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A Clinical Profile of Placenta Accreta Spectrum Disorders in a Tertiary Care Centre

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Abstract

Introduction: Placenta accreta spectrum (PAS) refers to abnormal placental implantation. In placenta accreta, villi attach to the myometrium due to the lack of decidua. Placenta increta involves villi invading uterine muscles and blood vessels, while placenta percreta extends beyond the uterus, affecting structures like the bladder. Risk factors include placenta previa, prior uterine surgery, manual placental removal, uterine anomalies, and multiple pregnancies. Complications can range from severe hemorrhage and sepsis to hysterectomy or even death if untreated. Magnetic resonance imaging is the most reliable diagnostic tool. RCOG guidelines recommend delivery between 34 and 36 weeks for confirmed cases. Treatment depends on severity and reproductive goals, with hysterectomy often being the preferred option after resuscitation and blood transfusion.

Methods: After receiving approval from the institutional ethics committee, patient records with placenta accreta syndrome were reviewed and analyzed. The study evaluates the type of adherent placenta, associated socio- clinical factors, relevant medical history, diagnostic methods, and management approaches used during delivery. Additionally, maternal and fetal outcomes were assessed.

Results: A total of 30 patients with placenta accreta spectrum were included in the study. The increased incidence was seen with increasing age. Most of them had history of lower segment cesarean section out of which few underwent cesarean hysterectomy. There was association of pelvic inflammatory disease , artificial reproductive techniques , dilatation and curettage . Blood transfusion was needed in most cases and most babies had neonatal intensive care unit admission due to preterm delivery.

Conclusion: Placenta previa is the most critical risk factor for pathological placentation, with a prior cesarean section being the next most significant. Prenatal diagnosis through ultrasonography and magnetic resonance imaging is essential for improving clinical outcomes. A multidisciplinary approach in managing pregnant women with placenta accreta spectrum disorders has been shown to effectively reduce blood loss, the need for hysterectomy, hospital stay duration, and intensive care unit admissions.

Categories: Obstetrics/Gynecology

Keywords: ultrasonography, placenta percreta, placenta increta, magnetic resonance imaging, lower segment cesarean section, placenta previa, placenta accreta spectrum disorder

INTRODUCTION

Placenta accreta spectrum (PAS) disorder refers to a condition in which the placenta is abnormally implanted, invasive, or overly adherent to the uterine wall. This occurs due to the partial or complete absence of the decidua basalis and fibrinoid layer, leading to firm placental attachment. Several factors increase the risk of PAS, including placenta previa, prior uterine surgery, manual placental removal, uterine anomalies, and grand multiparity. A history of cesarean delivery is also a significant contributing factor. Management generally involves planned preterm cesarean hysterectomy with the placenta left in situ [1].

Placenta accreta occurs when the placental villi attach directly to the superficial myometrium due to the absence of the decidua. In placenta increta, the villi invade the uterine muscle fibers and may extend into the deeper uterine blood vessels. Placenta percreta is the most severe form, where the placental tissue can either remain limited to the uterine serosa or infiltrate surrounding organs such as the bladder and other pelvic structures. Maternal outcomes largely depend on early detection, either before or during delivery, and accurate differentiation between adherent and invasive forms. [2]

Placenta accreta spectrum is considered a high-risk condition with serious associated morbidities; therefore, American College of Obstetricians and Gynecologists (ACOG) and the Society for Maternal-Fetal Medicine recommend these patients receive level III (subspecialty) or higher care. This level includes continuously available medical staff with appropriate training in managing complex maternal and obstetric complications, including placenta accreta spectrum, as well as consistent access to interdisciplinary staff with expertise in critical care [3].

The maternal risks associated with Placenta accreta spectrum are significant, including hemorrhage, hysterectomy, and death. The primary concern for the fetus and newborn is the risk of premature birth. Large cesarean scar defects in the lower uterine segment are associated with inadequate decidualization and thinning or loss of the subdecidual myometrium. These changes facilitate deeper implantation of the placental anchoring villi and migration of extravillous trophoblast cells closer to the uterine serosa.

Possible complications include heavy bleeding, shock, infection, uterine inversion, the need for hysterectomy, bladder perforation, and, if left untreated, potentially fatal outcomes. Magnetic resonance imaging (MRI) is regarded as the most reliable method for diagnosing these abnormalities.

According to RCOG guidelines, pregnancies complicated by placenta accreta should be delivered between 34 and 35+6 weeks of gestation. The management approach is determined by the severity of the condition and the patient's reproductive plans. In younger women who desire future pregnancies, a conservative approach may be considered, incorporating medication and additional surgical interventions. In cases where the placenta has invaded the bladder, a cesarean hysterectomy along with a partial cystectomy is performed. The most effective treatment for placenta accreta syndrome remains hysterectomy, following patient stabilization and blood transfusion.

MATERIALS AND METHODS

This observational study was conducted in the obstetrics department of a tertiary care center over a six-month period, from December 12, 2024, to June 10, 2025. During this time, patient records with placenta accreta spectrum disorders from the past five years were reviewed and analyzed for those who were admitted and delivered in the obstetrics ward. The study aimed to provide a comprehensive analysis of these cases within the institution. Patients were included in the study if they had complete medical records documenting their admission and delivery with a confirmed diagnosis of placenta accreta spectrum disorders. Exclusion criteria encompassed incomplete or lost records, inconclusive evidence, patients who were discharged against medical advice, and those who did not deliver at the hospital.

A convenience sampling technique was employed, and the sample size was determined to be 30 using Cochran's formula $n=Z2p(1-p)/d2n = Z^2p(1-p)/d^2n=Z2p(1-p)/d2$. Statistical analysis was conducted by a statistician. The statistical analysis was conducted using IBM SPSS Statistics for Windows, Version 25.0 (Released 2017; IBM Corp., Armonk, NY, USA). Descriptive statistics, including frequency and percentage distributions, were used to summarize the collected data. The study examined various parameters, including maternal age, gestational age, parity, socioeconomic status, ultrasound findings (placental location and depth of invasion), MRI findings, mode of delivery, medications administered, surgical interventions performed, histopathological findings, and maternal and fetal outcomes. The research posed no risks to participants. Approval for the study was obtained from the Central Research and Publication Unit and the Institutional Ethics Committee (IRB Name and Number - BV(DU)MC&H/Sangli/IEC/600/24).

The proforma used for data collection included the Appendices (Table *13*). This structured approach ensured a thorough assessment of each case, facilitating a detailed evaluation of placenta accreta spectrum disorders within the study population.

RESULTS

A total of 30 patients with placenta accreta syndrome were included in the study. Among the Placenta accreta spectrum disorders the incidence of accreta 13 (43.3%) was more compared to increta

11(36.7%)and percreta 6(20%).

The increased incidence of placenta accreta syndrome was seen in women with increasing age. The mean age group of women studied in this study was 28yrs and 16 (53.33%) belonged to age between 20-29years shown in Table *1*. With standard deviation being 3.87, it indicates moderate spread of cases across different maternal age groups with the most affected age group being 20-29 years with 16 cases whereas other groups have significantly fewer cases. the standard deviation suggests that while most cases are concentrated around the mean, there is still some variability, likely influenced by the lower cases in extreme age groups(less than 19yrs and greater than 35 years)

Age in years	Placenta accreta	Placenta increta	Placenta percreta 3a	Placenta percreta 3b	Placenta percreta 3c	Total
<19	0	1 (9.1%)	1 (20.0%)	0	0	2 (6.7%)
20-29	10 (76.9%)	4 (36.4%)	1 (20.0%)	1 (100%)	0	16 (53.3%)
30-35	3 (23.1%)	4 (36.4%)	2 (40.0%)	0	0	9 (30.0%)
>35	0	2 (18.2%)	1 (20.0%)	0	0	3 (10.0%)
Total	13 (100%)	11 (100%)	5 (100%)	1 (100%)	0	30 (100%)

Most of the patients were diagnosed between 36 to 40 weeks gestational age; those diagnosed during delivery 7 (23.3%) had more complications compared to the ones diagnosed antenatally shown in Table *2*. Standard deviation of 4.54 suggests a slightly higher spread in the distribution of cases across different gestational ages. 36-40 weeks groups have higher case counts contributing to deviation. the variation maybe attributed to late diagnosis or difference in case severity at different gestational ages.

Gestational age	Placenta accreta	Placenta increta	Placenta percreta 3a	Placenta percreta 3b	Placenta accreta 3c	total
28-32 Weeks	2(15.3%)	1(9.09%)	0	0	0	3(10.0%)
32-36 Weeks	2(15.3%)	3(27.3%)	0	0	0	5(16.7%)
36-40 Weeks	7(53.8%)	6(54.5%)	2(40.0%)	0	0	15(50.0%)
During delivery	2(15.3%)	1(9.09%)	3(60.0%)	1(100%)	0	7(23.3%)
Total	13(100%)	11(100%)	5(100%)	1(100%)	0	30(100%)

As previous history of cesarean was one of the most important risk factor 28 (93.3%) of them were multigravida in the study shown in Table *3*. With high standard deviation of 7.96 , it indicates large spread in number of cases between primigravida (first pregnancy) and multigravida(multiple pregnancies). Most cases (28 out of 30) occurred in multigravida patients, confirming that a history of pregnancy is a significant risk factor. The high standard deviation shows that the cases are highly skewed towards one group (multigravida), making it dominant risk factor in this study .

Parity	Placenta accreta	Placenta increta	Placenta percreta 3a	Placenta percreta 3b	Placenta percreta 3c	total
Primigravida	2(15.4%)	0	0	0	0	2(6.7%)
Multigravida (2-3)	11(84.6%)	11(100%)	5(100%)	1(100%)	0	28(93.3%)
Total	13(100%)	11(100%)	5(100%)	1(100%)	0	30(100%)

4 (13.3%)of the undiagnosed patient underwent vaginal delivery and the rest of them had lower segment cesarean section out of which most of them that is 15 (50%) of them had cesarean hysterectomy indicating

its strong association with placenta accreta spectrum disorders which is shown in Table *4*. With standard deviation of 3.1 moderate variability is seen in distribution of cases across different delivery methods.

Mode of delivery	Placenta accreta	Placenta increta	Placenta percreta 3a	Placenta percreta 3b	Placenta percreta 3c	total
Vaginal	3(23.1%)	0	0	0	0	3(10.0%)
Instrumental vaginal	1(7.7%)	0	0	0	0	1(3.3%)
Emergency LSCS	2(15.4%)	3(27.3%)	1(20.0%)	0	0	6(20.0%)
Elective LSCS	4(30.8%)	1(9.1%)	0	0	0	5(16.6%)
Cesarean hysterectomy	3(23.1%)	7(63.6%)	4(80.0%)	1(100%)	0	15(50.0%)
Total	13(100%)	11 (100%)	5(100%)	1 (100%)	0	30(100%)

Patients had history of IVF conception , pelvic inflammatory disease , anomalous uterus , fibroid and majority had history of previous cesarean section 26 (86.6%) , dilatation and curettage 11 (36.6%)and were associated with placenta previa 14 (46.6%) which is shown in Table *5*. Standard deviation of 4.20 shows higher variability with cases more unevenly spread across different medical histories. Previous LSCS had the most significant impact, making it a dominant risk factor.

PREVIOUS HISTORY	Grade I	Grade II	Grade IIIa	Grade 111b	Grade 111c	Total	Percentage out of total cases (30)
dilatation and curettage	5(45.4%)	4(36.3%)	2(18.1%)	0	0	11(100%)	36.66%
previous LSCS	10(38.4%)	10(38.4%)	5(19.2%)	1(3.8%)	0	26(100%)	86.66%
pelvic inflammatory disease	1(100%)	0	0	0	0	1(100%)	3.33%
endometriosis	0	0	0	0	0	0	0
IVF conception	1(100%)	0	0	0	0	1(100%)	3.33%
anomalous uterus	1(100%)	0	0	0	0	1(100%)	3.33%
tuberculosis	0	0	0	0	0	0	0
myomectomy	0	0	0	0	0	0	0
endometrial ablation	0	0	0	0	0	0	0
uterine adhesiolysis	0	0	0	0	0	0	0
fibroid/adenomyosis	1(100%)	0	0	0	0	1(100%)	3.33%
placenta previa	3(21.4%)	7(50.0%)	3(21.4%)	1(7.1%)	0	14(100%)	46.6%
Other surgeries	0	0	0	0	0	0	0

Patients were first tried to manage conservatively with medical methods post delivery for placenta removal with further dose of Injection OXYTOCIN 27 (90%) and Injection .CARBOPROST 17 (56.6%)in most of the cases which is shown in table *6*. This shows high variability with standard deviation being 5.52 , indicating that some drugs like Oxytocin(27 cases) and Carboprost (17 cases) were most commonly used drugs for management.

Drugs used	Grade I	Grade 11	Grade 111a	Grade 111b	Grade IIIc	Total	Percentage out of total cases(30)
Injection Oxytocin	12(44.4%)	10(37.03%)	4(14.8%)	1(3.7%)	0	27(100%)	90%
Injection Ergometrine	2(100%)	0	0	0	0	2(100%)	6.66%
Tablet Methergine	3(21.4%)	6(42.8%)	4(28.57%)	1(7.1%)	0	14(100%)	46.66%
Injection Methotrexate	3(100%)	0	0	0	0	3(100%)	10%
Injection Carbitocin	1(33.3%)	1(33.3%)	1(33.3%)	0	0	3(100%)	10%
Injection Carboprost	3(17.6%)	8(47.05%)	5(29.4%)	1(14.2%)	0	17(100%)	56.66%
Tablet Misoprostol	8(100%)	0	0	0	0	8(100%)	26.66%

All the cases were confirmed by histopathological reports as shown in Table *7*. A moderate level of variability with standard deviation 5.83 suggests that some findings like placenta accreta has higher cases than others.

Findings	Number	Percentage
Placenta Accreta	13	43.3%
Placenta Increta	11	36.6%
Placenta Percreta 3a	5	16.6%
Placenta Percreta 3b	1	3.3%
Placenta Percreta 3c	0	0
total	30	100%

24 (80%) cases were diagnosed by ultrasonography and the management was planned accordingly a shown in table *8*. Standard deviation of 4.87 shows lower variability with cases more evenly spread across different findings of diagnostic methods used. 10 cases out of 13 (76.9%) of placenta accreta and 10 cases out of 11 (90.9%) of increta cases were diagnosed beforehand and were useful in the planning of the management.

Findings	Total	Percentage out of 24 cases
Placenta Accreta	10(76.9%)	41.6%%
Placenta Increta	10(90.9%)	41.6%
Placenta Percreta 3a	3(60.0%)	12.5%
Placenta Percreta 3b	1(100%)	4.1%
Placenta Percreta 3c	0	0

Most of them belonged to class V -lower class according to Modified BJ Prasad classification as shown in table *9*. standard deviation of 5.94 suggests high variability with cases more unevenly distributed across socioeconomic classes , with Class 4 and 5 having higher number of cases than others. High variability suggests socioeconomic status significantly influences the placenta accreta spectrum cases.

Findings	I	II	III	IV	V
Placenta Accreta	2 (66.6%)	1(50.0%)	3(60.0%)	3 (33.3%)	4(36.6%)
Placenta Increta	0	1(50.0%)	1(20.0%)	3(33.3%)	6(54.5%)
Placenta Percreta 3a	0	0	1(20.0%)	3(33.3%)	1(9.09%)
Placenta Percreta 3b	1(33.3%)	0	0	0	0
Placenta Percreta 3c	0	0	0	0	0
Total	3(100%)	2 (100%)	5 (100%)	9(100%)	11 (100%)

To prevent excessive bleeding uterine , ovarian and internal iliac artery ligation was done in certain cases .Cesarean hysterectomy was done in 15 (50%) cases. For Placenta percreta with bladder involvement partial cystectomy was done with multidisciplinary approach as shown in table *10*. Standard deviation of 1.03 of Manual removal of placenta , 8.24 of uterine artery ligation, 3.35 of internal iliac artery ligation,5.4 of cesarean hysterectomy and high variability particularly in uterine artery ligation (variance - 67.87) and cesarean hysterectomy (variance- 29.2) indicates that these procedures were applied inconsistently across different cases.

SURGICAL MANAGEMENT USED	GRADE I	GRADE II	GRADE 111a	GRADE IIIb	GRADE IIIc	TOTAL	Percentage out of 30 cases
Manual removal of placenta	2(100%)	0	0	0	0	2(100%)	6.6%
Uterine artery ligation	9(40.9%)	9(40.9%)	4(18.1%)	0	0	22(100%)	73.3%
Internal iliac artery ligation	4(44.4%)	3(33.3%)	2(22.2%)	0	0	9(100%)	30.0%
Cesaerean hysterectomy	3(20.0%)	7 (46.6%)	4(26.6%)	1 (6.6%)	0	15(100%)	50.0%
B lynch sutures	3(50.0%)	3(50.0%)	0	0	0	6(100%)	20.0%
Partial Cystectomy	0	0	0	1(100%)	0	1(100%)	3.3%
Ovarian artery ligation	2(50.0%)	2(50.0%)	0	0	0	4(100%)	13.3%
Packing	4(44.4%)	5(55.5%)	0	0	0	9(100%)	30.0%

TABLE 10: Distribution of cases according different surgical management used

Blood transfusion was needed in most of the patients , 17(56.6%) of them needed ICU admission as shown in table *11*. Placenta accreta shows a standard deviation of 4.86 and increta shows a standard deviation of 4.55 and have highest mean values and variances suggesting these conditions required more interventions maybe due to more cases of accreta and increta.

Findings	ICU Admission	Mortality	No complications	Blood Transfusion
Placenta Accreta	6(35.2%)	0	2(66.6%)	11(40.7%)
Placenta Increta	5(29.4%)	0	1(33.3%)	10 (37.03%)
Placenta Percreta 3a	5(29.4%)	0	-	5(18.5%)
Placenta Percreta 3b	1(3.7%)	1(100%)	-	1(3.7%)
Placenta Percreta 3c	0	0	-	1(3.7%)
Total	17(100%)	1 (100%)	3 (100%)	27 (100%)
Percentage out of 30 cases	56.66%	3.33%	10%	90%

Of the patients who had preterm delivery most of the newborns 15 (50%) had Neonatal ICU admission and 4 (13.3%) of them had mortality as shown in table *12*. Similarly in fetal outcomes placenta accreta and increta shows maximum complications with standard deviation of 2.52 each maybe due to more number

of cases.

FINDINGS	NO COMPLICATION	NICU ADMISSION	MORTALITY
Placenta Acreta	4(36.3%)	7 (46.6%)	2(50.0%)
Placenta Increta	6(54.5%)	4(26.6%)	1(25.0%)
Placenta Percreta 3a	1(9.0%)	3(20.0%)	1(25.0%)
Placenta Percreta 3b	0	1 (6.6%)	0
Placenta Percreta 3c	0	0	0
Total	11(100%)	15(100%)	4(100%)
Percentage out of 30 cases	36.66%	50%	13.33%

TABLE 12: Distribution of cases according to fetal outcome

DISCUSSION

Placenta accreta spectrum (PAS) disorders, also referred to as adherent placenta, occur when part or all of the placenta attaches too deeply into the myometrium, serosa, or even nearby pelvic structures. This condition arises due to the absence of the decidua basalis, a missing Nitabuch's layer, or excessive invasiveness of cytotrophoblast cells.

Placenta accreta spectrum is more commonly observed in older women, individuals from lower socioeconomic backgrounds, and those with multiple pregnancies. The risk is higher in patients with a history of uterine procedures such as dilation and curettage, cesarean section, myomectomy, or conditions like pelvic inflammatory disease, endometriosis, and uterine anomalies. Additionally, factors such as in vitro fertilization (IVF) conception, uterine fibroids, tuberculosis, and previous endometrial ablation may contribute to its occurrence. Placenta accreta spectrum is frequently associated with abnormal placental positioning, particularly in cases of placenta previa. Silver and Branch also significantly contributed to the understanding and identification of risk factors associated with placenta accreta spectrum , particularly the increased risk linked to multiple previous caesarean delivery [1].

In our study, the most significant risk factor identified was a history of previous cesarean delivery, followed by placenta previa. Jauniaux et al. adopted the updated classification system from the International Federation of Gynecology and Obstetrics (FIGO), which enhances the accuracy of future systematic reviews and meta-analyses. This classification provides more precise epidemiological data, which are crucial for developing improved management strategies.

Markers such as maternal serum alpha-fetoprotein and beta-human chorionic gonadotropin may aid in identifying placenta accreta spectrum (PAS), as elevated levels of either can indicate a higher likelihood of the condition. Cahill et al. emphasized that conservative or expectant management should be reserved for carefully selected Placenta accreta spectrum cases, following thorough counseling on the associated risks, uncertain benefits, and variable effectiveness, considering it an investigational approach. Additionally, color flow Doppler imaging can assist in diagnosis, with turbulent lacunar blood flow being the most frequently observed feature of placenta accreta spectrum on this imaging modality. Delayed interval hysterectomy is an expectant approach to placenta accreta spectrum, except that future fertility is not a consideration, and minimizing blood loss and tissue damage are the primary goals [3].

In our study, 50% of the patients received conservative management. Bloomfield and Rogers emphasized that women with placenta previa and a prior cesarean delivery should undergo specialized ultrasounds at centers of excellence. While imaging abnormalities can be detected throughout pregnancy, placenta accreta spectrum (PAS) is most often suspected during the routine anomaly scan conducted between 18 and 20 weeks of gestation. A combined approach using transabdominal and transvaginal ultrasound has demonstrated a diagnostic sensitivity of 90% (95% confidence interval) and a specificity of 97% (95% confidence interval). Magnetic resonance imaging can be used for assessing posterior placentas and depth of invasion [4].

Antenatal diagnosis should be established using ultrasound with color Doppler, beginning in the second trimester. Key ultrasound findings include large placental lacunae with a "moth-eaten" appearance, thinning of the retroplacental myometrium, vascular bridging between the placenta and bladder serosa, disruption of the bladder serosa interface, and the absence of the normal hypoechoic zone behind the placenta. If ultrasound findings are inconclusive, MRI can serve as an additional diagnostic tool.

Women diagnosed with placenta accreta spectrum (PAS) should give birth in specialized centers equipped with immediate access to blood products, an intensive care unit, and a neonatal intensive care unit. The procedure should be managed by a multidisciplinary team experienced in complex pelvic surgeries. Donovan and Shainker investigated the maternal risks associated with PAS, including severe hemorrhage, hysterectomy, and mortality. Fetal and neonatal risks are primarily the result of premature delivery [5].

Horgan and Abuhamad did a meta-analysis and demonstrated that among patients with Placenta Accreta Spectrum , 63% were placenta accreta, 15% were placenta increta, and 22% were placenta percreta [6]. In our study, majority was placenta accreta [43.3%], followed by placenta increta [36.6%] and placenta percreta [20%].

In the absence of factors increasing the risk of preterm birth, a planned delivery between 35 and 37 weeks of gestation offers the optimal balance between fetal maturity and the risk of unplanned delivery. When placenta accreta is limited in both depth and surface area, and the entire implantation site is accessible without deep pelvic invasion, uterus-preserving surgery, such as partial myometrial resection, may be a viable option.

If the placenta is left in situ, close monitoring through regular ultrasound examinations is essential, along with immediate access to emergency care in case of complications like hemorrhage or infection. In cases where placenta accreta spectrum (PAS) is unexpectedly diagnosed after delivery, the placenta should remain in place, and an emergency hysterectomy should be performed. For severe cases identified before delivery, where placental detachment may result in uncontrollable bleeding, an en bloc cesarean hysterectomy that is removing the uterus along with the placenta is recommended. Uterus-preserving strategies, such as leaving the placenta in situ for a monitored, conservative approach, should only be considered in carefully selected cases.

Key elements of optimal care include direct supervision by a consultant obstetrician during delivery, anesthesia management by a consultant anesthetist, readily available blood and blood products, and a multidisciplinary team involved in preoperative planning, patient discussions, and consent. Additionally, access to a critical care unit should be ensured. Einerson ,Gilner and Zuckerwise highlighted that post-surgical complications may include high rates of post-traumatic stress disorder, chronic pelvic pain, reduced quality of life, and depression. In cases diagnosed prenatally, cesarean hysterectomy remains the most common and definitive treatment. The choice of conservative or alternative management depends on institutional expertise, available resources, the severity of placenta accreta spectrum disorder, and patient preferences. Any institution that offers obstetric care must anticipate the potential for encountering undiagnosed placenta accreta spectrum and have a pathway for escalation to a higher level of care [7].

In this study, all cases that were diagnosed early benefited from a multidisciplinary approach, leading to a reduction in complications. Liu X et al. reviewed evidence-based data on placenta accreta spectrum, covering aspects such as prevalence, risk factors, pathogenesis, clinical presentation, prenatal screening, and clinical management.

Currently, the pathogenesis of placenta accreta spectrum is believed to be linked to detectable and microscopic injuries to the endometrium. Early detection through prenatal screening plays a crucial role in managing placenta accreta spectrum effectively. Obstetric ultrasound is recommended for diagnosing or ruling out placenta accreta spectrum between 18 and 24 weeks of gestation. Additionally, MRI serves as a valuable diagnostic tool, offering advantages over ultrasound in assessing the depth of invasion and involvement of the bladder. The value of maternal biomarkers is quite limited in predicting this disease, for their low diagnostic accuracy and relative inaccessibility in lower economic settings [8].

In this study, most cases were diagnosed using ultrasonography and later confirmed with MRI. Jauniaux et al. found that over 70% of samples exhibited thick fibrinoid deposits between the tips of the anchoring villi and the uterine wall, as well as surrounding deeply implanted villi.

The presence of these dense deposits disrupts the uteroplacental interface and eliminates the normal plane of separation, contributing to abnormal placental attachment. The extent of the scar defect, the volume of placental tissue growing within the scar, and the remaining myometrial thickness in the affected area determine the distance between the placental basal plate and the uterine serosa, ultimately influencing the risk of placenta accreta [9].

Cappanolo et al. analyzed nine clinical practice guidelines, with 44.4% evaluating specific referral risk factors, primarily including placenta previa, previous cesarean delivery, or prior uterine surgery. Additionally, 55.6% recommended ultrasound screening for women with identified risk factors during the second and third trimesters, while 33.3% suggested the use of magnetic resonance imaging (MRI) for further assessment ; 88.9% of them recommended caeserean delivery at 34-37 weeks of gestation [10].

In this study, cases identified early underwent planned delivery between 36 and 38 weeks. Bhide reported that a substantial percentage (25-43%) of women with a history of one or more cesarean sections exhibited a defect in the scar. The prevalence of this defect varies based on the diagnostic method and definition applied. This defect, referred to as a "niche" or "isthmocele," is characterized by deficient decidua .The decidua is deficient, and the myometrium in the niche is replaced by fibrous tissue [11].

Chen K et al indicate that although conservative management of placenta accreta spectrum does not negatively impact future fertility, it is associated with considerable risks in subsequent pregnancies. These risks include a high likelihood of accreta spectrum recurrence, severe postpartum hemorrhage , and an increased rate of adverse delivery outcomes. Therefore, patients should receive detailed counseling regarding these potential complications. Future pregnancies require thorough preconception guidance, careful antenatal monitoring, and personalized management strategies to mitigate these risks effectively.Neonatal outcomes were generally favorable [12].

Uterus-conserving methods, including leaving the placenta in place for observation or performing uteroplacental excision, should be reserved for carefully chosen cases. In uncommon situations, a supracervical hysterectomy may serve as an alternative to a complete cesarean hysterectomy, depending on the patient's specific condition. However, the most suitable management approach should be determined based on the individual clinical context and with guidance from a team of specialized healthcare professionals. In cases where PAS is known preoperatively, uterotomy should be performed as far as possible from the placental attachment site [13].

Fluid resuscitation monitored through the inferior vena cava collapse index can significantly minimize the need for blood and fluid transfusions, as well as blood loss, in patients experiencing severe postpartum hemorrhage. Additionally, it enhances blood coagulation function. This approach is particularly effective in managing fluid volume and coagulation in patients undergoing cesarean sections for placenta accreta when guided by inferior vena cava diameter and inferior vena cava collapse index [14].Women who have undergone the Triple-P procedure for severe placenta accreta spectrum (PAS) may be able to pursue a second pregnancy with careful monitoring and management by an experienced multidisciplinary team, potentially leading to positive outcomes [15]. Effective management of placenta accreta spectrum requires a multidisciplinary approach to optimize maternal and fetal outcomes. Early diagnosis, individualized treatment strategies, and advances in surgical techniques have significantly improved patient prognosis. Ongoing research and collaboration among specialists remain essential to refining treatment protocols and reducing complications associated with placenta accreta spectrum. Continued efforts in early detection, preventive strategies, and innovative interventions will further enhance the quality of care and improve long-term outcomes for affected patients.

STUDY LIMITATIONS

As a retrospective study, this research was limited to reviewing past medical records, preventing the evaluation of all treatment approaches, including newer or advanced interventions. Some records were incomplete or unavailable, potentially introducing selection bias and restricting the analysis of certain variables. Financial constraints may have also limited access to advanced management options, such as interventional radiology, which could have influenced the overall findings.

Variability in documentation quality and consistency across different clinicians and time periods may have affected data accuracy and reliability. Additionally, the absence of standardized imaging and diagnostic protocols posed a challenge in ensuring uniform assessment. Since the study relied on retrospective data,

controlling for confounding factors, such as pre-existing maternal conditions and variations in clinical management, was difficult.

The findings may not be entirely generalizable to other healthcare settings due to differences in institutional protocols, available resources, and patient demographics. Furthermore, the study primarily focused on immediate maternal and fetal outcomes, lacking long-term follow-up on fertility, recurrence risk, and overall maternal health. Only patients with complete medical records and deliveries at the study institution were included, potentially excluding cases with different management approaches or those lost to follow-up.

Future prospective studies addressing these limitations could provide deeper insights into placenta accreta spectrum disorders, ultimately leading to improved maternal and fetal outcomes.

CONCLUSIONS

The most significant risk factor for abnormal placentation is placenta previa, followed by a history of cesarean section. The incidence of this condition is increasing due to the rising number of previous lower- segment cesarean deliveries, leading to higher rates of maternal and neonatal complications. Prenatal identification using ultrasonography and magnetic resonance imaging is essential for improving outcomes. Accurate diagnosis ensures optimal management, with delivery planned at specialized centers equipped with multidisciplinary care teams. Given the high risk of bleeding during and after delivery, the availability of blood products for transfusion is crucial. A combined management approach for pregnant women with Placenta Accreta Spectrum disorders has been shown to effectively reduce blood loss, the need for hysterectomy, hospital stay duration, and intensive care unit admissions.

Appendices

Parameters
Age-
Socioeconomic status-
Gestational age-
Obstetric history-
Past history- Medical – Surgical -
General examination-
Systemic examination-
Per speculum examination-
Per vaginal examination-
Diagnosis
Investigations-
Ultrasonography findings -
Magnetic resonance imaging findings-
Mode of delivery
Additional surgical methods used -
Drugs used -
Maternal outcome -
Fetal outcome -
Histopathology report-

Additional Information

DISCLOSURES

Human subjects: Consent for treatment and open access publication was obtained or waived by all participants in this study. Institutional Ethics Committee , Bharati Vidyapeeth (Deemed to be University) Medical College and Hospital, Sangli , 416416 issued approval BV(DU)MC&H/Sangli/IEC/600/24. In light of discussion related to documents submitted, I hereby inform you that; an unanimous decision has been reached and your research proposal has been approved.

Animal subjects: All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from

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REFERENCES

1. Silver RM, Branch DW: Placenta accreta spectrum. New England Journal of Medicine. 2018-19, 378:1529-36. 10.1056/NEJMcp1709324
2. Jauniaux E, Ayres-de-Campos D, Langhoff-Roos J, et al.: FIGO classification for the clinical diagnosis of placenta accreta spectrum disorders. International Journal of Gynecology & Obstetrics. 2019, 146:20-4. 10.1002/ijgo.12761
3. Cahill AG, Beigi R, Heine RP, Silver RM, Wax JR: Am J Obstet Gynecol . American College of Obstetricians and Gynecologists. Placenta accreta spectrum. American journal of obstetrics and gynecology. 20181, 219:2-16. 10.1016/j.ajog.2018.09.042
4. Bloomfield V, Rogers S, Leyland N: Placenta accreta spectrum. Cmaj. Canadian Medical Association Journal. 2020, 24:980. 10.1503/cmaj.200304
5. Donovan BM, Shainker SA: Placenta accreta spectrum. Neoreviews. NeoReviews. 20211, 22:722-33. 10.1542/neo.22-11-e722
6. Horgan R, Abuhamad A: Placenta accreta spectrum: prenatal diagnosis and management. Obstetrics and Gynecology Clinics. 2022, 1:423-38. 10.1016/j.ogc.2022.02.004
7. Einerson BD, Gilner JB, Zuckerwise LC: Placenta accreta spectrum. Obstetrics & Gynecology. 20231, 142:31-50. 10.1097/AOG.0000000000005229
8. Liu X, Wang Y, Wu Y, Zeng J, Yuan X, Tong C, Qi H: What we know about placenta accreta spectrum (PAS) . European Journal of Obstetrics & Gynecology and Reproductive Biology. 2021, 1:81-9. 10.1016/j.ejogrb.2021.02.001
9. Jauniaux E, Jurkovic D, Hussein AM, Burton GJ: New insights into the etiopathology of placenta accreta spectrum. American journal of obstetrics and gynecology. 20221, 227:384-91. 10.1016/j.ajog.2022.02.038
10. Capannolo G, D'Amico A, Alameddine S, et al.: Placenta accreta spectrum disorders clinical practice guidelines: a systematic review. Journal of Obstetrics and Gynaecology Research. 2023, 49:1313-21. 10.1111/jog.15544
11. Bhide A: Routine screening for Placenta Accreta Spectrum (PAS). Best Practice & Research Clinica1 Obstetrics & Gynaecology. Best Practice & Research Clinical Obstetrics & Gynaecology. 2023, 22:102392. 10.1016/j.bpobgyn.2023.102392
12. Chen K, Bai Y, Ma Y, Chen J, Huang Y, Yang F, Long Y: Subsequent pregnancy outcomes following conservative management for placenta accreta spectrum disorders: an ambispective cohort study. J Matern Fetal Neonatal Med. 2025, 38:2477782-10. 10.1080/14767058.2025.2477782
13. Markfeld Erol F, Häußler JA, Medl M, Juhasz-Boess I, Kunze M: Placenta Accreta Spectrum (PAS): Diagnosis, Clinical Presentation, Therapeutic Approaches, and Clinical Outcomes. Medicina (Kaunas. 2024, 20:1180. 10.3390/medicina60071180
14. Yu Y, Zhang Y, Zhu X, Zhang C, Tong C, Zhao Y: [Application of goal-oriented fluid replacement therapy in volume management of postpartum hemorrhage during cesarean section]. Zhonghua Wei Zhong Bing Ji Jiu Yi Xue. 2021, 33:305-310. 10.3760/cma.j.cn121430-20201016-00672
15. Zhang LZ, Du LL, Zhao HD, et al.: [Outcomes of the second pregnancy after Triple-P procedure in women complicated with placenta accreta spectrum disorders]. Zhonghua Fu Chan Ke Za Zhi. 2023, 25:44-48. 10.3760/cma.j.cn112141-20220825-00536