

Clinical Spectrum, Surgical Challenges, and Maternal Outcomes in Placenta Accreta Spectrum: A Case Series from a Tertiary Care Centre

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Abstract

Abstract:

Placenta accreta spectrum (PAS) represents a significant challenge in obstetric care, characterized by abnormal placental invasion or adherence to the uterine wall. The incidence of PAS has increased with the rising rates of cesarean sections, and it is associated with severe maternal morbidity and mortality. This case series presents the clinical spectrum, surgical challenges, and maternal outcomes of nine cases of PAS managed at a tertiary care center. The cases varied from focal accreta to severe placenta percreta, with complications such as massive hemorrhage, multiorgan dysfunction, and the need for peripartum hysterectomy. The findings emphasize the importance of early antenatal diagnosis using ultrasound and MRI to improve maternal outcomes. The study highlights that while antenatal diagnosis facilitates better management, emergency presentations, particularly in unbooked cases, continue to pose significant risks. Postoperative complications included hypovolemic shock, kidney injury, and pulmonary edema, necessitating intensive care and transfusion support. Despite these challenges, early detection and timely intervention significantly improve survival rates for both mothers and neonates.

Keywords:

Placenta accreta, placenta increta, placenta percreta, obstetric hemorrhage, cesarean section, peripartum hysterectomy, maternal morbidity, neonatal outcomes, antenatal diagnosis, ultrasound, magnetic resonance imaging (MRI), case series.

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Introduction

Placenta accreta spectrum (PAS) comprises a group of obstetric disorders characterized by abnormal adherence or invasion of the placenta into the uterine wall due to defective decidualization, resulting in failure of normal placental separation after delivery. It includes placenta accreta, increta, and percreta, representing increasing depth of placental invasion and clinical severity [1,2]. Over the past few decades, the incidence of PAS has risen dramatically, paralleling the increasing rate of cesarean deliveries worldwide. The incidence has increased from approximately 1 in 30,000 pregnancies to nearly 1 in 500–1000 pregnancies, making it an important contributor to maternal morbidity [3]. Placenta accreta spectrum is now recognized as a major cause of severe obstetric hemorrhage and maternal morbidity, frequently necessitating massive transfusion and emergency surgical interventions such as peripartum hysterectomy [4]. Clinically,

PAS is associated with significant complications including hypovolemic shock, coagulopathy, multiorgan dysfunction, and increased maternal mortality [5]. The most important risk factors for PAS include previous cesarean section and placenta previa, with the risk increasing significantly with the number of prior cesarean deliveries [6]. Additional risk factors include multiparity, advanced maternal age, prior uterine surgeries, obesity, and previous postpartum hemorrhage [7]. The coexistence of placenta previa and prior cesarean delivery represents the highest-risk clinical scenario for PAS development [8]. Early antenatal diagnosis of PAS using ultrasonography and magnetic resonance imaging plays a crucial role in improving maternal outcomes, as planned delivery in specialized centers with a multidisciplinary team significantly reduces intraoperative blood loss and perioperative complications [9]. However, despite advances in

imaging and clinical management, PAS continues to pose significant challenges, particularly in emergency or unbooked cases where timely intervention may not be feasible. The clinical presentation of PAS varies widely, ranging from focal accreta managed conservatively to severe forms such as placenta percreta associated with massive hemorrhage, adjacent organ involvement, and maternal mortality [2,10]. Given this wide spectrum of presentation and outcomes, detailed case series are valuable in understanding the variability in clinical features, surgical management strategies, and maternal outcomes. In this context, the present study aims to describe the clinical spectrum, surgical challenges, and maternal outcomes of placenta accreta spectrum cases managed at a tertiary care center, highlighting variations in presentation, intraoperative findings, management approaches, and outcomes across the full disease continuum.

Methodology:

CASE SERIES

Case 1

A 36-year-old female (G3P2L1) at approximately 29 weeks of gestation presented with multiple episodes of massive vaginal bleeding associated with passage of clots and severe abdominal pain. She was a high-risk pregnancy with placenta previa, overt diabetes, and severe anemia. On admission, she was hemodynamically unstable (BP ~90/60 mmHg) and required urgent resuscitation. Emergency LSCS was performed, followed by peripartum hysterectomy due to uncontrolled hemorrhage (~1–1.5 L). Postoperatively, the patient developed hypovolemic shock requiring inotropic support, acute kidney injury, metabolic acidosis, and diabetic ketoacidosis. She also developed pulmonary edema and bilateral pleural effusion requiring ventilatory support. After multidisciplinary ICU management, she improved and was discharged in stable condition. The neonate (0.7 kg) required NICU care.

Case 2

A 33-year-old female (G7P2L2A4) at 32 weeks 3 days gestation presented with bleeding per vaginum for 8 hours. She had a history of previous LSCS and irregular antenatal care. Diagnosis of placenta previa with placenta accreta was made. She underwent emergency LSCS followed by peripartum hysterectomy due to an inseparable placenta and risk of hemorrhage. Intraoperatively, dense adhesions with bladder involvement were noted. Blood transfusion support was provided. The postoperative period was uneventful, and the patient was discharged in stable condition. The neonate weighed 1.38 kg with good APGAR scores.

Case 3

A 31-year-old female (G5P3L2A2) at 37 weeks 2 days gestation presented with abdominal pain and bleeding per vaginum. She had two previous LSCS and was diagnosed with placenta previa with placenta percreta. She underwent exploratory laparotomy with peripartum hysterectomy, bladder repair, and internal iliac artery ligation. Intraoperative findings revealed placental invasion into the bladder with dense adhesions. Massive transfusion was required, and the patient was shifted to ICU with ventilatory and inotropic support. She gradually improved and was discharged in stable condition. The neonate (2.25 kg) had good APGAR scores.

Case 4

A 29-year-old female (G4P3L3) at 36 weeks 2 days gestation presented with shortness of breath, fever, and abdominal pain. She had a history of three previous LSCS and was diagnosed with placenta accreta with moderate anemia and deranged liver function tests. Cesarean hysterectomy was performed. Intraoperatively, dense adhesions and bladder adherence were noted. The patient required multiple transfusions and multidisciplinary management. Postoperative recovery was satisfactory. The neonate weighed 2.636 kg and required initial resuscitation.

Case 5

A 25-year-old female (G2P1L1) at 34 weeks 5 days gestation presented with bleeding per vaginum and abdominal pain. She had placenta previa with accreta and a history of previous LSCS. During cesarean section, attempted placental separation resulted in atonic postpartum hemorrhage, necessitating cesarean hysterectomy. Multiple transfusions were administered. Postoperative complications included urinary tract infection and surgical site infection, which were managed conservatively. The patient recovered well. The neonate weighed 2.286 kg with good APGAR scores.

Case 6

A 29-year-old female (G2P1L1) at 32 weeks 2 days gestation presented with bleeding per vaginum and was diagnosed with placenta previa with accreta and preeclampsia. She underwent exploratory laparotomy with peripartum hysterectomy. Intraoperative blood loss was approximately 1500 ml, requiring transfusion of blood products. Postoperative management included antihypertensives and supportive care. The patient stabilized and was discharged in good condition. The neonate (1.952 kg) required NICU admission.

Case 7

A 28-year-old female (G4P2L2A1) at 37 weeks 2 days gestation with a history of two previous LSCS underwent elective LSCS for suspected focal placenta accreta. Intraoperatively, the placenta was removed completely without difficulty, and hysterectomy was not required. Blood loss was minimal (~500 ml), and only one unit PRBC was transfused. The postoperative period was uneventful. The neonate weighed 2.636 kg with satisfactory APGAR scores.

Case 8

A 31-year-old female (G4P2L2A1) at 33 weeks gestation presented as an unbooked emergency with placenta previa and suspected placenta accreta. She underwent emergency cesarean section followed by peripartum hysterectomy due to massive hemorrhage (~2.5 L). Despite aggressive resuscitation including massive transfusion, ventilatory support, and inotropes, the patient developed refractory hypovolemic shock and succumbed intraoperatively. The neonate (1.852 kg) survived with good APGAR scores.

Case 9

A 28-year-old female (G4P3L2) at 37 weeks 6 days gestation presented with severe anemia, thrombocytopenia, and features suggestive of atypical preeclampsia with partial HELLP syndrome. She had a history of previous LSCS. During emergency LSCS, focal placenta accreta was identified with massive postpartum hemorrhage (~3000 ml). Peripartum hysterectomy was performed as a life-saving procedure. The patient required multiple transfusions including PRBC, platelets, and FFP. Laboratory findings revealed anemia, thrombocytopenia, and elevated liver enzymes consistent with HELLP syndrome. The patient stabilized postoperatively and was discharged in good condition. The neonate (3.664 kg) had good APGAR scores.

Results:

A total of 160 term newborns admitted to the NICU were included in the present study. The baseline demographic and clinical characteristics of the study population are shown in Table 1. The mean age at admission was 5.34 ± 1.53 days, with a median age of 5 days (IQR: 4–6). Male newborns constituted 51.9% of the study population, while females accounted for 48.1%. The mean birth weight was 2.86 ± 0.42 kg, and the mean gestational age was 38.6 ± 1.1 weeks. Slightly more than half of the neonates were delivered by LSCS (51.2%), while 48.8% were delivered vaginally. Inborn neonates accounted for 52.5% of admissions, while 47.5% were outborn (Table 1). The incidence, severity, and etiological profile of acute kidney injury are

summarized in Table 2. Among the 160 neonates included in the study, 63 developed AKI, resulting in an incidence of 39.4%, while 97 neonates (60.6%) did not develop AKI. According to KDIGO staging, Stage 1 AKI was observed in 24 neonates (15.0%), Stage 2 in 21 neonates (13.1%), and Stage 3 in 18 neonates (11.3%). Among neonates with AKI, Stage 1 was the most common stage, accounting for 38.1% of cases, followed by Stage 2 (33.3%) and Stage 3 (28.6%). Sepsis was identified as the most common etiological factor associated with AKI, being present in 44 neonates (69.8%). Birth asphyxia was the second most common cause, affecting 9 neonates (14.3%), followed by neonatal jaundice in 8 neonates (12.7%) and other causes in 2 neonates (3.2%) (Table 2). The comparison of clinical and laboratory parameters between neonates with AKI and those without AKI is presented in Table 3. Neonates with AKI had a significantly lower mean birth weight compared to non-AKI neonates (2.71 ± 0.41 kg vs 2.96 ± 0.40 kg, $p = 0.002$). The mean temperature was significantly higher among AKI neonates ($37.4 \pm 0.4^\circ\text{C}$) compared to non-AKI neonates ($37.1 \pm 0.3^\circ\text{C}$, $p = 0.01$). Similarly, the mean pulse rate was significantly elevated in the AKI group (154.6 ± 17.2 beats/min) compared to the non-AKI group (141.7 ± 18.1 beats/min, $p < 0.001$). Respiratory rate was also significantly higher among neonates with AKI (58.6 ± 9.4 breaths/min) compared to those without AKI (51.4 ± 8.7 breaths/min, $p < 0.001$) (Table 3). Significant differences were also observed in biochemical and renal function parameters between AKI and non-AKI neonates. Serum sodium levels were significantly lower among neonates with AKI (137.1 ± 4.9 mEq/L) compared to those without AKI (140.6 ± 3.8 mEq/L, $p < 0.001$). In contrast, serum potassium levels were significantly higher in AKI neonates (4.9 ± 0.6 mEq/L) than in non-AKI neonates (4.1 ± 0.5 mEq/L, $p < 0.001$). Urine output was markedly lower among AKI neonates (0.54 ± 0.36 ml/kg/hr) compared to non-AKI neonates (1.50 ± 0.48 ml/kg/hr, $p < 0.001$). Blood urea levels were significantly higher in the AKI group (92.6 ± 41.8 mg/dL) than in the non-AKI group (30.4 ± 12.9 mg/dL, $p < 0.001$). Similarly, maximum serum creatinine was markedly elevated among neonates with AKI (2.78 ± 0.96 mg/dL) compared to those without AKI (0.61 ± 0.12 mg/dL, $p < 0.001$), while eGFR was significantly lower in AKI neonates (16.2 ± 6.4 mL/min/1.73 m²) compared to non-AKI neonates (36.2 ± 7.8 mL/min/1.73 m², $p < 0.001$)

(Table 3). Mechanical ventilation was required in 57.1% of neonates with AKI compared to only 8.2% of those without AKI, and this difference was highly significant ($p < 0.001$). Similarly, vasoactive medications were required in 50.8% of AKI neonates compared to only 6.2% of non-AKI neonates ($p < 0.001$). Mortality was also significantly higher among neonates with AKI, with 28.6% of AKI neonates succumbing during hospital stay compared to only 4.1% of non-AKI neonates (p

< 0.001) (Table 3). These findings indicate that AKI was associated with increased illness severity, greater requirement for intensive support, and poorer short-term outcomes.

Table 1: summary of the case series in table format:

Case	Age	Gravida (G)	Para (P)	Gestational Age	Diagnosis	Surgical Intervention	Intraoperative Findings	Postoperative Outcome
Case 1	36	G3P2L1	29 weeks	Placenta previa, overt diabetes, severe anemia	Emergency LSCS, peripartum hysterectomy	Uncontrolled hemorrhage (~1-1.5L)	Hypovolemic shock, AKI, DKA, pulmonary edema	Stabilized in ICU
Case 2	33	G7P2L2A4	32 weeks 3 days	Placenta previa with placenta accreta	Emergency LSCS, peripartum hysterectomy	Dense adhesions with bladder involvement	Uneventful postoperative recovery	Neonate (1.38 kg) with good APGAR
Case 3	31	G5P3L2A2	37 weeks 2 days	Placenta previa with placenta percreta	Exploratory laparotomy, peripartum hysterectomy, bladder repair, internal iliac artery ligation	Placental invasion into the bladder, dense adhesions	ICU management, ventilatory and inotropic support	Neonate (2.25 kg) with good APGAR
Case 4	29	G4P3L3	36 weeks 2 days	Placenta accreta with anemia, deranged liver function	Cesarean hysterectomy	Dense adhesions, bladder involvement	Postoperative recovery satisfactory	Neonate (2.636 kg) with initial resuscitation
Case 5	25	G2P1L1	34 weeks 5 days	Placenta previa with accreta	Cesarean section with hysterectomy	Atonic postpartum hemorrhage	UTI, surgical site infection	Neonate (2.286 kg) with good APGAR
Case 6	29	G2P1L1	32 weeks 2 days	Placenta previa with accreta, preeclampsia	Exploratory laparotomy with peripartum hysterectomy	Blood loss (~1500 ml)	Postoperative antihypertensive and supportive care	Neonate (1.952 kg) in NICU

Case 7	28	G4P2L2A1	37 weeks 2 days	Suspected focal placenta accreta	Elective LSCS	Placenta removed without difficulty	Uneventful postoperative recovery	Neonate (2.636 kg) with good APGAR
Case 8	31	G4P2L2A1	33 weeks	Placenta previa with suspected accreta	Emergency LSCS, peripartum hysterectomy	Massive hemorrhage (~2.5L)	Hypovolemic shock, inotropic and ventilatory support, death	Neonate (1.852 kg) survived with good APGAR
Case 9	28	G4P3L2	37 weeks 6 days	Atypical preeclampsia with partial HELLP syndrome	Emergency LSCS, peripartum hysterectomy	Focal placenta accreta, massive hemorrhage (~3000 ml)	Multiple transfusions, HELLP syndrome, stabilized	Neonate (3.664 kg) with good APGAR

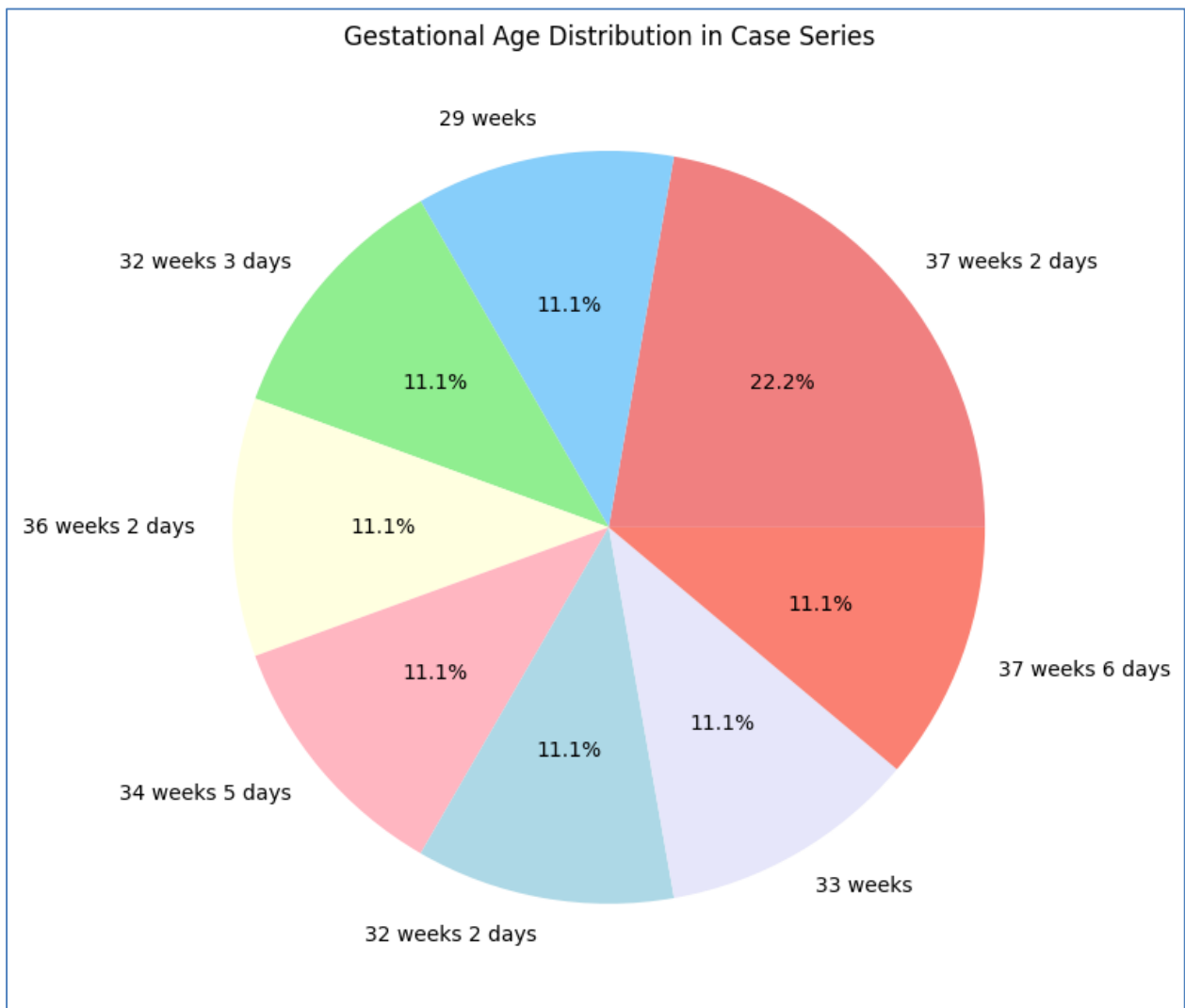


Figure 1: summary of the case series in table format:

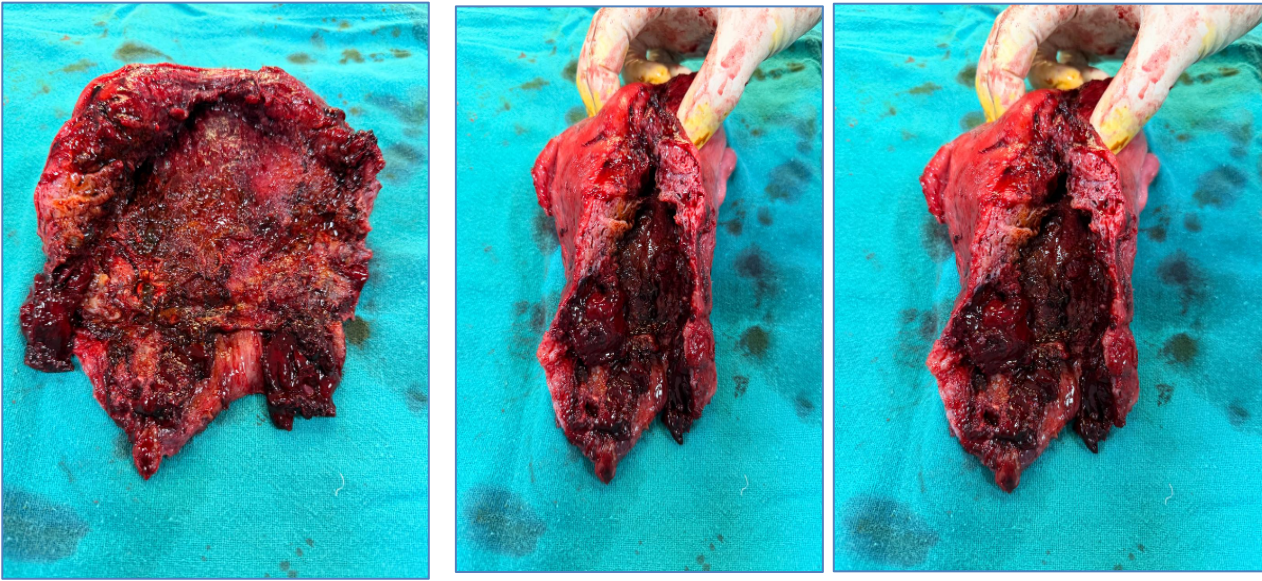


Figure 2. showing placenta accreta

Discussion:

The present case series demonstrated a wide clinical spectrum of placenta accreta spectrum (PAS), ranging from focal accreta managed conservatively to severe percreta with life-threatening complications. In our study, 66.7% (6/9) cases required hysterectomy, while 2 cases were managed conservatively. Blood loss ranged from approximately 500 mL to 3000 mL, with one maternal mortality (11.1%) and multiple near-miss events including acute kidney injury, pulmonary edema, and HELLP syndrome. These findings highlight the heterogeneity of PAS and increasing morbidity with increasing severity of invasion. Delayed or absent antenatal diagnosis in our study, particularly in unbooked cases, was associated with severe outcomes including massive hemorrhage (~2.5–3 L), ICU admission, and mortality. Shih et al. (2021) [11] reported that the “rail sign” predicted deep invasion, with 83.3% of patients having increta/percreta compared to 27.9% without the sign ($p < 0.001$), and significantly higher rates of hysterectomy (75% vs 24.6%), transfusion (80.6% vs 36.1%), and ICU admission (33.3% vs 16.4%). Similarly, in our study, a high hysterectomy rate (66.7%) and frequent need for transfusion and ICU care in severe cases support the predictive value of imaging markers. Jauniaux et al. (2023) [12] identified key ultrasound markers such as placental lacunae, loss of the clear zone, and bridging vessels, with more than 80% expert consensus for diagnosing PAS. Skupski et al. (2022) [13] demonstrated that the presence of three or more

ultrasound signs improved diagnostic accuracy, with sensitivity around 90% and specificity around 80%. In our study, although these markers were not consistently documented, intraoperative findings such as dense adhesions, absence of cleavage plane, and bladder involvement in severe cases correlated with advanced PAS, indicating that standardized ultrasound evaluation could improve early detection. Jauniaux et al. (2023) [14] reported that third-trimester transvaginal ultrasound has sensitivity greater than 90% for PAS detection and enables planned delivery. In our study, electively managed cases had lower blood loss (~500 mL–1.5 L), no need for hysterectomy, and no ICU requirement, whereas emergency cases had massive hemorrhage (~2.5–3 L), ICU admission, and mortality. These findings reinforce the importance of antenatal screening in improving outcomes.

Bladder involvement was observed in severe cases in our study and was associated with increased surgical complexity and morbidity. Al-Khan et al. (2022) [15] described a pulsatile vessel at the posterior bladder wall as a marker for placenta percreta, with predictive value greater than 85% for bladder invasion. Our findings are consistent, as deeper invasion was associated with higher transfusion requirement and ICU care. In our study, hysterectomy was performed in 66.7% of cases, with blood loss reaching up to 3000 mL and frequent requirement for transfusion. Shih et al. (2021) [11] reported mean blood loss of 2944 ± 2748 mL in severe PAS compared to 1530 ± 1895 mL in less severe cases, along with higher ICU admission rates.

Our findings similarly demonstrate increased hemorrhage and need for critical care in severe PAS. Our study reported one maternal death (11.1%) and multiple near-miss cases with complications such as AKI, pulmonary edema, coagulopathy, and HELLP syndrome. Shih et al. (2021) [11] reported ICU admission in 33.3% of severe PAS cases, and Jauniaux et al. (2023) [12] emphasized high morbidity in emergency presentations. The mortality in our study occurred in an unbooked case with massive hemorrhage (~2.5 L) and refractory shock, highlighting the importance of early diagnosis.

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