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Placenta Accreta Spectrum Disorders: Clinical Characteristics and Hemorrhagic Outcomes at Dr. Saiful Anwar General Hospital (2021-2025)

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ABSTRACT

Introduction: Placenta Accreta Spectrum (PAS) disorders, characterized by abnormal placental attachment to the uterine wall, pose challenges because of hemorrhagic complications. This study evaluated PAS cases at Dr. Saiful Anwar General Hospital, Malang, examining maternal risk factors and hemorrhagic outcomes.

Material and Methods: This retrospective descriptive study included pregnant women with suspected PAS who underwent delivery or surgery from July 2021 to June 2025. Data were obtained from medical records and hospital systems. Variables included characteristics, previous cesarean delivery, placenta previa, comorbidities, prenatal suspicion of PAS, estimated blood loss, hysterectomy, transfusion, ICU admission, surgical complications, bladder injury, DIC, and neonatal outcomes. Data were analyzed using frequencies and percentages.

Results: Among 176 patients, 96.0% were multiparous, 77.8% had previous cesarean delivery, and 88.1% had placenta previa. Gestational age 37–38 weeks predominated (50.6%), as was maternal age 30–34 years (36.4%). Estimated blood loss of 1,000–5,000 mL occurred most frequently (46.0%). Hysterectomy was performed in 75.0%, 81.3% required transfusion, 17.6% required ICU admission, 21.6% experienced surgical complications, 10.2% had bladder injury, and 5.1% developed DIC. Maternal mortality was 1.1%. Live birth occurred in 95.0% of neonates, and 23.9% required NICU admission.

Conclusion: Advanced maternal age, cesarean history, and placenta previa were significantly associated with hemorrhagic risk. PAS was strongly linked to multiparity, previous cesarean delivery, and placenta previa, with hemorrhagic morbidity. Early recognition, multidisciplinary planning, and preparation for hemorrhage and surgical complications are essential. Further analytical studies are needed to identify factors associated with severe maternal and neonatal outcomes.

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INTRODUCTION

Placenta previa is a critical obstetric complication characterized by abnormal placental implantation, either partially or completely obstructing the internal cervical os, with an estimated prevalence of approximately 5.2 per 1,000 pregnancies. The condition is clinically classified into four categories: low-lying, marginal, partial, and complete placenta previa [1]. Improper management of placenta previa significantly increases the risk of severe maternal and fetal complications, such as placenta accreta spectrum disorders, antepartum and postpartum

hemorrhage, fetal malpresentation, intrauterine growth restriction (IUGR), thrombophlebitis, preterm labor, and sepsis [2,3].

Among these complications, placenta accreta spectrum disorders are particularly concerning due to the abnormal adherence of placental trophoblastic tissue directly onto or penetrating through the uterine myometrium. This abnormal attachment significantly contributes to severe maternal morbidity, including extensive hemorrhage, multisystem organ failure, disseminated intravascular coagulation (DIC), intensive care unit admissions, emergency hysterectomies, and increased maternal mortality risk [4]. The underlying pathology of placenta accreta involves the absence or deficiency of the decidua basalis, frequently attributed to prior uterine surgery or trauma, facilitating the invasive trophoblastic process into compromised uterine tissues [2].

Despite increasing recognition of placenta accreta and its associated complications, comprehensive local data and in-depth studies on its incidence, management practices, and maternal-fetal outcomes remain limited, especially within Indonesian clinical settings. This gap in knowledge underscores the need for systematic analysis and improved clinical insights to enhance maternal care and outcomes.

Therefore, this study aims to address the current knowledge gap by analyzing the incidence, risk factors, clinical management practices, and maternal outcomes of placenta accreta cases managed at dr. Saiful Anwar General Hospital in Malang, Indonesia, to inform and potentially improve clinical protocols and patient care strategies.

MATERIAL AND METHODS

This study employed a retrospective descriptive study aimed to describe the clinical characteristics and hemorrhagic outcomes of patients with placenta accreta spectrum (PAS) at Dr. Saiful Anwar Malang, Indonesia, to provide an in-depth understanding of a particular phenomenon that was conducted from July 2021 to June 2025. Participants in this study comprised all pregnant women diagnosed with or suspected to have placenta accreta spectrum who received obstetric management at Dr. Saiful Anwar General Hospital during the study period. Data were collected retrospectively from medical records and the hospital information system related to patients diagnosed with placenta accreta.

The data collected from medical records included maternal age, gestational age, parity, history of cesarean delivery, placenta previa, documented prenatal suspicion of PAS, estimated blood loss, hysterectomy, blood transfusion, intensive care unit (ICU) admission, maternal mortality, neonatal outcomes, surgical complications, bladder injury, and disseminated intravascular coagulation (DIC). Neonatal outcomes, including birth weight, Apgar scores, gestational age at birth, neonatal intensive care unit (NICU) admission, and neonatal mortality, are obtained when available. Surgical complications included documented intraoperative or postoperative complications such as bladder injury, ureteral injury, bowel injury, reoperation, and other major surgical complications documented in the medical records.

The inclusion criteria were: 1) pregnant women diagnosed with or clinically suspected of PAS during pregnancy or at delivery; 2) patients who received obstetric management at Dr. Saiful Anwar General Hospital between July 2021 and June 2025; and 3) medical records containing information on maternal characteristics and delivery outcomes. Patients were excluded if the medical records were unavailable or contained insufficient information regarding the diagnosis or delivery outcome.

The diagnosis of PAS was based on the obstetrician's clinical assessment and supported by antenatal imaging findings. Prenatal assessment was primarily performed using obstetric ultrasonography, with magnetic resonance imaging (MRI) performed when clinically indicated. Relevant sonographic features included loss or irregularity of the retroplacental clear zone, myometrial thinning or interruption, placental lacunae, increased subplacental vascularity, bridging vessels, and abnormalities of the uterovesical interface. If hysterectomy specimens or placental tissue were available for histopathological examination, the pathological findings were recorded as confirmatory evidence of PAS.

Hemorrhagic outcome was assessed based on the estimated blood loss (EBL) documented in the medical record. Blood loss was categorized into three groups: <1,000 mL, 1,000–5,000 mL, and >5,000 mL. These categories were used to provide a descriptive representation of the distribution of blood loss among patients with PAS.

The degree of prenatal suspicion of PAS was recorded from the antenatal medical records. The documented categories of 10–30%, 40–70%, and >70% represented the clinician-reported estimated likelihood of PAS at the time of antenatal assessment. These percentages were not independently calculated by the investigators and were not derived from a validated prediction model or standardized PAS scoring system.

The statistical analysis was conducted descriptively. Categorical variables were presented as frequencies and percentages, whereas continuous variables were presented as mean and standard deviation or median and interquartile range. Data were analyzed using IBM SPSS Statistics Version 27.

RESULTS

A total of 176 patients were included in this study. Table 1 below presents the basic characteristics of the study subjects, including gestational age, maternal age, parity, delivery history, history of placenta previa, accreta probability, volume of bleeding, and comorbidities.

Based on Table 1, the majority of subjects had a gestational age of 37–38 weeks (50.57%), followed by 34–36 weeks (18.18%). The largest proportion of maternal age fell within the 30–34 year range (36.36%), followed by 35–39 years (28.98%). Nearly all subjects were multiparous (96.02%). A history of cesarean delivery was found in 77.84% of patients, and most subjects (88.07%) had a history of placenta previa at initial presentation.

In terms of accreta probability, the 10–30% and 40–70% groups each accounted for 19.89% and 18.18% of patients, while 15.34% had an accreta probability of more than 70%. The greatest volume of bleeding ranged between 1,000 and 5,000 cc (46.02%), followed by less than 1,000 cc (40.91%) and more than 5,000 cc (13.07%). The most common comorbidity was obesity (7.39%), followed by hypertension and COVID-19 infection (each 5.11%). This provides a comprehensive overview of the risk factors and characteristics of patients with placenta previa and accreta at Dr. Saiful Anwar Regional Hospital in Malang.

Important maternal and surgical outcomes included hysterectomy, ICU admission, blood transfusion, maternal mortality, surgical complications, bladder injury, and DIC. These outcomes are summarized in Table 2.

Regarding maternal outcomes, hysterectomy was performed in 132 patients (75.00%), while 44 patients (25.00%) did not undergo hysterectomy. ICU admission was documented in 31 patients (17.61%). Blood transfusion was required in 143 patients (81.25%), indicating that transfusion support was frequently required among patients with PAS. Surgical complications were documented in 38 patients (21.59%). Bladder injury occurred in 18 patients (10.23%). DIC was documented in 9 patients (5.11%). Maternal mortality occurred in 2 patients (1.14%), while 174 patients (98.86%) survived.

Regarding neonatal outcomes, 169 infants (95.00%) were live births, while 7 (4.00%) were stillbirths. NICU admission was required in 42 neonates (23.86%), whereas 134 neonates (76.14%) did not require NICU admission. Neonatal mortality was documented in 4 cases (2.27%). The findings indicate a substantial maternal hemorrhagic and surgical burden among patients with PAS, as reflected by the high proportion of patients requiring hysterectomy and blood transfusion. ICU admission, surgical complications, bladder injury, and DIC were less frequently documented, while maternal and neonatal mortality occurred in a small proportion of cases.

DISCUSSION

The placenta is a vital organ responsible for supporting fetal growth and development within the uterus, undergoing continuous maturation throughout pregnancy. Although rare, abnormal placental development characterized by

Table 1. Research Subject Characteristics

Type	Categories	Frequency (n)	Percentage (%)
Pregnancy Weeks	<30	5	2,84
	30 – 32	11	6,25
	32 – 34	9	6,25
	34 – 36	32	18,18
	37 – 38	89	50,57
	38 – 40	24	13,64
	>40	4	2,27
Age	<20	2	1,14
	20 – 24	8	4,55
	25 – 29	24	13,64
	30 – 34	64	36,36
	35 – 39	51	28,98
	40 – 44	24	13,64
	>45	3	1,70
Paritas	Nullipara	7	3,98
	Multipara	169	96,02
Caesarean Delivery History	Yes	137	77,84
	No	39	22,16
Placenta Previa History	Yes	155	88,07
	No	21	11,93
Placenta Accreta Probability	10 – 30 %	35	19,89
	40 – 70 %	32	18,18
	>70 %	27	15,34
Hemorrhage (cc)	< 1000	72	40,91
	1000 - 5000	81	46,02
	> 5000	23	13,07
Comorbidities	Obesity	13	7,39
	Diabetes Mellitus	1	0,57
	Hypertension	9	5,11
	COVID-19	9	5,11
	Malignancy	3	1,70
	Asthma Bronchiale	2	1,14

inadequate or weakened trophoblastic attachment to the uterine myometrium is known as placenta accreta [5]. This study observed that the most prevalent gestational ages at diagnosis were 37-38 weeks (50.57%), followed by 34-36 weeks (18.18%), and 38-40 weeks (13.64%), which aligns with previous findings reported by Matsuzaki et al. (2021). Interestingly, the incidence of vaginal bleeding is more common at earlier gestational ages, while the risk of bleeding tends to decrease as the pregnancy advances. This phenomenon may be attributed to improved placental maturation and implantation capabilities as pregnancy progresses. Indeed, approximately 80% of patients with placenta previa and accreta who reached 36 weeks or beyond presented without symptoms of vaginal bleeding [6].

Maternal age during pregnancy was identified as a significant risk factor for placenta accreta in this study, with the highest incidence noted among women aged 30-34, 35-39, and 40-44 years. Older maternal age was associated with a considerably increased risk (up to 9.7-fold) of developing placenta accreta. This is associated with higher parity and an increased risk of placenta previa during pregnancy, as well as a higher likelihood of prior uterine procedures or fertility treatments. These factors reflect underlying hormonal disturbances or altered implantation environments within the uterus [5,7].

Table 2. Maternal, Hemorrhagic, Surgical, and Neonatal Outcomes

Type	Categories	Frequency (n)	Percentage (%)
Hysterectomy	Yes	132	75,00
	No	44	25,00
ICU admission	Yes	31	17,61
	No	145	82,39
Blood transfusion	Yes	143	81,25
	No	33	18,75
Maternal mortality	Yes	2	1,14
	No	174	98,86
Bladder injury	Yes	18	10,23
	No	158	89,77
DIC	Yes	9	5,11
	No	167	94,89
Neonatal outcome	Live birth	169	95,00
	Still birth	7	3,98
NICU admission	Yes	42	23,86
	No	134	76,14
Neonatal mortality	Yes	4	2,27
	No	172	97,73

In this study, 96.02% of all women diagnosed with placenta accreta were multiparous. Multiparous women, particularly those with a history of multiple cesarean deliveries, are at increased risk due to the presence of uterine scarring from previous pregnancies and surgeries, as well as a higher likelihood of developing placenta previa [8]. Nulliparous women have a lower risk of developing placenta accreta; however, this risk increases significantly in the presence of placenta previa or a history of prior uterine surgery [9–11].

Moreover, this research identified a strong correlation between placenta accreta and previous cesarean section history. Uterine scarring is a risk factor for placenta accreta spectrum (PAS) disorder [12]. The history of cesarean section was the strongest risk factor for PAS among women with placenta previa [13]. A meta-analysis supported this finding, demonstrating that a single previous cesarean delivery elevated the risk by 3.02 times compared to vaginal birth, and three prior cesarean deliveries further increased the risk by 1.96 times relative to two previous cesareans [14].

This increased risk is attributed to abnormal development and structural changes of the lower uterine segment post-cesarean section, leading to atypical implantation sites [15,16]. Sholapurkar (2013) further suggested that pathological stretching and incomplete healing of the myometrial area during subsequent pregnancies might explain the increased incidence of abnormal placental adherence [17].

Additionally, placenta previa was confirmed as another significant risk factor associated with placenta accreta. Placenta previa itself is a severe pregnancy complication that substantially elevates the risk of postpartum hemorrhage and organ damage [18]. According to cohort studies, the prevalence of placenta accreta among patients with placenta previa was markedly higher at 41.8 per 1,000 pregnancies compared to 8.8 per 1,000 among those with a history of previous cesarean sections alone [19,20].

The high proportion of hysterectomy in this cohort (75.00%) reflects the substantial surgical burden associated with PAS. Hysterectomy remains an important definitive surgical approach in patients with extensive placental invasion, particularly when conservative management is considered inappropriate or when uncontrolled hemorrhage occurs. The need for hysterectomy also reflects the complexity of PAS surgery, in which attempts to manually remove an abnormally adherent placenta may result in severe hemorrhage. Blood transfusion was required in 81.25% of patients. These findings demonstrate the considerable transfusion requirements associated

with PAS and emphasize the importance of adequate preoperative blood-product preparation and multidisciplinary management. The relatively high transfusion requirement is consistent with the substantial blood loss frequently encountered during surgical management of PAS.

Surgical complications were documented in 21.59% of patients, with bladder injury occurring in 10.23%. Bladder injury represents an important complication of PAS surgery because abnormal placental vascularity and invasion may involve the vesicouterine interface, particularly in patients with placenta previa and previous cesarean delivery. Careful preoperative assessment of placental location and suspected invasion, together with multidisciplinary surgical planning, may help anticipate these complications. Consistent with previous literature, placenta previa with concurrent accreta independently contributed to increased severe maternal morbidity, including heightened risks of peripartum hemorrhage, substantial blood transfusion requirements, shock, disseminated intravascular coagulation (DIC), coagulopathy, and urinary tract injuries [21].

Among the ultrasonographic indicators, the disappearance of the post-placental clear space, the emergence of cross-border blood vessels in the region of subplacental vascularity, interruption or disappearance of the bladder line, and the presence of the cervical blood sinus had the most significant correlation with hemorrhage during PAS [22]. To reduce the intraoperative bleeding and improve maternal outcomes, we should pay more attention to these indicators in prenatal ultrasound examination. Ultrasound scores are associated with PAS outcomes, including intraoperative hemorrhage, postpartum hemorrhage, hysterectomy, length of hospital stay, and neonatal prognosis [23].

Obesity is a comorbidity frequently associated with an increased risk of placenta accreta. In this study, obesity was the most prevalent comorbidity among pregnant women, with a rate of 7.39%. The underlying mechanisms are not yet fully understood; however, obesity may alter endometrial function, cause hormonal imbalances, and affect angiogenesis within the uterus [24]. Conditions such as obesity, diabetes, and hypertension can lead to vascular changes in the uterus, potentially contributing to deeper placental invasion [25].

CONCLUSION

This retrospective descriptive study demonstrates a substantial maternal and neonatal morbidity burden among patients with placenta accreta spectrum managed at Dr. Saiful Anwar General Hospital between July 2021 and June 2025. The study population was predominantly multiparous women with a history of previous cesarean delivery and placenta previa. Estimated blood loss of 1,000–5,000 mL was the most frequently documented hemorrhagic category, while hysterectomy and blood transfusion were frequently required. ICU admission, surgical complications, bladder injury, and DIC were also observed, although maternal mortality occurred in only a small proportion of patients.

Most neonates were live births, while a proportion required NICU admission. These results align closely with existing literature. Limitations of this study include a small sample size and its single-hospital scope, without exploring correlations or specific risk probabilities. Further multicenter analytical studies using standardized PAS diagnostic criteria and validated scoring systems are warranted to identify factors associated with severe hemorrhage and adverse maternal and neonatal outcomes. Future research should involve larger, diverse populations and investigate unexplored risk factors to further enhance understanding and clinical management strategies for placenta accreta.

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CONFLICT OF INTEREST

There is no conflict of interest.

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