



The Effectiveness of the USG PAS Score in Detecting the Outcome of the Placenta Accreta Spectrum

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Abstract

Purpose: Placenta Accreta Spectrum (PAS) is a general term used to describe the invasion of abnormal trophoblasts into the myometrium of the uterine wall. Ultrasound examination with PAS score is currently one of the modalities in determining the degree of invasion of the placenta. We tried to assess the effectiveness of the USG-based PAS score compared to the placenta accreta spectrum classification based on FIGO at the time of surgery.

Methods: This study involved 40 samples who had been diagnosed as placenta accreta spectrum disorder at RSUP Haji Adam Malik Medan. Samples were collected by consecutive sampling. The PAS value of USG was compared with the PAS FIGO classification at the time of operation. Analyzes were performed by Chi-square based test, Fisher exact test, using SPSS version 25, with a P value <0.05 was considered statistically significant (95% CI).

Results: The correlation between PAS and FIGO scores in PASD patients was included in the weak relationship category based on the correlation test spearman ($r=0.223$). In the test chi square found the value of $p=0.29$ ($p>0.05$) were not found a significant relationship between PAS and FIGO scores in patients PASD.

Conclusion: The correlation score of PAS and FIGO PASD patients included in the category of relationship with a sensitivity of 46%, specificity 75%, PPV 81.2%, NPV 37.5%.

Keywords: Placenta accrete; Pregnancy; FIGO; PAS score

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Introduction

Placenta Accreta Spectrum (PAS) is a general term used to describe the invasion of the abnormal trophoblast into the myometrium of the uterine wall. In a 2019 systematic review covering 7001 cases of PAS among nearly 5.8 million births, the overall pooled prevalence was 0.17 percent (range 0.01% to 1.1%). This is significantly higher than the 0.003 percent prevalence in the United States in the 1950s. A very significant increase in PAS, starting in the 1980s and 1990s and being observed worldwide is associated with the increasing prevalence of cesarean delivery in recent decades. Correct diagnosis of this disorder is of course the key to the success of future patient management in order to reduce maternal mortality due to placenta accreta spectrum problems. Placenta accreta itself causes poor outcomes for maternal and neonatal outcomes with high mortality and morbidity rates. The increase in the prevalence of the placenta accreta spectrum is also associated with the increasing number of cesarean sections in Indonesia. This is the main reason why it is necessary to study to reduce the mortality and morbidity rates in mothers and babies due to the placenta accreta spectrum. This study is a cross sectional study comparing ultrasound diagnoses based on PAS scores with PAS FIGO classification at the time of surgery. The data that has been collected will be presented in a frequency distribution and analyzed.

Materials and Methods

Research Sample

This study was an observational study with a cross sectional design. This study was approved by the ethics committee of the University of North Sumatra and the University of North Sumatra Hospital. The subjects of the study were all patients diagnosed with placental accreta disorders according to the PAS score at the Obstetrics and Gynecology Section of the University of Sumatera Utara Medan Hospital from March to December 2020 who met the inclusion and exclusion criteria. Candidates have signed informed consent as evidence of their willingness to be research subjects.

Table 1: Characteristics of respondents.

	PAS Median (Min-Max)
Age (years)	33 (26-44)
BW (kg)	54 (50-60)
TB (cm)	145 (140-160)
UAC (cm)	24.8 (23.5 -27.7)
Systole (mmHg)	112 (100-120)
Diastole (mmHg)	63 (60-68)
MAP	80 (74-84)
Gravida	3 (2-6)
Parity	2 (1-4)
Miscarriage	0 (0 -3)
Gestational age (weeks)	36 (32-37)
History of Caesarean Section	2 (0-3)
History of Curettage	0 (0-2)
Last Operating Distance (years)	4 (1-7)

Data Collection and Analysis

Patients who come to the obstetrics polyclinic of RSU Haji Adam Malik are taken to take anamnesis about the history of the disease, do basic records, body weight, height, previous medical history, physical examination, supporting examinations, and admission diagnosis. PAS scores were taken by ultrasound (GE Voluson S8) by an obstetrician and compared with FIGO classification of placenta accreta spectrum disorders during patient surgery. Data were analyzed using the chi-square test or Fisher's exact test, with a P value <0.05, which was considered significant with a 95% confidence interval.

Results

After conducting the research, the following results were found (Table 1). It is shown that the median characteristics of respondents for age is 33 with Mix-Max (26-44), for body weight 54 (Min-Max 50-60), height 145 (Min-Max 140-160), arm circumference upper 24.8 (Min-Max 23.5-27.7), systolic/diastolic blood pressure 112 (Mix-Max 100-120)/63 (Mix-Max 60-68), mean arterial pressure 80 (Mix-Max 74-84), Gravida 3 (Mix-Max 2-6), Parity 2 (Mix-Max 1-4), Miscarriage 0 (Mix-Max 0-3), Gestation Age (weeks) 36 (Mix-Max 32- 37), history of caesarean section 2 (Mix-Max 0-3), history of curettage 0 (Mix-Max 0-2), and last operating distance (years) was 4 (Mix-Max 1-7).

For comparison of placenta accreta spectrum scores and scores of the International Federation of Gynecology and Obstetrics (FIGO) in placenta accreta spectrum patients, several outcomes were tested. For the outcome of Caesarean Section (SC), PAS score was found with Mode 1 (Min-Max 1-2) while FIGO 2 score (Min-Max 2-4). For Total/Subtotal output Bilateral Bilateral Hysterectomy (TAH/STAH) with Mode 1 (Min-Max 0-2) and FIGO score with Mode 5 (Mix-Max 2-6). For Conservative output with Mode 1 (Min-Max 1-2) and FIGO score with Mode 2 (Mix-Max 2-6) (Table 2).

In Table 3 it is shown that the correlation of PAS and FIGO scores in PASD patients is included in the weak relationship category based on the correlation test spearman ($r=0.223$) with a sensitivity of 46%, specificity of 75%, PPV 81.2%, NPV 37.5%. In the test, it was chi square found that the value of $p=0.29$ ($p>0.05$), which means that

Table 2: Comparison of PAS Score and FIGO Score in PASD Patients.

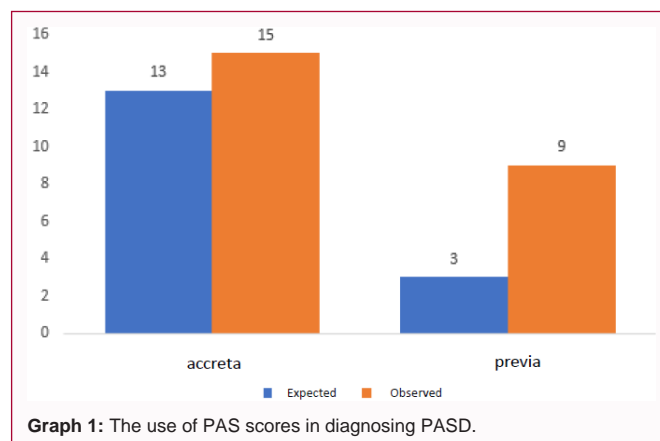
Output	PAS Score Mode (Min-Max)	FIGO Mode (Min-Max)
Cesarean Section	1 (1-2)	2 (2-4)
TAH/STAH	1 (0-2)	5 (2-6)
Conservative	1 (1-2)	2 (2-6)

TAH: Total Abdominal Hysterectomy; STAH: Subtotal Abdominal Hysterectomy

Table 3: Correlation of PAS and FIGO scores in PASD patients.

	Sensitivity	Specificity	PPV	NPV	r	p
PAS	46%	75%	81.20%	37.50%	0.223 ^a	0.29 ^b

^a:Spearman; ^b: Chi-Square



there was no significant relationship between PAS and FIGO scores in PASD patients.

From Graph 1 it is shown that the mean PAS score for placenta accreta is 13 for the expectation group and 15 for the observation group, while in the case of placenta previa it appears that the score is 3 for the expectation group and 9 for the observation group.

Discussion

Characteristics of research samples

Research by Cali G et al. [1] the mean maternal age at diagnosis was 31.6 ± 5.6 years and the mean gestational age at delivery was 35.6 ± 1.7 weeks. Based on parity found 28.2% nulliparous, 19.7% primiparous, and 52.1% multiparous. Then, if seen from the history of cesarean section, 27.8% have never had surgery, 21.2% have had 1x, 32.4% 2x and 18.5% 3x. On histopathological or clinical assessment, placenta accreta was diagnosed in 8.9% (95% CI, 6.0%-13.0%; 23/259) of women, placenta increta in 6.2% (95% CI, 3.8-9.8; 16/259) and placenta percreta in 27.0% (95% CI, 22.9-32.8; 70/259) of the included cases, while 57.9% (95% CI, 51.8%-64.0%; 150/259) were not showing signs of PAS disruption [1]. Research by Boroomand Fard et al. [2] showed that the mean age of PAS patients was $31.43 \pm 4.48 \sim 33.19 \pm 4.25$ years, for the number of cesarean sections between 1-2 with gestational age at the time of diagnosis was $32.01-5.35 \sim 34.8 \pm 3.46$ weeks and the gestational age at delivery was $34.14 \pm 4.97 \sim 38.3 \pm 1.87$ weeks [2].

In the research of Cui et al. [3] it appears that the mean age of PAS patients is 29.89 ± 5.49 years, the number of parity is 1, the mean gravidity is 2, and the gestational age at diagnosis is 19.36 ± 4.56 weeks. For past history, 75.9% had a history of had a history had a history curettage, 69% had a history of cesarean section of which 48.3% of once and 20.7% of 2x [3-5]. Research by Zhu et al.

[6], showed that the mean patient age was $31.3 \pm 6.4 \sim 32.7 \pm 4.9$, body weight $69.2 \pm 8.5 \sim 70.9 \pm 6.5$ kg with gestational age $36.4 \pm 1.2 - 1, 4$ weeks and gravidity $3.7 \pm 1.4 \sim 3.9 \pm 1.2$ weeks [6]. Research by Zhang showed that the mean age of PAS patients was 33.5 ± 4.2 years with a gestational age of 241 ± 30 days. In PAS patients, there were 11 patients with a history of miscarriage once, 9 with a history of miscarriage twice, 8 without miscarriage and 1 patient with a history of miscarriage $\geq 3x$. In addition, for a history of cesarean section, 24 patients had experienced at least 1x, 3 patients never and 2 patients $\geq 2x$ operations [7].

PAS Score and FIGO Score in PASD Patients

In a cohort study of 68 women with placental invasion of adjacent organs, the indications for 18 patients undergoing hysterectomy were rupture circumferential segmental $>50\%$ ($n=13$), coagulopathy ($n=2$), infection ($n=1$), and uncontrolled hemodynamic instability ($n=2$). In a review of 54 cases of placenta percreta affecting the bladder, partial cystectomy was performed in 24 of 54 patients. Caesarean section hysterectomy is considered the gold standard treatment for invasive accreta but is associated with high maternal morbidity (40% to 50%) and, in the case of placenta percreta; the mortality rate can be as high as 7% due to damage to the pelvic organs and blood vessels. In a previous survey of preference for surgical versus conservative therapy in cases of placenta percreta, it was found that when adjacent pelvic organs such as the bladder and intestines are involved, the majority of members of the Society of Perinatal Obstetricians, with and without experience in the management of placental accreta spectrum disorders, prefer treatment. Conservative (69% and 70%, respectively) [5].

Based on signs of impaired PAS on ultrasound examination, 57.9% (95% CI, 51.6%-64.0%; 150/259) of women were classified as PAS 0.15.1% (95% CI, 11.2%-19.9%; 39/259) as PAS1, 6.2% (95% CI, 3.8%-9.8%; 16/259) as PAS 2 and 20.8% (95% CI, 18.2%-26.4%; 54/259) as PAS3. Surgical complications involving bladder, ureter or bowel damage did not occur in cases with PAS0 or PAS1 and in 25.0% and 27.8% of those with PAS2 and PAS3, while 31.5% of women with PAS3 were admitted to the ICU compared to none of them with PAS0, PAS1 or PAS2 [1]. The correlation between the USG PAS staging system and the clinical scoring system proposed recently by FIGO is influenced by the retrospective nature of the analysis because at the time of the study, the FIGO scoring system had not been published. All women classified as PAS0 according to the ultrasound staging system were categorized as having PAS Grade 1 impairment according to the FIGO scoring system. In contrast, of the women who had PAS1 on ultrasound, 64.1% (95% CI, 48.4%-77.3%) were classified as having Grade-3, while 35.9% (95% CI, 22.7%-51.6%) were classified as having Grade-4 PAS disorder according to the FIGO clinical scoring system. Finally, all women with PAS2 according to the ultrasound staging system were categorized as having Grade-5 and all women with PAS3 had a PAS Grade-6 disorder, according to the FIGO scoring system [1].

Ultrasonography remains the main prenatal diagnostic method for placenta accreta. This increases the introduction of placenta accreta

and continues to improve diagnostic techniques, with increased sensitivity. In recent years, the sensitivity of ultrasound in diagnosing placenta accreta is 87% to 95%, specificity 76% to 98%, and its positive predictive value is 82% to 93%. Study by Chong et al. showed that the accuracy of the scoring system for predicting the pathological type of placenta accreta was 83.9% to 92%, indicating a relatively high accuracy. Patients with a score ≤ 5 points should undergo repeated ultrasound examinations every 3 to 4 weeks before delivery and attempt delivery after 37 weeks, depending on whether the patient has vaginal bleeding, abdominal pain, and other symptoms. With scores ≥ 6 and <9 , ultrasound should be performed every 2 to 3 weeks before delivery and try to deliver between 35 and 36 weeks according to the patient's symptoms. With a score of ≥ 10 , repeat ultrasound should be performed every 1 to 2 weeks before delivery and attempt delivery between 33 and 34 weeks according to the patient's symptoms [4].

Conclusion

The correlation between PAS and FIGO scores in PASD patients is included in the weak relationship category based on the correlation test spearman ($r=0.223$) with a sensitivity of 46%, specificity of 75%, PPV 81.2%, NPV 37.5%.

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