusion where majority of the patients required one to two units though around 27.8% required ≥ five units. Around 44.4% patients had sepsis among which most of them required ICU admission (38.8%). The mortality was seen in two patients. Massive haemorrhage led to other complications like haemorrhagic shock, disseminated intravascular coagulation, ARDS, acute renal failure which eventually led to multiple organ failure and death. Bladder injury was seen in two patients where placenta was invading posterior bladder wall which kept on oozing. Urologist was called intra-operatively to repair bladder. (Table 3)

Table 4: ICU Interventions Required

	Number of patients	Percentage
Blood transfusion	18	100%
Mechanical ventilation	5	27.7%
Inotrops	5	27.7%
Central line insertion	5	27.7%
Dialysis	3	16.6%

27.7% required mechanical ventilation, inotropic support, central line insertion while 16.6% patients required dialysis. (Table 4)

Table 5: Neonatal Outcomes

		Number of patients	Percentage
Birth weight	< 1.5 Kg	1	5.5%
	1.5 – 2.5 Kg	10	55.5%
	>2.5 Kg	7	38.9%
Prematurity		14	77.8%
Stillbirth		3	16.6%
NICU admission		3	16.6%
APGAR SCORE at 1 min	< 7	3	16.6%
	>7	15	83.3%
APGAR SCORE at 5 min	< 7	2	11.1%
	>7	16	88.9%

61.1% babies were low birth weight babies (<2.5 kg) and 77.8% were premature. There were three (16.6%) stillborn in the present study. Three babies had APGAR <7 at 1 minute while only two babies had APGAR <7 at 5 minutes. Three (16.6%) babies had NICU admission. Main reason for NICU admission was prematurity. The neonatal outcome was not significantly affected by placental invasion rather it was mainly affected by gestational age at the time of termination. (TABLE 5)

Maximum number of patients had placenta increta on histopathology report (38.8%) followed by placenta accreta (33.3%) followed by placenta percreta (27.7%).

Discussion

Placenta accreta spectrum is one of the devastating complications in pregnancy with significant maternal morbidity and mortality. It is one of the leading causes of intractable post-partum haemorrhage and emergency peripartum hysterectomy.

Study done by Aggarwal *et al.* [3] over a period of five years in a tertiary care hospital in Delhi in 2012 found incidence to be 0.04%. In another study by Chaudhari *et al.* [4] incidence of placenta accreta was found to be slightly higher 1.3% during a period of 3 years in a tertiary care hospital in 2014. In present study the incidence is comparatively lower being 0.01%. This may be attributed to the fact that though patients presented in the emergency but they refused to the treatment when high risk and poor prognosis were explained. Our center being in a rural area patients were not motivated and went to big hospitals in cities.

Patients with PAS in the present study had a mean age of 29.4 years and 94% patients were multigravida. These finding correlate with the study by Obajimi *et al.* [5] where morbidly adherent placenta usually occurs in subsequent pregnancies, explaining the increasing age and higher gravidity of the patients a risk factor.

In this study placenta increta was the commonest type (38.8%) followed by placenta accreta (33.2%). This is in concordance to the study by Kumari *et al.* [6] which is in contrast to that reported in literature, accreta being most common (75-78%), increta (17%) and percreta (5-7%) of all women.

Maximum number of patients with PAS were in the gestational age group 34 to 37 weeks. Twelve patients (66.7%) were in this group. Majority patients who were diagnosed antenatally were terminated electively before 37 weeks because elective termination has better prognosis than emergency caesarean. More over as gestational age increases placental and lower segment vascularity also increases leading to massive haemorrhage.

61.1% patients in this study were booked while 38.9% were unbooked. These are similar to the study by Bassetty *et al.* [7] where 67% patients were booked and diagnosed antenatally. The booked cases diagnosed during antenatal period had reduced morbidity as compared to those diagnosed at the time of procedure. Antenatal diagnosis helps in planning delivery with multidisciplinary approach with better feto- maternal outcome. 77.8% patients were diagnosed antenatally while 22.2% were diagnosed intra-operatively where placenta could not be delivered after delivery of baby. The high rates of antenatal diagnosis were mainly due to study being conducted in a tertiary care center where the diagnostic tools such as ultrasound, colour doppler and MRI were available during routine as well as emergency hours.

94.5% patients in this study had a history of previous caesarean section. 66.7% were previous one caesarean section while 27.8% were previous two caesarean sections. Only one patient in the study was primigravida who was also an IVF conception. Our results were in concordance with the study by Wasim *et al.* [8] where history of caesarean section was present in 96% patients. According to similar study by Fitzpatrick *et al.* [9] the odds of having PAS were raised in women who had a previous caesarean delivery (adjusted odds ratio 14.41).

Also in present study concurrent placenta previa was seen in 50% cases which is lesser as compared to 71% in study by Choudhary *et al.*(4) and 64% in study by Fitzpatrick *et al.* [9] In individuals with placenta previa, the risk of placenta accreta dramatically increases with increased number of prior caesarean sections. According to study by Silver RM *et al.* [2] among cases of placenta previa, the risk of placenta accreta was 40% for those having their third caesarean delivery and over 60% for the fourth or greater caesarean delivery.

Two patients (11.1%) in this study had IVF conception. In a study by Modest *et al.* [10] the overall incidence of PAS was 0.4%, and the incidence was higher in the IVF group (2.2%) compared with the non-IVF group (0.3%). When adjusted for maternal age, nulliparity, and year of delivery, women in the IVF group had 5.5 times the risk of PAS compared with women in the non-IVF group. Recent studies suggest that a supraphysiologic hormonal milieu at the time of implantation and placentation resulting from IVF may modulate trophoblast invasion and lead to abnormal placentation [11]. Also, IVF patients have higher rates of both prior uterine curettage and hysteroscopy. Both of these procedures can result in endometrial scarring, an unintended consequence that can be a risk factor in the IVF population. Additionally, the inflammatory process resulting from IVF and associated procedures changes the underlying immune environment of the endometrium and decidua leading to abnormal placentation.

77.8% patients underwent elective caesarean section while 22.2% landed in emergency. None of the patients delivered vaginally. Study by Pham *et al.* [12] also had similar results with elective surgery in 90.7% patients and emergency surgery in 9.3% patients. Planned procedures had better outcomes with reduced morbidity and mortality.

Prophylactic peri-operative bilateral internal iliac artery balloon catheter placement were done in four patients. After caesarean section, in case of non-separation of placenta, hysterectomy was planned but there was risk of catastrophic haemorrhage. To prevent this, prophylactic bilateral internal artery balloon inflation was done. During this procedure bilateral femoral access was done and balloon catheters were placed in anterior division of bilateral internal iliac arteries under minimal fluoroscopic guidance. Then after, lower segment caesarean section was performed in DSA suite under general anaesthesia. Bilateral internal iliac artery balloons were inflated manually once the umbilical cord was clamped by the obstetrician and hysterectomy was performed. This intervention decreased uterine vascularity significantly. These four patients had better outcome in the form of less blood loss, lesser transfusion requirement intra-op and post operatively, lesser operating duration, lesser ICU requirement and reduced duration of hospitalization.

Study by Nankali A *et al*. [13] states that the use of prophylactic internal iliac artery balloon occlusion in patients with placenta previa or Placenta accreta spectrum has benefits such as reduced intraoperative blood loss, reduced hysterectomy and increased gestational age. Another study by Tan *et al*. [14] compares the blood loss between the study (With internal iliac artery balloon occlusion) and control group and concluded that intraoperative blood loss and blood transfusion were significantly lower in study group. The mean duration of surgery was significantly lower in study group. However, length of hospitalization after surgery as well as ICU admission were comparable. In contrast to our study another study Chen *et al*. [15] suggested that Prophylactic internal iliac artery balloon occlusion has no significant effect on reducing hysterectomy rate in patients with placenta previa and accreta, although it could reduce the intraoperative blood loss in patients with massive haemorrhage but it significantly increases the financial cost for patients. Therefore, it should not be routinely recommended to patients with placenta previa and accreta. Thus internal iliac artery balloon occlusion is a newer technique which has proven efficacy for uterine preservation, optimal perioperative outcomes and reduced maternal morbidity. Bilateral internal iliac artery ligation lowers the pulse pressure of the pelvic vasculature by 85% and the rate of blood flow by 50% [16].

Study by Marcellin *et al*. [17] showed morbidity rates as high as 86% and mortality of 3.9%. In another study by Lensen S *et al*. [18] had maternal case fatality rate was 7/1000. In the present study, two patients had mortality (11.1%). Massive haemorrhage caused irreversible haemorrhagic shock which resulted in disseminated intravascular coagulation (DIC) and multiple organ dysfunction syndrome (MODS) in these patients. Mortality rate was higher than Marcellin *et al*. The higher mortality rate cannot be taken per se as study population is less.

In another study by Lensen S *et al*. [18] about 35% patients of accreta had ICU admissions. In present study, ICU admission was almost comparable (38.8%). 27.7% patients needed ICU interventions like mechanical ventilation, inotropic support and central line insertion while 16.6% patients required dialysis.

Some studies report the following incidence of surgical complications in women with PAS – bladder injury (5-40%), urethral injury (0-18%), bowel injury/obstruction (2-4%), venous thromboembolism (4%), surgical site infection (18-32%), massive blood transfusions (5-40%) [12]. In our study, bladder or bowel injury (11.1%) is within similar range. The blood transfusions were required in all patients (100%), though 27.8% required 5 or more blood transfusions which is again within the range of various studies.

Patients with placenta accreta spectrum had poor neonatal outcomes in the form of prematurity, low birth weight babies, stillbirth, low APGAR scores. 61% babies had birth weight less than 2.5 kg, 77.8% were premature out of which 16.6% required NICU admission. Three IUFD were there in the study. 16.6% had low APGAR scores at birth. Balayla J *et al*. [19] also reported adverse neonatal outcome include preterm birth, low birth weight, small for gestational age, and reduced 5-min Apgar scores. Elective termination before 36 weeks in antenatally diagnosed PAS patients could lead to iatrogenic prematurity and NICU admissions.

The small sample size was a limitation of this study. Sample size was further reduced by including only pathology confirmed cases of placenta accreta and excluding cases of focal placenta accreta. Thus, possibly underestimating the rate of PAS.

Conclusion

Placenta accreta spectrum is a major emerging obstetrics epidemic mainly due to increasing number of caesarean sections. It is one of the most dreaded complication as there is increased risk of massive blood transfusions, post-partum haemorrhage, peripartum hysterectomy, surgical injuries, ICU stay, sepsis, prolonged hospital stay, deep venous thrombosis, transfusion related lung injury, disseminated intravascular coagulation and even death. To reduce this caesarean section must be performed only when indicated. PAS should be excluded in patients with risk factors such history of previous uterine surgeries, placenta previa and high parity. Antenatal diagnosis along with multidisciplinary team with planned delivery helps to improve maternal as well as neonatal outcome.

Conflict of Interest

Not available

Financial Support

Not available

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