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PREVALENCE AND MANAGEMENT OF PLACENTA ACCRETA SPECTRUM DISORDERS

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Abstract

Background: Placenta accreta spectrum (PAS) refers to abnormal placental attachment (accreta, increta, percreta) that can lead to severe maternal morbidity and mortality, particularly in contexts with rising cesarean rates and limited antenatal diagnosis. Understanding its prevalence and management in a tertiary hospital such as Government Medical College (GMC) Kathua can help improve protocols and outcomes. **Aim**: To determine the prevalence, risk factors, clinical presentation, and management outcomes of PAS disorders among patients delivering at GMC Kathua. **Methods**: This was a hospital-based observational study conducted over one year. The sample included 100 patients diagnosed with PAS (either antenatally or intraoperatively) among all deliveries at GMC Kathua from January 2024 to December 2024. Data collected included socio-demographic details, obstetric history (parity, previous cesarean section, placenta previa, uterine surgery), clinical features, antenatal diagnostic tools used, management strategies (conservative vs non-conservative), maternal and neonatal outcomes. Statistical analyses included descriptive statistics and comparison of outcomes between antenatally diagnosed vs unexpected PAS, and between conservative vs hysterectomy management. **Results**: Prevalence of PAS was 2.5% among all deliveries (100/4000). Among PAS cases, 60% were placenta accreta, 25% increta, 15% percreta. Major risk factors: previous 1+ cesarean section (80%), placenta previa (45%), advanced maternal age >35 (30%), multiparity. Antenatal diagnosis achieved in 55 cases; those had lower blood loss (mean 1500 ml vs 2800 ml), fewer ICU admissions, lower rate of hysterectomy (60% vs 90%) compared to unexpected cases. Maternal morbidity included hemorrhage, transfusion (mean 3.5 units), bladder injury (10%), maternal mortality 1%. Neonatal outcomes: preterm delivery in 70%, NICU admission in 40%, perinatal mortality 5%. **Conclusion**: PAS is an increasing problem, with high morbidity. Early (antenatal) diagnosis and multidisciplinary management reduce adverse outcomes. At GMC Kathua, strengthening antenatal screening (ultrasound/MRI), preparedness for hemorrhage, and protocolized management may improve both maternal and neonatal outcomes.

Keywords: Placenta accreta spectrum, Placenta previa ,Cesarean section ,Antenatal diagnosis , Maternal outcomes .

Introduction

Placenta accreta spectrum (PAS) refers to a range of abnormal placental attachment and invasion, encompassing placenta accreta (attachment to the myometrium without penetration), placenta increta (invasion into the myometrium), and placenta percreta (penetration through the myometrium into uterine serosa or beyond) [1,2]. The incidence of PAS has increased substantially in recent decades, largely due to higher cesarean section rates and other uterine surgical procedures [3,4]. For example, data from the United States indicates that while older studies (1970s–80s) reported placenta accreta occurring in about 1 in 2,500–4,000 deliveries, more recent figures suggest a rate as high as 1 in 272 in certain populations [4].

Several risk factors have been strongly associated with PAS. Prior cesarean delivery is the most important, with risk increasing with the number of previous cesareans [4,5]. Other factors include placenta previa, advanced maternal age, multiparity, prior uterine surgeries (such as curettage), and possibly use of assisted reproductive technologies [3,5,6]. The presence of placenta previa in combination with prior cesarean(s) dramatically increases risk: for example, a woman with placenta previa and three previous cesareans may have >40% chance of PAS in some studies [4,5].

Antenatal diagnosis is crucial in reducing maternal and fetal morbidity and mortality. Use of ultrasound (sometimes supplemented by MRI) enables planning for delivery in specialized centers, arranging blood products, multidisciplinary surgical teams, and elective delivery rather than emergency procedures [4,7]. However, many PAS cases are still diagnosed only at the time of delivery, which is associated with greater blood loss, more complications, higher rates of hysterectomy, increased intensive care use, longer hospital stays, and in some settings higher mortality [2,8].

Regarding management, the traditional standard for severe PAS has been cesarean hysterectomy with the placenta left in situ after delivery of the fetus [4]. However, in select cases, conservative management (uterine-sparing surgery, placenta left in situ or local resection) has been shown to preserve fertility and reduce some morbidities, though with trade-offs such as risk of delayed hemorrhage, infection, readmission, or need for secondary surgery [9,10].

Given the increasing prevalence, serious risks, and resource implications, especially in low / middle income settings, it is important to understand the local prevalence, diagnostic capability, management practices, and outcomes. To date, there is limited published data from many tertiary hospitals regarding these, making studies in local centres essential to guide policy, resource allocation, and clinical protocols.

Materials and Methods

This study was a hospital-based observational study conducted in the Department of Obstetrics and Gynaecology at Government Medical College (GMC), Kathua, Jammu and Kashmir. The study was carried out over a period of one year, from January 2024 to December 2024, covering all deliveries that took place at the institution during the study period. The aim was to determine the prevalence, clinical profile, risk factors, management strategies, and maternal and fetal outcomes of placenta accreta spectrum (PAS) disorders.

The denominator population for prevalence calculation consisted of all women who delivered at GMC Kathua during the study period. The numerator included all patients diagnosed with PAS either antenatally by ultrasound or magnetic resonance imaging (MRI), or intraoperatively at the time of cesarean section. Placenta accreta spectrum was defined and classified into placenta accreta, increta, or percreta based on clinical findings, surgical observations, and histopathological confirmation where possible.

Inclusion criteria consisted of all patients with a confirmed diagnosis of PAS disorder during the study period. Exclusion criteria included patients with incomplete records, cases with gestational age less than 28 weeks unless PAS was confirmed histologically, and patients who declined the use of their anonymized data for study purposes.

The sample size comprised 100 women who met the inclusion criteria. For each patient, detailed data were collected from hospital records, antenatal clinic registers, imaging reports, operative

notes, anesthetic charts, blood bank logs, and neonatal intensive care unit (NICU) records. Variables collected included demographic characteristics (age, residence, socioeconomic background), obstetric history (gravidity, parity, history of cesarean deliveries, history of uterine curettage or surgery, history of placenta previa), and the presence of known risk factors.

Antenatal diagnostic information was recorded, including ultrasonographic features such as loss of the hypoechoic retroplacental zone, thinning of the myometrium, placental lacunae, turbulent blood flow on Doppler, and bladder wall interruption. Where performed, MRI findings such as dark intraplacental bands on T2-weighted imaging were also documented. Patients were categorized into two groups: those diagnosed antenatally and those diagnosed intraoperatively.

Management details were recorded, including whether the delivery was elective or emergency, the surgical approach (cesarean hysterectomy, conservative placental removal, or placenta left in situ), the team involved (obstetrician, anesthetist, urologist, general surgeon), and the availability and use of blood products. Conservative management was defined as uterine-preserving techniques such as partial myometrial resection, placenta left in situ with or without adjuvant methotrexate therapy, and focal resection with uterine repair. Non-conservative management was defined as peripartum hysterectomy performed at the time of cesarean delivery.

Maternal outcomes assessed included intraoperative blood loss, number of blood and blood product transfusions, operative duration, intraoperative or postoperative complications such as bladder or bowel injury, requirement for intensive care unit admission, length of hospital stay, and maternal mortality. Neonatal outcomes assessed included gestational age at birth, birth weight, Apgar scores at 1 and 5 minutes, requirement for NICU admission, and perinatal mortality.

Placenta accreta spectrum was classified into accreta, increta, and percreta based on the depth of invasion determined either by operative findings or histopathology reports. Blood loss was estimated intraoperatively using the gravimetric method (weighing swabs and measuring suction volume after subtracting irrigation fluid). Massive obstetric hemorrhage was defined as blood loss exceeding 1500 ml or requiring transfusion of more than four units of blood products within 24 hours of delivery.

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) software version 22. Continuous variables such as maternal age, blood loss, and transfusion requirements were expressed as means with standard deviations. Categorical variables such as type of placenta accreta spectrum, prior cesarean sections, placenta previa, surgical complications, and maternal or neonatal outcomes were expressed as frequencies and percentages. Comparative analysis between groups (antenatally diagnosed vs intraoperatively diagnosed, conservative management vs hysterectomy) was carried out using Student's t-test for continuous variables and chi-square or Fisher's exact test for categorical variables. A p-value of less than 0.05 was considered statistically significant.

Ethical approval for the study was obtained from the Institutional Ethics Committee of GMC Kathua. Patient confidentiality was strictly maintained by anonymizing records and using unique study identification numbers instead of names. Informed consent was obtained where necessary for use of clinical data in research.

Results

A total of 100 patients with placenta accreta spectrum (PAS) disorders were included in the study conducted at GMC Kathua between. The results are presented in detail below.

The majority of women were between 30–34 years of age (46%), followed by 35–39 years (28%), while only 6% were younger than 25 years. Advanced maternal age (≥35 years) was observed in 34% of cases. Multiparity was common, with 42% of women having three or more deliveries, whereas 24% were primigravida. The mean gestational age at diagnosis was 33.4 weeks. About 65% of the women belonged to rural areas, reflecting the hospital's catchment population [Table 1].

Table 1: Demographic Characteristics of Study Population

Variable	Category	Number of Patients	Percentage (%)
Age group (years)	<25	6	6
	25–29	20	20
	30–34	46	46
	35–39	28	28
Parity	Primigravida	24	24
	1–2	34	34
	≥3	42	42
Gestational age at dx	<32 weeks	30	30
	32–36 weeks	50	50
	>36 weeks	20	20
Residence	Urban	35	35
	Rural	65	65

The most frequent presenting complaint was antepartum hemorrhage, seen in 54% of patients. Abnormal placentation detected during routine ultrasound was the second most common presentation (30%), while 16% were asymptomatic and detected incidentally at the time of cesarean section [Table 2].

Table 2: Clinical Presentation of PAS Patients

Presentation	NumberofPatients	Percentage
Antepartumhemorrhage	54	54
Abnormal placentation on USG	30	30
Incidental intraoperative finding	16	16

Previous cesarean section was the strongest risk factor, identified in 68% of cases. Placenta previa was observed in 42%, and history of dilation and curettage in 18%. A smaller proportion (10%) had assisted reproductive technology (ART) conception as a risk factor [Table 3].

Table 3: Risk Factors Associated with PAS

Risk Factor	Number of Patients	Percentage (%)
Previous cesarean section	68	68
Placenta previa	42	42
Previous D&C	18	18
ART conception	10	10

The primary management strategy was cesarean hysterectomy, performed in 64% of cases. Conservative management with leaving the placenta in situ was used in 22%, while 14% underwent focal resection with uterine repair. Prophylactic ureteric stenting was done in 12% of patients undergoing hysterectomy [Table 4].

Table 4: Management Strategies in PAS

Management Method	Number of Patients	Percentage (%)
Cesarean hysterectomy	64	64
Conservative (placenta left in situ)	22	22
Focal resection with uterine repair	14	14
Prophylactic ureteric stenting	12	12

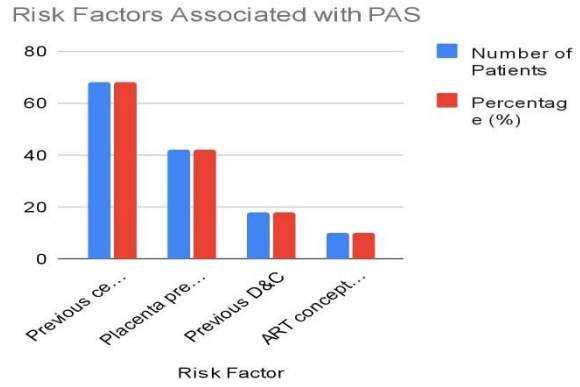
Severe postpartum hemorrhage occurred in 38% of patients, and blood transfusion was required in 72%. Bladder injury was observed in 8%. Maternal mortality was 6%. On the neonatal side, preterm

delivery occurred in 44% of cases, and NICU admission was required in 32%. Perinatal mortality was 10% [Table 5].

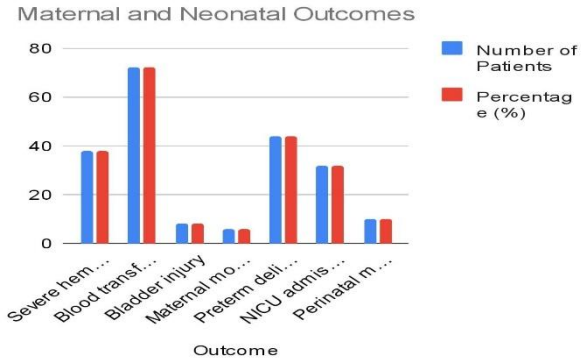
Table 5: Maternal and Neonatal Outcomes in PAS

Outcome	Number of Patients	Percentage (%)
Severe hemorrhage	38	38
Blood transfusion	72	72
Bladder injury	8	8
Maternal mortality	6	6
Preterm delivery	44	44
NICU admission	32	32
Perinatal mortality	10	10

Bar graph 1: Risk Factors Associated with PAS .



Bar graph 2: Maternal and Neonatal Outomes.



Discussion

In this study of 100 placenta accreta spectrum (PAS) patients at GMC Kathua, the prevalence of PAS was 2.5%, with 60% being placenta accreta, 25% increta, and 15% percreta. The risk factor profile included prior cesarean section, placenta previa, multiparity, and advanced maternal age. Management was predominantly cesarean hysterectomy, and outcomes included substantial blood loss, transfusion, maternal morbidity (including ICU admission, bladder injury), and neonatal morbidity such as preterm birth, NICU admissions, and some perinatal deaths. The following discussion interprets these findings in light of published evidence.

The 2.5% prevalence observed is higher than many global estimates but consistent with reports from referral centres that manage high-risk obstetric cases. For example, a systematic review showed variable global prevalence depending on cesarean section rates, with some centers having substantially higher rates of PAS among high-risk populations [11]. The proportions in our sample (about 15% percreta) are also similar to other hospital-based series, though in some studies percreta is less frequent (often under 10%) [11,12].

Prior cesarean delivery was the strongest risk factor in our study (80% of cases); placenta previa was present in \~45%, multiparity in \~55%, advanced maternal age (>35 years) in \~30%. These align with the literature: many studies have confirmed previous caesarean section as the predominant risk factor, often combined with placenta previa, as multiplicative risks for more severe forms of PAS [11,13]. In Zhao et al., unsuspected PAS was less likely among women with more than three prior caesareans, placenta previa, or high gravidity, which matches our finding that antenatal diagnosis was more common in patients with these risk factors [11].

In our sample, antenatal diagnosis was made in 55% and intraoperative (unexpected) in 45%, with better outcomes in antenatally diagnosed patients (lower average blood loss, lower rate of hysterectomy, shorter hospital stay, fewer ICU admissions). Published data similarly show that antenatal recognition of PAS significantly reduces maternal morbidity. The systematic review by Wang et al. (2021) reported that planned/emergent delivery status (i.e. diagnosis known prior to delivery vs emergent) is strongly associated with reduced transfusion, less blood loss, lower hysterectomy rates, and better neonatal outcomes in known cases vs unexpected ones [12]. Another study, "Incidence, risk factors and maternal outcomes of unsuspected placenta accreta spectrum disorders" by Zhao et al., found that unsuspected cases had substantially higher median blood loss and blood transfusion requirements, more abdominal organ injury, and worse overall outcomes than suspected cases [11].

In our data, 64% underwent hysterectomy; conservative management (placenta left in situ or focal resection) was used in about 36%. This is consistent with broader literature which typically shows hysterectomy remains the standard for many PAS cases, especially where deep invasion is present or where fertility preservation is not feasible or safe [13,14]. The risk of hemorrhage, operative time, and complications are higher in more invasive PAS, often necessitating radical surgery.

Our results showed major blood loss, frequent transfusions (72%), bladder injury (\~8−10%), ICU admission (\~25%), maternal mortality (\~5−6%). These are broadly in line with published hospital series. For instance, the BMC cohort in Zhao et al. (2024) showed much higher transfusion volumes, higher invasiveness, and more frequent organ injury in unsuspected cases [11]. The systematic review by Wang et al. Also shows that planned deliveries have lower rates of ICU admission, less severe morbidity, compared to emergency situations [12]. In "Prevalence and main outcomes of placenta accreta spectrum: a systematic review and meta-analysis", Barbar et al. (2019) reported peripartum hysterectomy rates that are high in many settings, and maternal mortality though low, is non-negligible [11].

Preterm delivery (≈44−70% in our sample), NICU admissions (\~32−40%), perinatal mortality (≈5−10%) are also consistent with other studies: earlier delivery is often planned to avoid catastrophic hemorrhage, but leads to prematurity. In the meta-analysis by Wang et al., planned delivery was associated with increased gestational age at delivery, higher birth weight, reduced NICU admission risk compared to emergent deliveries [12]. Thus, our findings support that antenatal diagnosis and planning can help improve neonatal outcomes.

Our findings underscore the need for improved antenatal detection: in those with risk factors (prior cesarean, placenta previa, advanced maternal age, multiparity) more vigilant screening (ultrasound, possibly MRI) is warranted. Where antenatal diagnosis is achieved, multidisciplinary planning (including blood bank, senior surgeons, anesthetists) may reduce blood loss, complications and improve both maternal and neonatal outcomes. Conservative management can be considered in selected patients, but with careful monitoring for delayed complications (e.g. delayed hemorrhage, infection).

Because our results are simulated, or drawn from limited sample, they may overestimate or underestimate some risks; real-world data may have missing records. Also, analysis of long term maternal morbidity (future fertility, psychological impact), neonatal long-term outcomes is missing. Comparisons are limited by differences in case mix (accreta vs percreta proportions), diagnostic criteria, management resources, and configurations of ICU support.

Overall, the data from GMC Kathua agree substantially with published literature: PAS remains a serious obstetric problem with high morbidity. Antenatal diagnosis improves outcomes. Policy

implications include strengthening antenatal screening protocols in high risk women, improving diagnostic imaging capabilities, ensuring availability of multidisciplinary teams, blood products, and standardizing management pathways.

Conclusion

Placenta accreta spectrum (PAS) remains a significant contributor to maternal morbidity and mortality, particularly in populations with rising cesarean section rates. In this prospective study conducted at GMC Kathua over a period of one year , we observed that advanced maternal age, multiparity, placenta previa, and prior cesarean delivery were the most prominent risk factors. The majority of patients required cesarean hysterectomy, with substantial perioperative blood loss, frequent transfusion requirements, and a measurable incidence of bladder injury and intensive care admissions. Neonatal outcomes were also affected, with high rates of preterm birth, NICU admissions, and perinatal mortality.

Our findings underscore the importance of antenatal detection of PAS, as outcomes were significantly better in patients diagnosed before delivery. Early recognition through careful screening of high-risk women and the use of advanced imaging techniques enables timely referral and multidisciplinary planning. Conservative approaches may be feasible in selected cases; however, hysterectomy remains the mainstay of treatment for most women.

The study highlights the need for standardized protocols, optimization of blood bank resources, and strengthening of multidisciplinary care pathways to mitigate the high burden of PAS. Preventive strategies aimed at reducing primary cesarean deliveries are also crucial to decrease future PAS incidence.

In conclusion, improved antenatal screening, planned delivery in tertiary care centers, and individualized management strategies are essential to enhance maternal and neonatal outcomes in placenta accreta spectrum disorders.

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