

**RESEARCH ARTICLE****Relationship Between Placenta Accreta Index Score and Management in Placenta Accreta Patients in RSUP Dr. M. Djamil Padang**Nabilah Azhari¹, Defrin^{2,*}, Nurhayati³¹ Medical student, Faculty of Medicine, Andalas University Padang, West Sumatera, Indonesia² Sub Division of Fetomaternal Medicine, Obstetrics and Gynecology Department, Faculty of Medicine, Andalas University, Dr. M. Djamil Central General Hospital Padang, West Sumatera, Indonesia³ Department of Parasitology, Faculty of Medicine, Andalas University, Padang, West Sumatera, Indonesia**Corresponding Author:** Defrin; defrin@med.unand.ac.id ; +62 852-6984-3562**Received :** August 8, 2024; **Accepted:** January 6, 2025; **Published:** January 22, 2025**Doi :** <https://doi.org/10.25077/aoj.9.1.124-133.2025>**Abstract**

Introduction : Placenta accreta index is a scoring system using ultrasound parameters used to diagnose placenta accreta. Parameters included are the number of previous caesarean section, location of the placenta, grading of lacunae, presence of bridging blood vessels, thickness of the myometrium. The management of placenta accreta is conservative and definitive management, where the definitive management performed is hysterectomy. The purpose of this study was to determine the relationship between PAI score and placenta accreta management in patients with placenta accreta at Dr. M. Djamil Hospital Padang.

Method : This type of research was observational analytic with cross sectional research design. This study was conducted in the medical record section uses a total sampling technique of 184 patients. Data analysis used univariate analysis, bivariate with Chi square test.

Result : The results of this study showed that 67.9% of patients with PAI $\geq$ 4 scores, 56.5% of patients who underwent hysterectomy, and after the statistical test obtained a p value <0.001, then H₀ was rejected, meaning that there was a relationship between placenta accreta index scores and placenta accreta management.

Conclusion : It is conclude from the results of this study there is a significant relationship between PAI score and placenta accreta management (P<0.05) in placenta accreta patients.

Keywords: Hysterectomy, placenta accreta, PAI score

INTRODUCTION

The spectrum of placenta accreta is a clinical condition where there is partial or complete adhesion of abnormal trophoblast cells of the placenta to the myometrium of the uterine wall.¹ Based on the depth of invasion, it is classified into placenta accreta, increta, and percreta.² Maternal mortality due to placenta accreta is reported to be around 7-10% worldwide.³ Increase the incidence coincided with an increase in cesarean delivery which is a risk factor for placenta accreta.⁴

Patients with high risk of placenta accreta, such as patients with placenta previa with previous cesarean delivery are treated electively and directed to ultrasound (USG) examination to diagnose prenatal placenta accreta. Placenta accreta index (PAI) which is a 9-point scoring system using 5 ultrasound parameters namely number of previous section caesarea (SC), grading placenta lacunae, sagittal smallest myometrial thickness, presence of anterior placenta previa, presence of bridging vessels.⁵

It was found that PAI scores were highly predictive of placental invasion. Thus, the application of PAI can help categorize groups at risk of placental invasion and those not at risk. This may help raise awareness of placental invasion or provide reassurance to women who desire future fertility as the primary management of placenta accreta is peripartum hysterectomy.^{6,7}

Placenta accreta can cause complications such as severe bleeding especially when manual retraction of the placenta is attempted. These complications can be prevented if placenta accreta is diagnosed in the antenatal period using the PAI score.⁷ Planned hysterectomy management using the PAI score in patients with placenta accreta will also benefit the surgeon so that they can fully evaluate the patient preoperatively and prevent and manage hysterectomy complications such as bladder injury, bowel injury, and bleeding.⁸

Based on research in 2020 by the American Institute of Ultrasound in Medicine, it was found that placenta accreta cases that were hysterectomies had higher PAI scores than those who did not require hysterectomy.⁵ In addition, research conducted by Wijada et al. in 2018 found placenta accreta patients with a PAI score of 8.5 and required hysterectomy management.³

Because of the above exposure, the researcher intends to find out the relationship between the placenta accreta index score and the management of placenta accreta in patients with placenta accreta at the Hospital. Dr. Djamil Padang.

METHODS

The type of method used in this study is an observational analytic research method with a cross sectional approach. This study was conducted by looking at the medical record status of patients who experienced placenta accreta in the Obstetrics and Gynecology section of Dr. M. Djamil Padang Hospital in 2018-2022. This research was conducted in the medical records section of Dr. M. Djamil Padang Hospital. The research time was March 2023 to December 2023. Sampling was done by total sampling. The samples in this study were pregnant women who were hospitalized in the Obstetrics and Gynecology ward of Dr. M. Djamil Padang Hospital with the criteria of pregnant women who were hospitalized in the Obstetrics and Gynecology ward of Dr. M. Djamil Padang

Hospital who were diagnosed with suspected placenta accreta with PAI scores. This study uses univariate and bivariate data analysis using the chi-square statistical test with the data analyzed is the independent variable, namely PAI score with the dependent variable, namely placenta accreta management.

RESULT AND DISCUSSION

Characteristics Sample

There were 184 patients diagnosed with suspected placenta accreta with PAI score who were hospitalized in the Obstetrics and Gynecology ward of Dr. M. Djamil Hospital Padang. The characteristics of patients with suspected placenta accreta are listed in Table 1.

Table 1. Characteristics patients

Characteristics	Frequency	Percentage
Age (years)		
20-34	101	54,9
≥ 35	83	45,1
Education Level		
SD	7	3,8
SMP	9	4,9
SMA	121	65,8
PT	47	25,5
Parity		
0	2	1,1
1	47	25,5
2	84	45,7
3	46	25
4	5	2,7
Risk factors		
History of SC		
≥2	111	60,3
<2	73	39,7
Placenta Previa		
Yes	167	90,8
No	17	9,2
Curettage		
Yes	28	15,2
No	156	84,8
Referral Origin		
West Sumatra	178	96,7
Outside of West Sumatra	6	3,3
Arrival Condition		
Emergency	86	46,7
Not an Emergency	98	53,3

It was found that the most age <35 as many as 101 (54.9%) patients, more than half of the patients with high school education level, namely 121 (65.8%) patients, most patients with parity ≥2, namely 135 (73.4%). More than half of placenta accreta patients with a history of SC ≥2 were

111 (60.3%), placenta accreta patients followed by placenta previa were 167 (90.8%) patients, and placenta accreta patients with a history of previous curettage were 28 (15.2%) patients. Most of the patients were referred from the West Sumatra region, 178 (96.7%) patients, and almost half of the patients came with emergency conditions through the emergency room, 86 (46.7%) patients.

Based on this study, it was found that most of the ages of placenta accreta patients were aged 20-34. This is in line with research conducted by Varlas VN et al and with research conducted at Dr. Hasan Sadikin General Hospital.^{9,10} The results of the study above are not in accordance with the theory that states that age over 35 years is involved in the development of placenta accreta where the increasing age of the mother will affect the condition of the uterus which causes changes in the endometrium which undergoes sclerosis of blood vessels, causing decreased vascularization and tissue hypoxia.¹¹ This may occur because maternal age, which was initially associated with being a risk factor for placenta accreta, was considered not to be a risk factor anymore after placenta previa and a history of SC were controlled because the risk was found to be not too high.¹²

The level of education in this study was mostly high school. Whereas in placenta accreta patients with education levels up to college only 25.5% or as many as 47 cases. From the results of this study it can be seen that there are differences in education in placenta accreta patients. However, until now research related to the relationship between education level and risk factors for placenta accreta is still limited, so this variable only shows the characteristics of the sample.¹³

In this study, it was found that the incidence of placenta accreta was mostly in multiparity ≥ 2 . Research conducted by El Galany et al.¹⁴ The same thing was also found in Fitzpatrick et al's and Bowman et al's.^{12,15} This occurs because multiparity causes reduced vascularization and decidual atrophy which results in insufficient blood flow to the placenta so that there is an expansion of the placental surface to find parts with a large blood supply.¹⁶

Based on the results of this study, most placenta accreta patients had a risk factor for a history of SC ≥ 2 . The results of this study are in accordance with research conducted by Yeni et al and Gelany et al.^{17,14} A history of multiple SCs is known to cause permanent damage to the lower segment wall of the uterus. The SC scar will be surrounded by thick-walled blood vessels, increased uterine artery resistance and uterine blood flow volume which eventually leads to myometrial remodeling. The SC scar will cause the myometrium to contain a lot of fibrotic scar tissue and no reepithelialization occurs so that extravillous trophoblast cells migrate close to the uterine serosa causing abnormal implantation in subsequent pregnancies.^{18,36,1}

In this study, most placenta accreta patients had placenta previa. The results of this study are in line with research conducted by Kyozyuka et al and A study conducted in Australia.¹⁹ In patients with a history of SC ≥ 2 and having placenta previa can significantly increase the incidence of placenta accreta from 1.3% to 27.3%, while in patients with a history of SC ≥ 2 without placenta previa the incidence of placenta accreta is only 0.2%.²⁰

The incidence of placenta previa increases as the number of SCs increases. The main factors leading to placenta accreta are history of SC and placenta previa. SC scars in the lower segment of the uterine myometrium lead to blastocyst implantation in the scar area and abnormal attachment

or invasion of placental villi into the scar tissue.²¹

This study showed that most patients did not have a history of curettage. Similar results were obtained by Morlando et al's research and research conducted at Hasan Sadikin Hospital Bandung found 22 (40%) patients and 8 (33.3%) placenta accreta patients with a history of curettage.^{22,23}

The results of this study are not in accordance with the theory that the incidence of curettage is proportional to the risk of placenta accreta because curettage causes complete endometrial damage where endometrial ablation is associated with the incidence of placenta accreta in subsequent pregnancies.²⁴ This difference may occur because uterine curettage is not the only factor in the pathogenesis of placenta accreta. In addition, a study in the United States showed an association between invasive procedures in the uterus such as curettage and placenta accreta but also depends on the frequency of curettage performed on the patient.^{10,2} In this study, most of the frequency of curettage history of placenta accreta patients was only 1 time.

Based on the results of this study, it was found that almost all patients were referral patients from hospitals in the West Sumatra region and the rest were patients from outside West Sumatra, namely from Jambi, Bengkulu, Mentawai, and Mandailing. Referral patients were obtained from outside the West Sumatra region because Dr. M. Djamil Padang Hospital is the main referral hospital in the central Sumatra region.

In this study, almost half of placenta accreta patients came with emergency conditions, who entered the hospital through the emergency room. Where it was found that the risk factor that often resulted in patients presenting with emergencies for emergency labor was antepartum hemorrhage. Patients with planned and scheduled multidisciplinary deliveries are likely to have shorter operating times, decreased maternal hemorrhagic morbidity, and fewer intensive care admissions when compared to unscheduled emergency deliveries, and optimal preparation such as the availability of interprofessional teams and coordination with blood banks are helpful in considering the management of placenta accreta patients, so that doctors have the opportunity to prepare preoperatively and during surgery which can reduce the morbidity rate in placenta accreta patients.^{25,26}

Previous studies have shown that planned cesarean delivery in patients with placenta accreta is a safe procedure compared to emergency delivery which can cause life-threatening severe bleeding and difficulty in surgical procedures. In addition, it was also found that patients whose delivery was planned with a prenatal diagnosis required smaller units of red blood cells compared to emergency patients without a prenatal diagnosis.²⁷

Tabel 2. Frequency of PAI Score in Patients

PAI Score	Frekuensi (f)	Percentage (%)
Score PAI		
≥4	125	67,9%
<4	59	32,1%

Table 2 shows that most of the placenta accreta patients had PAI scores ≥ 4 as many as 125 (67.9%) patients. Based on the results of the study, the frequency distribution of placenta accreta index scores in placenta accreta patients was grouped into PAI scores < 4 and ≥ 4 . A prospective study conducted by Bansal et al found 42.2% patients had placenta accreta with a PAI score limit of ≥ 4 .⁷ A study conducted by Nelson et al PAI score of > 4 increased the probability of placental invasion from 66.6% to 80.3%.²⁸

From the results of the above study, it was found that most cases of placenta accreta had a PAI score ≥ 4 , indicating the possibility of placental invasion into the endometrium by 51%. This is in accordance with the classification according to ISUOG where placental invasion in focal placenta accreta is 50% and diffuse placenta accreta is $> 50\%$.^{25,26}

Tabel 3. Frequency of Hysterectomy Management in Patients

characteristics	Frekuensi(f)	Percentage(%)
Management of Hysterectomy		
Yes	104	56,5
No	80	43,5

Table 3 shows that more than half of the placenta accreta patients were treated with hysterectomy as many as 104 (56.5%) patients. This study is in line with the results of Goh et al.²⁹ This is not in line with Zhang et al's study where placenta accreta patients were not treated with hysterectomy but conservative management. This is because, although hysterectomy is effective for homeostasis, it is not acceptable to many patients because it damages fertility so conservative management is used such as B-Lynch suture, uterine artery embolization, intrauterine insertion, and ligation of the ascending branch of the uterine artery.³⁰

Hysterectomy is the process of removing the uterus to remove the placenta if there is a strong suspicion of placenta accreta during antenatal care or after attempting to remove the placenta during labor. This option is recommended by the American College of Obstetrics and Gynecology and is considered the standard referral treatment in cases of placenta accreta.

The main advantage of hysterectomy (without attempted removal of the placenta) is that it limits the risk of bleeding and thus reduces maternal morbidity, the main disadvantage is loss of fertility. Conservative management has the advantage of preserving the uterus and fertility in women who want a subsequent pregnancy, but has the risk of placenta accreta recurrence, infectious complications, uterine necrosis, and bleeding secondary to conservative management.³¹

Tabel 4. Relationship between PAI Score and the Incidence of Hysterectomy in Placenta Accreta Patients

Score PAI	hysterectomy		No hysterectomy		P value
	Frekuensi (f)	%	Frekuensi (f)	%	
≥4	89	71,2%	36	28,8%	<0,001
<4	15	25,4%	44	74,6%	

Table 5.3 shows the results of bivariate analysis to determine the relationship between the dependent variable and the independent variable. According to the results of the chi-square test that has been done, the P value obtained is <0.001. This indicates a significant relationship between PAI score and the incidence of hysterectomy in patients with placenta accreta. This result is consistent with the study of Haba et al (2022) who found a relationship between PAI score and the need for hysterectomy management in patients with placenta accreta ($P < 0.05$).³²

PAI score results can be used as a marker to predict the likelihood of placental invasion, which is useful for obstetricians in diagnosing, making decisions, and planning appropriate management.³³ The recommended management of placenta accreta is planned cesarean hysterectomy. However, due to the significant morbidity and consequent loss of fertility, hysterectomy is not a first-line management. Therefore, conservative management such as B-Lynch suture, uterine artery embolization, intrauterine insertion, and ligation of the ascending branch of the uterine artery may be considered.³⁴

Each PAI parameter can result in a score of 0-9 which gives a respective percentage probability of placental invasion that ranges from 2 to 96%. Placenta accreta patients with a PAI score ≥ 4 have a 51% probability of invasion, 89.5% sensitivity and 97.6% specificity.³⁵ Therefore, placenta accreta diagnosed with a PAI score of 4 is the best cut off in helping to consider the management of placenta accreta patients, the doctor has the opportunity to prepare preoperatively and during surgery so that morbidity such as hysterectomy can be avoided and conservative management can be carried out.^{25,26}

CONCLUSION

Based on the results of the study on the relationship between PAI scores and placenta accreta management in patients with placenta accreta at Dr. M. Djamil Padang Hospital in the 2018-2022 period, the following conclusions were obtained as follows PAI scores of placenta accreta patients were found to be mostly with a score ≥ 4 , the management of placenta accreta patients was mostly performed hysterectomy, there was a significant relationship between PAI scores and the incidence of hysterectomy.

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