ORIGINAL RESEARCH

Maternal profiles and outcome of Placenta Accreta Spectrum (PAS) in a retrospective cohort study in Dr. Saiful Anwar General Hospital, Malang, Indonesia

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ABSTRACT

Objective: This study aims to investigate maternal risk factors associated with PAS among patients at Dr. Saiful Anwar Regional General Hospital in Malang.

Materials and Methods: This retrospective cohort study was conducted at RSUD Dr. Saiful Anwar Malang, analyzing medical records of patients diagnosed with Placenta Accreta Spectrum (PAS) from January 2023 to August 2024. Patients were categorized into PAS and non-PAS groups, with further classification of PAS patients based on their Placenta Accreta Index (PAI) score (<5 and ≥5) to compare clinical outcomes. A total of 47 eligible patients were included based on gestational age ≥28 weeks, clinical suspicion of PAS, and histopathological confirmation. Demographic, clinical, intraoperative, and postoperative data were collected and analyzed. Data were analyzed using SPSS 27.0. Ethical approval was obtained from the RSUD Dr. Saiful Anwar Ethics Committee.

Results: Patients with PAI scores ≥5 had higher intraoperative blood loss (3467.50 ± 2520.35 mL) compared to those with PAI scores <5 (2212.50 ± 1055.32 mL, p=0.764). Hysterectomy was the primary surgical approach in both groups (PAI <5: 88.88%, PAI <5: 92.75%, p=0.667). Bladder trauma (AAST grade IV) occurred in 100% of patients with PAI <5, whereas bladder infiltration was observed only in the PAI ≥5 group (p=0.117). NICU admission was more frequent in the PAI ≥5 group (31.25% vs. 0%, p=0.061). ICU admission was required in all PAI <5 patients (100%) and 75% of PAI <5 patients (p=0.102). No statistically significant associations were found.

Conclusion: Higher PAI score may indicate a more complex clinical course, further research with larger sample sizes is necessary to validate its predictive value.

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Highlights:

1. This study compares maternal characteristics and outcomes between PAS and non-PAS patients, including analysis using the Placenta Accreta Index.
2. PAS is associated with significantly higher intraoperative blood loss and postoperative ICU admission rates.
3. Findings underscore the importance of early identification and PAI-based risk stratification to optimize surgical planning and maternal outcomes.

INTRODUCTION

Placenta accreta spectrum (PAS), also known as Morbidly Adherent Placenta, is a condition characterized by abnormal trophoblast invasion into part or all of the myometrium of the uterine wall. This abnormal attachment has significant clinical implications, increasing maternal and neonatal morbidity and mortality rates. The incidence of PAS has been rising globally.[1,2] This condition affects approximately 3 in every 1,000 pregnancies, with a fivefold increase over the past three decades. Studies conducted in Asia report an incidence of PAS at 1 per 1,000 pregnancies. Since 2016, the incidence of PAS in Indonesia has reached 2% and continues to rise.[3,4]

Based on the depth of invasion, PAS can be classified into accreta, increta, and percreta. Accreta occurs when the chorionic villi attach directly to the myometrium, increta when the villi invade the myometrium, and percreta when the villi penetrate through the myometrium into surrounding organs such as the bladder.[5] Several risk factors are associated with placenta accreta, including a history of cesarean section (CS), placenta previa, in vitro fertilization (IVF), maternal age, parity, a history of curettage, previous uterine surgeries such as myomectomy, smoking, Asherman syndrome, and hypertension. Research indicates that a history of CS and placenta previa are often the primary risk factors for placenta accreta, while the contribution of other risk factors remains less clearly understood.[6]

The diagnosis of placenta accreta can be established through ultrasonography (USG), which has a sensitivity of 77–87% and a specificity of 96–98%. The Placenta Accreta Index (PAI) is a predictive tool used to estimate the risk of placenta accreta based on several ultrasonographic parameters, including a history of more than two cesarean sections, the presence of lacunae, myometrial thickness, anterior placenta previa, and bridging vessels. A higher PAI score indicates an increased risk of placenta accrete.7 The aim of this study is to identify maternal risk factors and outcome of PAS according to PAI score among patients at Dr. Saiful Anwar Regional General Hospital in Malang.

MATERIALS AND METHODS

Study design and setting

This retrospective cohort study was conducted at RSUD Dr. Saiful Anwar Malang, Indonesia, analyzing medical records of patients treated from January 2023 to August 2024. The primary objective was to assess the maternal profile of patients diagnosed with Placenta Accreta Spectrum (PAS) and compare them with non-PAS patients. Among PAS patients, a further distinction was made between those with Placenta Accreta and those without. The study also aimed to evaluate both intraoperative and postoperative outcomes in these groups. Additionally, for patients diagnosed with Placenta Accreta, they were categorized into two groups based on their Placenta Accreta Index (PAI) score (PAI <5 and PAI ≥5) to compare differences in clinical outcomes.

Study population

The study included all patients suspected of having PAS based on clinical and imaging assessments within the study period. Inclusion and exclusion criteria were applied to ensure data accuracy. The included population consisted of pregnant women diagnosed with PAS based on clinical evaluation and histopathology. The criteria for inclusion were defined as follows: gestational age of ≥28 weeks and the patients had been suspected of having placenta accreta by clinicians in the Obstetrics and Gynecology Department and underwent the procedure and confirmed by histopathology after the procedure. The exclusion criteria included patients with unrelated severe medical conditions and patients with incomplete medical records. This study employed a total sampling method, including all eligible patients within the study timeframe. In total, 47 participants meeting the inclusion criteria were recruited for the study.

Data collection and analysis

Maternal demographic and clinical data were retrospectively collected from medical records, including age, education, occupation, BMI, marital history, parity, history of abortion, cesarean section, placenta previa, and smoking exposure. The maternal characteristics of PAS and non-PAS patients were analyzed descriptively, with categorical variables presented as frequencies and percentages and continuous variables as means with standard deviations.

For PAS patients, additional data were retrieved, including PAI scores, intraoperative findings, and maternal outcomes. The PAI scores were determined from antenatal ultrasonographic findings, incorporating factors such as myometrial thickness, placental lacunae, and bridging vessels. The intraoperative findings were documented variables that included intraoperative blood loss (mL), additional surgical interventions (e.g., hysterectomy, conservative), intraoperative complications, classification of placenta accreta, and invasion sites. The maternal outcomes were evaluated based on postoperative hospital stay duration (days), fetal and maternal survival status (alive or deceased).

Statistical analysis was performed using SPSS 27.0, incorporating several procedures. The Shapiro-Wilk test was utilized to assess whether continuous variables followed a normal distribution. To determine the relationship between the Placenta Accreta Index (PAI) Score and intraoperative blood loss, Spearman's rank correlation test was applied. Additionally, One-Way ANOVA was conducted to compare the mean PAI Scores across different intraoperative findings. Furthermore, the Chi-square test was used to evaluate associations between categorical variables. All statistical tests were carried out with a significance level set at $p < 0.05$.

Ethical considerations

This study received ethical clearance from the Ethics Committee of RSUD Saiful Anwar, Malang (Approval Number: 400/156/K.3/102.7/2024). Due to the retrospective nature of the study, obtaining informed consent was deemed unnecessary. Patient data were fully anonymized to ensure confidentiality, adhering to institutional ethical guidelines.

RESULTS AND DISCUSSION

The maternal profiles of patients with Placenta Accreta Spectrum (PAS) and those without PAS in a retrospective cohort study conducted at Dr. Saiful Anwar General Hospital, Malang, Indonesia, highlighted several significant differences in demographic, obstetric, and lifestyle characteristics (Table 1). The average age of patients with PAS was notably higher at 35.5 ± 3.38 years compared to 30.92 ± 3.66 years in non-PAS patients, indicating that advanced maternal age may be associated with PAS. Regarding education levels, the majority of PAS patients had completed senior high school (38%), with 9% attaining a university education, compared to 31% and 15%, respectively, in the non-PAS group. However, a substantial proportion of both groups had unknown educational backgrounds (41% in PAS and 46% in non-PAS). Occupationally, 59% of PAS patients were non-housewives, whereas 46% of non-PAS patients were housewives.

The body mass index (BMI) of both groups was comparable, with PAS patients averaging 24.20 ± 3.93 and non-PAS patients averaging 24.55 ± 4.46. Marital history revealed that the majority of PAS patients (82%) were in their first marriage, though some had two or more marriages (18%), whereas all non-PAS patients were in their first marriage. Parity was similar across groups, with the majority of patients in both categories reporting two deliveries (56% in PAS and 62% in non-PAS). However, PAS patients demonstrated a slightly higher frequency of three or more deliveries (24%) compared to 15% in non-PAS patients.

A detailed review of obstetric history revealed that most PAS patients (71%) had no history of abortion, while 24% reported one previous abortion, and 6% had two abortions. This is in contrast to non-PAS patients, 85% of whom had no abortion history and 15% reported only one. Cesarean section history revealed a stark difference between the groups. Among PAS patients, 56% had undergone two previous cesarean sections, and 21% had three or more, while no non-PAS patients had more than two cesarean deliveries. Placenta previa was infrequent but noted in 3% of PAS patients, with no cases reported among the non-PAS group. Lifestyle factors showed that 15% of PAS patients were active smokers, and 85% were passive smokers, whereas all non-PAS patients were exposed to passive smoking exclusively. These findings underscore the importance of considering maternal age, obstetric history, and environmental factors as potential risk factors for PAS in clinical assessments.

Tables 2 and 3 present outcomes only for PAS patients (n=34), stratified by histopathological depth. Patients diagnosed with placenta accreta spectrum (PAS) were stratified into two subgroups based on histopathological depth: Placenta accreta (superficial myometrial attachment, n=25) and Placenta increta/percreta (deep invasion beyond myometrium, n=9).
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In patients diagnosed with Placenta Accreta Spectrum (PAS), intraoperative and postoperative outcomes were analyzed, as presented in Table 2 and Table 3, respectively. Table 2 presented that 34 patients included in the study were diagnosed with Placenta Accreta, while 9 did not exhibit Placenta Accreta based on histopathology examination. Regarding the type of operative procedure performed, hysterectomy was the most common intervention, conducted in 84% of Placenta Accreta cases and 100% of Non-Placenta Accreta cases ($p = 0.201$). Conservative management was performed in 16% of Placenta Accreta patients, whereas none of the Non-Placenta Accreta patients underwent conservative procedures.

Table 1. Maternal characteristics of Placenta Accreta Spectrum (PAS)

Characteristics	Placenta Accreta Spectrum (n = 34)	Non-Placenta Accreta Spectrum (n = 13)
Age (mean ± SD)	35.5 ± 3.38	30.92 ± 3.66
Education		
ES	2 (6%)	1 (8%)
JHS	2 (6%)	0
SHS	13 (38%)	4 (31%)
University	3 (9%)	2 (15%)
Unknown	14 (41%)	6 (46%)
Occupation		
Housewife	14 (41%)	6 (46%)
Non-housewife	20 (59%)	7 (54%)
BMI (mean ± SD)	24.20 ± 3.93	24.55 ± 4.46
Marriage History		
1	28 (82%)	13 (100%)
2	4 (12%)	0
≥3	2 (6%)	0
Parity		
1	7 (21%)	3 (23%)
2	19 (56%)	8 (62%)
3	5 (15%)	1 (8%)
>3	3 (9%)	1 (7%)
Abortion History		
0	24 (71%)	11 (85%)
1	8 (24%)	2 (15%)
2	2 (6%)	0
≥3	0	0
C-Section History		
0	2 (6%)	0
1	8 (24%)	7 (54%)
2	19 (56%)	6 (46%)
≥3	5 (21%)	0
Placenta Previa History		
Yes	1 (3%)	0
No	33 (97%)	13 (100%)
Smoking		
Active	5 (15%)	0
Passive	29 (85%)	13 (100%)
No	0	0

*SD: Standard Deviation; ES: Elementary School; JHS: Junior High School; SHS: Senior High School; BMI: Body Mass Index

The extent of placental invasion varied among patients. Focal invasion (S1 and S2) was observed in 36% of Placenta Accreta cases and 33.33% of Non-Placenta Accreta cases, while diffuse invasion (S1 and S2) was identified in 64% and 66.66% of Placenta Accreta and Non-Placenta Accreta patients, respectively (p = 0.718).

The mean intraoperative blood loss was significantly higher in Non-Placenta Accreta patients (3666 ± 1158 mL) compared to Placenta Accreta patients (2696 ± 2330 mL) (p = 0.022). However, there were no statistically significant differences in the mean volume of transfused packed red cells (PRC) or whole blood cells (WBC) between the two groups (p = 0.820 and p = 0.743, respectively). Regarding intraoperative complications, two cases of iatrogenic bladder trauma (AAST grade IV) and one case of bladder infiltration were reported in the Placenta Accreta group, while no complications were observed in the Non-Placenta Accreta group (p = 0.553). The majority of patients in both groups did not experience intraoperative complications.

Postoperative outcomes including ICU admission, length of hospital stay, hemoglobin levels, and neonatal outcomes, were analyzed (Table 3). ICU admission was required in 84% of Placenta Accreta cases and 88.88% of Non-Placenta Accreta cases (p = 0.723). Among those admitted to the ICU, the duration of stay exceeded 24 hours in 68% of Placenta Accreta patients and 66.66% of Non-Placenta Accreta patients (p = 0.942). The length of postoperative hospitalization was greater than three days in 84% of Placenta Accreta patients and 66.66% of Non-Placenta Accreta patients, though this difference was not statistically significant (p = 0.270). Postoperative hemoglobin levels were also evaluated, with most patients having hemoglobin concentrations between 8-10 g/dL. No patients in either group had

hemoglobin levels below 5 g/dL (p = 0.502). Neonatal outcomes indicated that 80% of neonates in the Placenta Accreta group and 100% in the Non-Placenta Accreta group required admission to the neonatology unit, while 20% of neonates in the Placenta Accreta group required admission to the NICU (p = 0.146). In terms of maternal outcomes, all patients in both groups survived postoperatively.

Table 2. Intraoperative characteristics of patients with Placenta Accreta Spectrum

Characteristics	Placenta Accreta (n=25; %)	Non-Placenta Accreta (n=9; %)	P-value
Operative procedures			
Conservative	4 (16)	0 (0)	0.201
Hysterectomy	21 (84)	9 (100)	
Placental Invasion			
Focal S1	6 (24)	2 (22.22)	
Focal S2	3 (12)	1 (11.11)	0.718
Diffuse S1	3 (12)	0 (0)	
Diffuse S2	13 (52)	6 (66.66)	
Blood Loss (mean SD)	2696 ± 2330	3666 ± 1158	0.022
Transfusion (mean SD)			
PRC	596 ± 290	549 ± 332	0.820
WBC	620 ± 376	642 ± 252	0.743
Complication			
Iatrogenic bladder trauma AAST grade IV	2	0	
Bladder infiltration	1	0	0.553
No Complication	22	9	

Table 3. Post-operative characteristics of patients with Placenta Accreta Spectrum

Characteristics	Placenta Accreta (n=25; %)	Non- Placenta Accreta (n=9; %)	P-value
ICU Admission			
Yes	21 (84)	8 (88.88)	0.723
No	4 (16)	1 (11.11)	
ICU Admission Duration			
≤ 24 hours	8 (32)	3 (33.33)	0.942
>24 hours	17 (68)	6 (66.66)	
Post Operative Treatment			
≤ 3 days	4 (16)	3 (33.33)	0.270
>3 days	21 (84)	6 (66.66)	
Post Operative Hemoglobin			
>10 gr/dl	7 (28)	4 (44.44)	
08-10 gr/dl	14 (56)	3 (33.33)	0.502
5-8 gr/dl	4 (16)	2 (22.22)	
<5 gr/dl	0	0	
Fetal Outcome			
Neonatology Unit	20 (80)	9 (100)	0.146
NICU	5 (20)	0	
Outcome Maternal			
Alive	25 (100)	9 (100)	-
Death	0	0	

Table 4. Outcome of patients with placenta accreta based on PAI score

Characteristic	PAI Score <5 (n=9; %)	PAI Score ≥5 (n=16; %)	P-value
Operative procedures			
Conservative	1 (11.11)	1 (6.25)	0.667
Hysterectomy	8 (88.88)	15 (92.75)	
Blood Loss			
	2212.50 ± 1055.32	3467.50 ± 2520.35	0.764
Organ Injury			
Iatrogenic bladder trauma AAST grade IV	2 (100)	0 (0)	0.117
Bladder infiltration	0 (0)	1 (100)	
Fetal Outcome			
Neonatology Unit	9 (100)	11 (68.75)	0.061
NICU	0 (0)	5 (31.25)	
ICU Admission			
Yes	9 (100)	12 (75)	0.102
No	0 (0)	4 (25)	

Table 4 presents the outcomes of patients with Placenta Accreta based on their Placenta Accreta Index (PAI) scores. Patients were categorized into two groups: those with a PAI score of less than 5 (n=9) and those with a PAI score of 5 or greater (n=16). Regarding the type of operative procedure performed, hysterectomy was the predominant intervention in both groups, occurring in 88.88% of patients with a PAI score <5 and 92.75% of those with a PAI score ≥5 (p = 0.667). Conservative management was performed in only one patient in each group.

The mean intraoperative blood loss was higher in the group with a PAI score ≥5 (3467.50 ± 2520.35 mL) compared to the group with a PAI score <5 (2212.50 ± 1055.32 mL), but this difference was not statistically significant (p = 0.764). In terms of organ injury, iatrogenic bladder trauma classified as AAST grade IV occurred in two patients from the PAI <5 group, while no cases were observed in the PAI ≥5 group. Conversely, bladder infiltration was reported in one patient with a PAI score ≥5, whereas no cases were recorded in the PAI <5 group (p = 0.117).

Fetal outcomes showed that all neonates in the PAI <5 group were admitted to the neonatology unit, whereas 68.75% of neonates in the PAI ≥5 group were admitted to the same unit. However, 31.25% of neonates from the PAI ≥5 group required admission to the neonatal intensive care unit (NICU), while none from the PAI <5 group did (p = 0.061). ICU admission was required for all patients in the PAI <5 group (100%) and for 75% of those in the PAI ≥5 group, though this difference did not reach statistical significance (p = 0.102).

Maternal age emerged as a significant factor, with PAS patients being notably older than their non-PAS counterparts. Advanced maternal age is a recognized risk factor for PAS, likely due to the cumulative effects of uterine trauma and decreased endometrial integrity over time. With increasing age, particularly beyond 35 years, the endometrium undergoes degenerative changes including sclerosis or hardening of blood vessels which leads to a decreased blood supply and localized hypoxia. This hypoxic state impairs the healing of the endometrium following childbirth or surgical procedures such as curettage and cesarean section. Consequently, damage to the basalis decidua which plays a key role in preventing excessive trophoblast invasion, occurs. If this layer does not form adequately, it becomes easier for the chorionic villi to penetrate the myometrium.[8–10]

There is a significant relationship between maternal age (p<0.05) and the incidence of placenta accreta, consistent with the studies by Farquhar (2017) and Koo (2012), which demonstrated a significant correlation between age and placenta accreta (p<0.001). Age is a risk factor that can affect the condition of the mother's uterus. After the age of 35, the endometrium undergoes changes, such as sclerosis of blood vessels, leading to reduced vascularization, which may result in tissue hypoxia.[11,12] In previous studies, the majority of mothers with placenta accreta syndrome (PAS) were between 30–34 years old, although some cases of PAS were observed in mothers under 25 years old and over 40 years old.[9,13] Compared to the group under 35 years old, mothers aged 35 or older had an odds ratio of 2.26 (95% CI: 1.85–2.76), indicating that older mothers have a higher risk of developing PAS.[10]

Body mass index (BMI) showed no significant difference between PAS and non-PAS patients, suggesting that BMI does not directly influence PAS

risk in this cohort. However, maintaining optimal maternal health through proper weight management remains crucial for reducing overall pregnancy complications. The lack of a BMI difference aligns with some studies but contrasts with others, indicating the need for more research into the complex interplay of maternal weight and obstetric outcomes. Obesity can influence the occurrence of placenta accreta through several mechanisms related to physiological and metabolic changes in women with obesity. One such mechanism is hormonal imbalance, where obesity often leads to increased levels of estrogen, insulin, and leptin in the body. These hormones can disrupt the normal process of implantation and placental development by increasing the risk of the placenta adhering more deeply to the uterine wall. Additionally, obesity leads to the accumulation of free fatty acids in the body, which can result in lipotoxicity, causing damage to the endometrial cells and impairing the process of decidualization. This, in turn, increases the likelihood of the placenta invading the myometrium and contributing to the development of PAS.[14–17]

Parity and marital history also provided insights into PAS risk factors. While most patients in both groups had two previous deliveries, PAS patients had slightly higher rates of three or more deliveries. Higher parity can lead to increased uterine scarring, which may contribute to PAS development. Marital history, while not directly linked to PAS, might reflect broader reproductive patterns influencing risk, such as repeated pregnancies. Research indicates that women with a history of multiple pregnancies (multiparous) are at a higher risk of developing placenta accreta compared to women who have never given birth (primiparous). Among multiparous women, the risk of placenta accreta increases with higher parity. This data highlights that women with a parity of two or more face a significantly elevated likelihood of experiencing complications related to placenta accrete.[18,19] Each pregnancy and delivery can trigger changes in the decidua basalis, the uterine lining that serves as a barrier against excessive trophoblast invasion. After multiple pregnancies, this layer may become thinned or damaged due to repeated stretching, contractions, and healing processes. This weakening of the protective uterine layer increases its susceptibility to penetration by chorionic villi, leading to the development of placenta accrete.[20,21]

A key finding was the strong association between prior cesarean sections and PAS. Most PAS patients had undergone at least two cesareans, with some having three or more, compared to non-PAS patients who rarely had more than one. This aligns with established evidence that cesarean scars disrupt the uterine lining, increasing the likelihood of abnormal placentation. The high prevalence of prior cesareans among PAS patients reinforces the need for careful evaluation of surgical histories during antenatal care. Previous research found that women undergoing cesarean delivery with a history of prior cesarean sections had a significantly higher risk of developing placenta accreta (2.30%) compared to those undergoing cesarean delivery without a history of prior cesareans, where the incidence was only 0.51%. A Chi-square test with a 95% confidence interval (CI) yielded a p-value of 0.000, indicating a significant association between a history of cesarean sections and the occurrence of placenta accrete.[22] This finding is supported by a 2019 retrospective cohort study conducted in China, which also demonstrated a statistically significant relationship between prior cesarean sections and the incidence of placenta accrete.[23]

Placenta previa, observed in a small percentage of PAS cases, remains a critical risk factor due to its anatomical and pathological overlap with PAS. While the low prevalence in this study might reflect diagnostic criteria or underreporting, it underscores the importance of monitoring patients with placenta previa for potential PAS. Placenta previa complicates management strategies and highlights the need for multidisciplinary care in such cases. In women with placenta previa, the risk of developing placenta accreta is 3%, 11%, 40%, 61%, and 67% for the first, second, third, fourth, and fifth or subsequent cesarean deliveries, respectively.[24]

Smoking exposure was another notable finding, with all PAS patients exposed to either active or passive smoking. Active smoking was present in a minority, but passive exposure was universal among both groups. Smoking is known to impact placental health through vascular and inflammatory changes, although its direct contribution to PAS remains an area for further research. Public health efforts to reduce smoking exposure, particularly during pregnancy, are essential to improve maternal and fetal outcomes.[25,26]

Compared to previous studies, the findings support the role of PAI Score in preoperative risk assessment. For instance, Fonseca and Ayres de Campos (2021) reported that patients with higher PAI Scores are more likely to undergo extensive surgical interventions due to deeper placental invasion.[27] These findings are in line with the outcomes of this study, which showed that 56.5% of patients underwent subtotal hysterectomy, while 15.2% required total hysterectomy. This severity significantly influences clinical decision-making during operative management. Patients with Diffuse S2 invasion are more likely to require additional surgical interventions, such as Subtotal Vaginal Hysterectomy (SVH) or Total Abdominal Hysterectomy (TAH), to manage the

massive hemorrhage frequently associated with extensive placental invasion.[1] The choice of performing SVH in PASD cases is often dictated by the extent of placental invasion observed intraoperatively. This procedure is generally selected for cases where the placental invasion does not extend to surrounding organs or involve the cervix extensively. Previous studies have demonstrated that SVH can serve as a more conservative option compared to TAH, particularly for patients with Placenta Accreta or Increta, where the invasion remains localized. The effectiveness of this approach is highly dependent on the readiness of a multidisciplinary team, which includes surgeons and anesthesiologists, along with access to critical resources such as blood for transfusion.[2]

A previous history of Cesarean Section (CS) is acknowledged as a major risk factor contributing to the development of PASD. Studies have demonstrated a progressive increase in PASD risk with a greater number of previous CS procedures. Patients with placenta previa and a history of more than three CS are at an increased risk of developing PASD. as high as 60%, markedly higher compared to those with no history of CS.[9] The physiological explanation for this lies in the disruption of the decidua basalis and scarring of the myometrium caused by prior CS, creating conditions conducive to abnormal placental invasion in subsequent pregnancies.[5] Additionally, this study identified a correlation between CS history and the Placenta Accreta Index (PAI) Score. Patients with an increased number of prior Cesarean Sections (CS) were observed to have elevated PAI Scores. Research conducted by Putri and Ariadi (2019) highlighted the utility of the PAI Score as an effective predictor of PASD severity in high-risk obstetric cases. As a result, prenatal assessment using the PAI Score is essential for optimizing surgical planning, particularly in patients with an extensive CS history.[6]

Intraoperative observations and the extent of placental invasion offer essential information regarding the severity of PASD. Procedures like SVH are often employed to manage complications, particularly in patients with accreta or increta, while those with multiple CS histories require a more comprehensive risk assessment to anticipate the need for extensive surgical interventions.[4] An integrated approach, including the use of PAI Score and multidisciplinary collaboration, is essential to reduce morbidity and mortality in PASD patients.

However, the weak correlation between PAI Score and blood loss contrasts with findings from Samosir et al. (2017), who reported a moderate positive correlation ($r = 0.495$, $p = 0.001$).7 This difference could stem from variations in sample size, patient demographics, or methodological differences. The retrospective nature of this study may also have introduced variability in the accuracy of recorded intraoperative data, particularly regarding blood loss estimates.

CONCLUSION

This study highlights the significant impact of Placenta Accreta Index (PAI) scores on intraoperative and postoperative outcomes in patients with Placenta Accreta Spectrum (PAS). Higher PAI scores (>5) were associated with increased intraoperative blood loss and a greater need for NICU admission, although these differences did not reach statistical significance. Hysterectomy remained the primary surgical approach across both groups, regardless of PAI score. Additionally, while organ injury patterns varied, with bladder trauma occurring more frequently in patients with lower PAI scores and bladder infiltration being observed in those with higher PAI scores, no statistically significant correlation was found. These findings suggest that while a higher PAI score may indicate a more complex clinical course, further research with larger sample sizes is necessary to validate its predictive value in guiding perioperative management strategies for PAS patients.

DISCLOSURES

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Conflict of interest

The authors declare no conflict of interest.

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Author contribution

All authors have contributed to all processes in this research, including preparation, data gathering and analysis, drafting and approval for publication of this manuscript.

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