Liaquat Medical Research Journal (LMRJ)
Open access, Peer review Journal OPEN ACCESS

Original Article

DETERMINANTS OF SPECTRUM AND FETOMATERNAL OUTCOME OF MORBID ADHERENT PLACENTA: AN OBSERVATIONAL STUDY

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DOI: 10.38106/LMRJ.2025.7.3-05
Received: 02.01.2025
Accepted: 25.09.2025
Published: 30.09.2025

ABSTRACT:

The objective of the study was to determine the factors underlying maternal and fetal outcomes of Placenta Accreta Spectrum (PAS). This observational, prospective study was conducted during a period of four years. A total of 9080 patients were admitted in Obstetrics & Gynaecology department throughout this duration. Out of which 147 were diagnosed with the history of antepartum haemorrhage with pregnancy. Full term, near term patients or patients with massive antepartum haemorrhage underwent emergency or elective caesarean section while patients diagnosed in the second or early third trimester on ultrasound or with mild antepartum haemorrhage treated conservatively. In our study, we found that the frequency of Placenta Accreta Spectrum was 1.6%. The average age of the participants was 28.08 years, with age ranging between 17 to 42 years. Most participants lived in urban areas (46%), and a significant number were grand multiparous (70%). We observed that a history of previous caesarean section (62%) and previous placenta previa (68%) increased the risk of PAS. During surgery, the most common complication was bleeding (11.5%), followed by bladder injury (8.8%). The occurrence of PAS cases has significantly risen in the recent years. The PAS is linked with serious health risks for both the baby and the mother. It's crucial to implement strategies aimed at reducing the rate of caesarean sections to mitigate the associated complications, such as placenta previa and PAS, which pose significant risks to maternal and fetal health.

Keywords: Placenta accrete spectrum (PAS), Morbidity, Mortality, Fetal outcome.

INTRODUCTION

Placenta Accreta Spectrum disorder (PAS), also known as abnormally invasive placenta (AIP), presents a multifaceted clinical scenario wherein the placenta fails to detach spontaneously following delivery, leading to a heightened risk of severe haemorrhage if forcibly extracted(1,2). This global health concern exhibits an escalating incidence, attributable primarily to the increasing prevalence of caesarean deliveries, a key predisposing factor for PAS in subsequent pregnancies (3–9). PAS manifests along a spectrum of severity, delineated as placenta accreta (invasion <50% of the myometrium), increta (invasion >50% of the myometrium), and percreta (invasion through the serosa into adjacent pelvic organs). Notably, PAS poses substantial maternal morbidity and mortality risks, thereby emerging as one of the most perilous complications during pregnancy (10).

Enhanced maternal and neonatal outcomes are evident with pre-delivery PAS diagnosis, facilitating management by a multidisciplinary team equipped with specialized expertise in the condition (11,12). The depth of placental invasiveness serves as a crucial determinant of maternal outcomes (12). Therefore, accurate assessment of invasion extent at delivery, patient stratification based on this assessment, and meticulous correlation between prenatal imaging, intra-operative findings, and pathological assessments are pivotal for optimal PAS management and comprehensive comparative analysis across studies (13,14).

The primary objective of this study was to investigate the prevalence and factors associated with PAS disorder within our local population, while also evaluating maternal and fetal outcomes in detail, thereby contributing to a deeper understanding of this intricate obstetric challenge.

The rationale for this study lies in the increasing global incidence of PAS, coupled with its significant maternal morbidity and mortality risks. By investigating the frequency and factors of PAS within our local population, alongside assessing maternal and fetal outcomes, we aimed to contribute valuable insights into the management of this complex obstetric condition. Understanding the prevalence and impact of PAS will inform clinical practice,

facilitating timely diagnosis, multidisciplinary management, and ultimately improving outcomes for both mothers and new born.

METHODS

This was an observational, prospective study conducted during a period of four years (from 1st January 2017 to31st December 2023) at Liaquat University of Medical and Health Sciences hospital and a private sector Hospital in Hyderabad. A total 9080 patients were admitted in Obstetrics & Gynaecology department throughout this duration of those 147 were diagnosed by history of antepartum haemorrhage in pregnancy and confirmed by ultrasound for fetal wellbeing and placental localization or patients diagnosed with placenta previa (morbidly adherent) on ultrasound scan during the antenatal period without antepartum haemorrhage were enrolled in the study. After taking informed consent demographic data, maternal and fetal outcome of patients with Placenta Previa & Accreta Spectrum were recorded. Full term, near term patients or patients with massive antepartum haemorrhage underwent emergency or elective caesarean section while patients diagnosed in second or early third trimester on ultrasound or mild antepartum haemorrhage were treated conservatively. Patients with antepartum haemorrhage other than Placenta Previa & Accreta Spectrum were excluded from this study.

STATISTICAL ANALYSES

Data were analysed by using Statistical Package for Social Sciences software (SPSS) version 20. Data was presented as mean and standard deviation (±SD) for continuous variables while number and percentage presented for categorical variables. *Chi*-square test was used for hypothesis testing and a p-value of ≤0.05 was considered as significant.

RESULTS

In our study, the prevalence of placenta previa and Accreta spectrum disorder was 1.6%. The mean age of affected individuals was 28.08 years, ranging from 17 to 42 years, with a predominance of urban residency observed in 68 (46%) cases. The majority of the patients (88%) had low socioeconomic status, which is a direct factor in accessing care at the right time. Patients with 0 antenatal visits accounted for 29%, while those with 1 to 3 visits accounted for 59% (Table 1). A significant association was identified between placenta previa spectrum and grand multiparity, with 103 (70%) of the participants being grand multiparous. Furthermore, a history of previous caesarean section (92 cases, 62%) and previous placenta previa (100 cases, 68%) were significantly correlated with an increased risk of placenta previa spectrum ($p<0.001$) (Table 2). This finding underscores the importance of obstetric history in identifying individuals at heightened risk for PAS.

The most frequent intraoperative complication encountered was bleeding, occurring in 17 cases (11.5%), followed by bladder injury in 13 cases (8.8%). Additionally, 17 patients (11.5%) necessitated emergency obstetrical hysterectomy to manage severe haemorrhage (Table 3). These intraoperative challenges underscore the complexity and critical nature of managing PAS during delivery. Out of the 147 cases included in our study, 97.9% had uneventful recovery, while 3 individuals succumbed to massive haemorrhage despite receiving emergency surgical intervention and intensive care upon referral from suburban areas. Regarding fetal outcomes, 44 infants (41.1%) survived, with 35 (32.7%) born preterm and 17 (15.8%) stillborn. Additionally, 11 neonates (10.2%) experienced early neonatal death immediately following birth (Table 4).

Table 1. Demographic and Socioeconomic Characteristics of PAS Patients (n=147)

Characteristic	n	%
Urban residency	68	46
Low socioeconomic status	129	88
Antenatal visits = 0	43	29
Antenatal visits 1–3	87	59

Table 2. Obstetric History and Risk Factors for Placenta Previa Spectrum (n=147)

Risk Factor	n	%	*p*-value
Grand multiparity	103	70	—
Previous cesarean section	92	62	<0.001
Previous placenta previa	100	68	<0.001

Table 3. Intraoperative Complications in PAS Patients (n=147)

Complication	n	%
Bleeding	17	11.5

Table 4. Fetal Outcomes in PAS Patients (n=147)

Outcome	n	%
Survived infants	44	41.1

Bladder injury	13	8.8	Preterm birth	35	32.7
Emergency obstetrical hysterectomy	17	11.5	Stillborn	17	15.8
			Early neonatal death	11	10.2

DISCUSSION

The term placenta Accreta was first described in 1937 by Irving and Hertig as a histopathological term as the 'abnormal adherence of the afterbirth in whole or in parts to the underlying uterine wall in the partial or complete absence of decidua(14). The terms placenta accreta and morbidly adherent placenta have been recently substituted by the terms abnormal invasion of placenta or placenta accreta spectrum disorders to encompass cases of both myometrial invasion and invasion beyond the uterus. Globally, the prevalence of AIP has grown, primarily because of the increase in caesarean section rates, which have gone from 1 in 2500 to 1 in 500 births (15). The increased morbidity and mortality among mothers and fetus make the disorder significant. Iatrogenic prematurity is the primary cause of the implications for the fetus, but the increased risk of obstetric haemorrhage and surgical complications mostly affects the mother. A blood transfusion is necessary for up to 90% of patients, with an average blood loss of 3000–5000 mL(16). Hysterectomy and injuries to the ureters, bladder, and colon are examples of surgical complications. Longer hospital stays and a greater frequency of admissions to intensive care units are the outcomes of this. Furthermore, there is an increased prevalence of psychological disorders and post-traumatic stress disorder (PTSD).

According to our study, placenta previa associated morbidly adherent placenta was found to be independently linked to a higher risk of severe maternal and fetal morbidities and mortalities including surgical morbidities, longer hospital stay, higher inpatient costs, and a higher use of surgical procedures (such as hysterectomy, cesarean delivery, cystoscopy, urinary system repair and bowel repair) bleeding, transfusion of blood products, iatrogenic fetal prematurity and its consequences. Placenta previa has also been linked to a markedly increased risk of blood product transfusion, shock, disseminated intravascular coagulation or other coagulopathy, urinary tract damage, and peripartum hemorrhage. A higher risk of bleeding persisted among patients with PAS and placenta previa. Fitzpatrick KE, Sellers S, Spark P, et al and HudonL,et al found the same results (17,18) . Placenta praevia and previous caesarean section are the two most recognized risk factors for AIP A recent systematic review by Marshall NE et al reported an increase in the incidence of abnormally invasive placenta from 3.3%–4% in women with placenta praevia and no previous caesarean section to 50%–67% in women with three or more previous caesarean deliveries(18). Pregnant patients with both PAS and placenta previa complications may have a compounded risk of maternal morbidities and worse outcomes than patients with PAS but not placenta previa, as both conditions are independently linked to significant morbidity and mortality (19-23). According to a research by Mulla et al. comprising 105 PAS patients, the median estimated perinatal blood loss volume was significantly larger in those with concurrent placenta previa than in those without it (3500 mL versus. 1200 mL; $P < .001$) (24). Additionally, Heading et al. discovered that, out of 134 PAS patients, those who had placenta previa had significantly larger estimated blood loss volumes (25).

Fetal outcome in our study was 44(41.1%) remained alive, 35 preterm (32.7 %) and 17 (15.8%) stillborn, while 11(10.2%) died just after birth (early neonatal death ENND).The findings of this investigation offer more evidence that, among patients with PAS, placenta previa is a significant risk factor linked to a higher probability of unfavorable maternal outcomes. Placenta previa may be regarded as an independent risk factor linked to a higher chance of poorer maternal outcomes among patients with PAS, in addition to being a risk factor and screening indicator for the condition. To enhance the results for patients with placenta previa-complicated PAS, routine Antenatal care, special Doppler ultrasound and magnetic resonance imaging MRI for localization &morbid adherence of placenta may need to be evaluated or improved. Our findings underscore the critical importance of comprehensive antenatal care and advanced imaging modalities in the management of placenta previa-complicated placenta accreta spectrum disorders (PAS). Healthcare providers should prioritize early detection and intervention to mitigate the heightened risks of maternal and fetal morbidity and mortality associated with this condition. Integrating Doppler ultrasound and magnetic resonance imaging (MRI) into routine protocols can enhance diagnostic accuracy and guide treatment decisions, ultimately improving outcomes for affected patients. Strategies aimed at minimizing surgical interventions, optimizing blood management, and addressing psychological well-being are essential to enhancing maternal health in PAS cases. While our study contributes

valuable insights into the implications of placenta previa complicating PAS, several limitations warrant consideration. The retrospective design of our investigation may have introduced biases and confounding variables, potentially impacting the validity of our results. Additionally, the study's sample size may have been insufficient to detect rare outcomes or subtle differences, limiting the generalizability of findings to broader populations. Future research endeavors should aim to address these limitations and further elucidate strategies for optimizing outcomes in this complex and high-risk obstetric condition.

CONCLUSION

The incidence of placenta accreta spectrum has significantly risen in recent years, a trend expected to persist due to increased rates of caesarean section deliveries and assisted reproductive technologies. PAS poses significant risks to both maternal and fetal health, with high morbidity and mortality rates. Measures are needed to decrease caesarean section rates and mitigate associated complications such as placenta previa and PAS. Prenatal diagnosis plays a crucial role in improving outcomes for both mother and fetus. With advancements in ultrasound technology and increasing expertise among physicians, ultrasound has become as effective as MRI in diagnosing anterior placental invasion, particularly as PAS reoccurrences rise.

Conflict of Interest

Authors declare no conflict of interest.

Ethical consideration

The study was approved by local research ethics committee.

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