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Address for Correspondence:Editorial Room Andalas Obstetrics and Gynecology Journal, 3rd floor of KSM of Obstetrics and Gynecology, RSUP DR. M. Djamil Padang, Jl. Perintis Kemerdekaan Padang, Sumatera Barat 25127**Website:**<http://jurnalobgin.fk.unand.ac.id/index.php/JOE>**RESEARCH**

Diagnostic Test On Modified Score Of Cesarean Section History In Placenta Accreta Index In Predicting Placenta Accreta Diagnosis In Rsup Dr M Djamil

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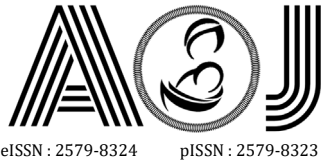
Abstract

Introduction : Placenta accreta is defined as abnormal implantation of placenta villi which invades myometrium without the presence of decidua basalis resulting in placenta that is difficult to remove. Based on the depth of invasion, placenta accreta is divided into three grades, placenta accreta, placenta increta, and placenta percreta. Placenta accreta develops if chorionic villi attaches to endometrium beyond decidua basalis. Placenta increta develops when chorionic villi invades the whole myometrium. Placenta percreta develops when chorionic villi attaches beyond myometrium reaching serous and abdominal organ. Based on clinical manifestation, placenta accreta is the common term being used. Incident of abnormal placenta invasion varies from 1 : 93.000 up to 1 : 540 pregnancy. PA incidence had increased four times from 1994 to 2002 in line with increased of caesarean section procedure. Other study showed history of caesarean section increased risk of placenta accreta up to 8,7 times. Placenta accreta index (PAI) was developed based on scoring process or various parameters assessment to help diagnose placenta accreta. The parameters including: history of caesarean section ≥ 2 times, lacunae grade, sagittal smallest myometrial thickness, anterior placenta previa and birthing vessel. High PAI indicates high risk of abnormal placenta invasion based on histology.

Objective : This study aims to investigate modified history of cesarean section score in placenta accreta index in predicting placenta accreta diagnosis in RSUP DR M Djamil Padang.

Material and methods : This was analytical study with cross sectional design. Study population was 84 placenta accreta patients in RSUP Dr. M. Djamil Padang from 2016 to 2019. Study sample was recruited using simple random sampling technique after meeting inclusion and exclusion criteria. Statistic analysis was done using Cohen's Kappa test. Diagnostic test including sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and diagnostic accuracy.

Result : Strength of agreement diagnosis placenta accreta based on PAI showed Kappa score of 0,002 (Kappa score $< 0,2$) which indicated poor strength of agreement. Strength of agreement diagnosis placenta accreta based on modified PAI showed Kappa score of 0,353 (Kappa score range from 0,21 to 0,40) which indicated fair strength of agreement. PAI diagnostic test yield sensitivity of 97,1%, specificity of 2,8%, positive predictive value of 48,5%, negative predictive value of 50%, and



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accuracy of 48,6%. Modified PAI diagnostic test yield sensitivity of 97,1%, specificity of 38,9%, positive predictive value of 60%, negative predictive value of 93,3%, and accuracy of 67,1%.

Conclusion : PAI has high sensitivity, low specificity, moderate positive predictive value, moderate negative predictive value, and moderate accuracy. Modified PAI has high sensitivity, moderate specificity, moderate positive predictive value, high negative predictive value, and high accuracy. PAI diagnosis has poor strength of agreement compared with pathology anatomy. Modified PAI diagnosis has fair strength of agreement compared with pathology anatomy. Modified PAI has identical sensitivity with standard PAI, meanwhile for specificity, positive predictive value, negative predictive value, and accuracy, modified PAI yields higher result compared to PAI.

Keywords: Modified score of history caesarean section, placenta accreta index, Modified placenta accreta index, diagnostic test of placenta accreta diagnosis

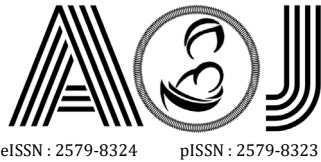
INTRODUCTION

Placenta accreta is defined as abnormal implantation of placenta villi which invades myometrium without the presence of decidua basalis resulting in placenta that is difficult to remove.^{1,2} Based on the depth of invasion, placenta accreta is divided into three grades, placenta accreta, placenta increta, and placenta percreta. Placenta accreta develops if chorionic villi attaches to endometrium beyond decidua basalis. Placenta increta develops when chorionic villi invades the whole myometrium. Placenta percreta develops when chorionic villi attaches beyond myometrium reaching serous and abdominal organ.^{3,4} Based on clinical manifestation, placenta accreta is the common term being used.²

Incidence of abnormal placenta invasion for placenta accreta, increta, and percreta are 81,6%; 11,8%; and 6,6%; respectively.⁴ Placenta accreta (PA) is abnormal placentation where chorionic villi directly attaches to structure beyond myometrium.³ So thus, a portion of placenta cannot be separated after delivery which leads to severe bleeding where emergency caesarean hysterectomy is necessary.^{5,6}

Incident of abnormal placenta invasion varies from 1 : 93.000 up to 1 : 540 pregnancy.¹ PA incidence had increased four times from 1994 to 2002 in line with increased of caesarean section procedure.⁵ Placenta previa and history of caesarean section are contributing factor in placenta accreta occurrence. In the last 50 years, prevalence of placenta accreta has increased ten times in United States, mainly due to primary caesarean section and history of caesarean section.^{2,3} Other study showed history of caesarean section increased risk of placenta accreta up to 8,7 times.⁷

Placenta accreta index (PAI) was developed based on scoring process or various parameters assessment to help diagnose placenta accreta. The parameters including: history of caesarean section ≥ 2 times, lacunae grade, sagittal smallest myometrial thickness, anterior placenta previa and birthing vessel. High PAI indicates high risk of abnormal placenta invasion based on histology.^{8,9}



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Previous study investigating PAI with placenta accreta incidence in RSUP. Dr. M. Djamil Padang in 2018 showed patients with placenta accreta had higher PAI compared with patients without placenta accreta. This study also suggested there was significant correlation between PAI score with placenta accreta case. This study was in accordance with study by Rac et al in 2014 and Nelson et al in 2016.¹⁰

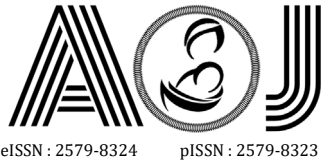
Initial diagnosis of placenta accreta is made during patient first visit by converting placenta accreta index score (PAI). Patient is declared having placenta accreta if PAI score > 4.^{11,12} PAI includes various parameter, one of them is caesarean section history, with the constant score as follows: score 0 for history of caesarean section < 2 and score 3 for history of caesarean section ≥ 2 times. The range of scoring range is very large (3 point difference), in this study, subjective SC history scores were modified for a better diagnosis of placenta accreta. If the score range is reduced or modified, where the score is reduced to 2, the PAI score might yield different diagnosis. Diagnosis is said to be accurate if the result is in accordance with the placenta accreta outcome. Placenta accreta outcome is obtained from pathology anatomy lab result and surgery report.

During initial survey on 10 medical records of 120 placenta accreta case in RSUP M Djamil, 2 patients were initially diagnose with placenta accreta but the end result was not placenta accreta. Therefore, the predictive rate of PAI is not 96% according to placenta accreta outcome after surgery, and it is assumed that the score of history of caesarean section $\geq 2x = 3$, contributed too much for PAI score which leads to false positive. In this study, author would like to investigate whether score for PAI index in the case of caesarean section $\geq 2x = 3$, might be too high to predict placenta accreta diagnosis when compared with score of 2. Based on the comparison, we would find out which constant value yields more accurate diagnosis.

METHODS

This was an analytical study with cross sectional design.^{13,14} Study population was all placenta accreta patient in RSUP. Dr. M. Djamil Padang from 2016 to 2019. As many as 84 patients were recruited.

Sample was recruited using simple random sampling where the patient who met the inclusion and exclusion criteria was recruited in this study. Inclusion criterias are as follows history of cesarean section ≥ 2 times and Medical record consisted of initial diagnosis, PAI score, surgery report, and pathology result. Exclusion criterias were inaccessible medical record, placenta accreta case with no pathology anatomy expertise. Sample was recruited using simple random sampling technique, where population who met the inclusion and exclusion criterias had equal opportunity to be recruited.^{13,14} From the results of the



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calculation using the Slovin sample formula, it was determined that the sample size was 69.4 samples (the samples were rounded up to 70 samples).

Univariate analysis was applied to every variable. Data was presented in distribution and frequency table, such as age distribution and frequency, parity, total of caesarean section history. *Cohen's Kappa* test was used to investigate power of consistency from diagnoses through PAI score with pathology anatomy lab result. The higher the Kappa score, the higher the strength of agreement between diagnosis based on PAI with pathology anatomy lab result. Kappa score interpretation (strength of agreement) is categorized as poor (score < 0,20), fair (score 0,20-0,40), moderate (0,41-0,60), good (score 0,61-0,80), and almost perfect (score 0,81 – 1,0).^{13,14}

Ethical clearance was granted by Research Ethics Commission Team of the RSUP M Djamil Padang prior the study. Ethical clearance was issued with statement number of 278 / KEPK / 2020.

RESULTS

1. Sample characteristic

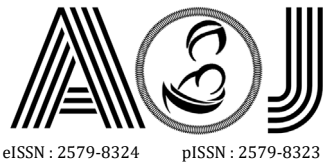
Sample characteristic includes maternal age, parity, number of past caesarean section.

1.1 Age

Sample characteristic includes maternal age, parity, number of past caesarean section.

Table 1. Sample frequency distribution based on age

Age (years)	F	%
26	1	1,4
27	1	1,4
28	2	2,9
29	4	5,7
30	4	5,7
31	1	1,4
32	7	10
33	3	4,3
34	9	12,9
35	10	14,3
36	8	11,4
37	8	11,4
38	6	8,6
39	1	1,4
40	3	4,3
41	1	1,4
44	1	1,4
Total	70	100



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The table above shows the youngest age is 26 years old and the oldest is 44 years old. The most frequent age group is 35 years old (14,3%).

2. Parity

Data regarding sample's parity is shown in Table 2

Table 2. Sample frequency distribution based on parity

Parity	f	%
2	40	57,1
3	22	31,4
4	5	7,1
5	2	2,9
6	1	1,4
Total	70	100

The table above shows sample parity range 2-6. Minimum parity is 2, and maximum parity is 6. The most frequent parity is 2 (40%).

1.3 History of caesarean section

Data regarding of caesarean section history is shown in Table 3

Table 3. Sample frequency distribution based on history of caesarean section

History of CS	f	%
2	55	78,6
3	14	20
4	1	1,4
Total	70	100

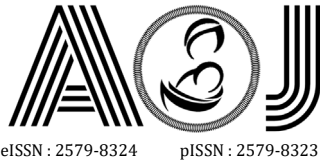
The table above shows range of caesarean section history is 2x – 4x, the lowest number of caesarean section history is 2x, and the highest is 4x. The most frequent number of caesarean section history is 2x (55%).

1.4 PAI Score

PAI score was obtained by calculating PAI score using the constant history of caesarean section $\geq 2x = 3$, as shown in table 4

Table 4. Sample frequency distribution based on PAI score

PAI score	F	%
4	2	2,9
4,25	3	4,3
4,5	2	2,9



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5	8	11,4
5,25	1	1,4
5,5	6	8,6
5,75	4	5,7
6	5	7,1
6,5	5	7,1
7,5	2	2,9
7,75	1	1,4
8	4	5,7
8,25	2	2,9
8,5	14	20
9	11	15,7
Total	70	100

The table above shows range of PAI score among participant starts from 4 – 9 with the lowest and highest score are 4 and 9, respectively. The most frequent score is 8,5 (20%).

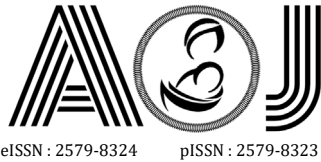
1.5 Modified PAI Score

Modified PAI score was obtained by calculating total PAI score using constant history of caesarean section score $\geq 2x = 2$, as shown in Table 5

Table 5. Sample frequency distribution based on modified PAI score

Modified PAI score	F	%
3	2	2,9
3,25	3	4,3
3,5	2	2,9
4	8	11,4
4,25	1	1,4
4,5	6	8,6
4,75	4	5,7
5	5	7,1
5,5	5	7,1
6,5	2	2,9
6,75	1	1,4
7	4	5,7
7,25	2	2,9
7,5	14	20
8	11	15,7
Total	70	100

The table above shows range of modified PAI score starts from 3 – 8, where the lowest and highest score are 3 and 8, respectively. The most frequent score is 7,5 (20%).



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Strength of agreement of placenta accreta diagnosis based on PAI was investigated using *Cohen's Kappa* test. The result is shown in Table 6.

Table 6. *Cohen's Kappa* test result on accuracy of placenta accreta diagnosis based on PAI

		PAI			Kappa
		Placenta accreta	Not placenta accreta	Total	
Pathology anatomy (PA)	Placenta accreta	33	1	34	-0.002
	Not placenta accreta	35	1	36	
	Total	68	2	70	

Table 6 shows *Cohen's Kappa* test for PAI where Kappa score = -0,002 (Kappa score < 0,2). This result indicated *Cohen's Kappa* has poor strength of agreement. This concludes PAI diagnosis has poor strength of agreement with the result from pathology anatomy.

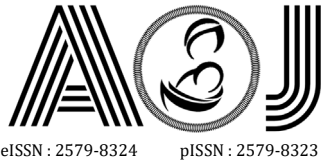
3. Diagnostic strength of placenta accreta based on modified PAI

Strength of agreement placenta accreta diagnosis based on modified PAI was investigated using *Cohen's Kappa* test. The result is shown in table 7.

Table 7. *Cohen's Kappa* test result on accuracy of diagnosis placenta accreta based on modified PAI

		Modified PAI			Kappa
		Placenta accreta	No placenta accreta	Total	
Pathology anatomy (PA)	Placenta accreta	32	2	34	0.353
	No placenta accreta	22	14	36	
	Total	54	16	70	

Table 3 shows *Cohen's Kappa* test for modified PAI, where Kapp score = 0,353 (Kappa score was in the range of 0,21-0,40). This indicates *Cohen's Kappa* test has fair strength of agreement. This result concludes modified PAI diagnosis has fair strength of agreement with pathology anatomy result.



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Diagnostic test includes sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), accuracy of PAI and modified PAI diagnosis.

4.1 PAI diagnostic test

The following 2x2 table presents diagnostic test.

Table 8. Table 2x2 for diagnosis placenta accreta based on PAI

		Pathology Anatomy (PA)		
		Placenta accreta	No placenta accreta	Total
PAI	Placenta accreta	33 (a)	35 (b)	68
	No placenta accreta	1 (c)	1 (d)	2
	Total	34	36	70

The following values are calculated based on table 4.1 :

a. Sensitivity

$$\frac{a}{a+c} \times 100\% = \frac{33}{33+1} \times 100\% = 97,1\%$$

b. Specificity

$$\frac{d}{b+d} \times 100\% = \frac{1}{35+1} \times 100\% = 2,8\%$$

c. Positive predictive value (PPV)

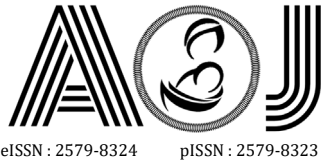
$$\frac{a}{a+b} \times 100\% = \frac{33}{33+35} \times 100\% = 48,5\%$$

d. Negative predictive value (NPV)

$$\frac{d}{c+d} \times 100\% = \frac{1}{1+1} \times 100\% = 50\%$$

e. Accuracy

$$\frac{a+d}{(a+b+c+d)} \times 100\% = \frac{33+1}{(33+22+1+14)} \times 100\% = 48,6\%$$



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Based on the previous calculation, PAI yields sensitivity of 97,1% and specificity of 2,8%, positive predictive value (PPV) 48,5%, negative predictive value (NPV) 50%, and accuracy of 48,6%.

4.2 Modified PAI diagnostic test

The following 2x2 table present modified PAI diagnostic test

Table 9. 2x2 Table for diagnosis placenta accreta based on modified PAI

		Pathology anatomy (PA)		
		Placenta accreta	No placenta accreta	Total
Modified PAI	Placenta accreta	33 (a)	22 (b)	55
	No placenta accreta	1 (c)	14 (d)	15
	Total	34	36	70

The following values are calculated based on table 4.2 :

a. Sensitivity

$$\frac{a}{a+c} \times 100\% = \frac{33}{33+1} \times 100\% = 97,1\%$$

b. Specivicity

$$\frac{d}{b+d} \times 100\% = \frac{14}{22+14} \times 100\% = 38,9\%$$

c. Positive predictive value (PPV)

$$\frac{a}{a+b} \times 100\% = \frac{33}{33+22} \times 100\% = 60\%$$

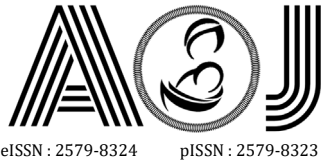
d. Negative predictive value (NPV)

$$\frac{d}{c+d} \times 100\% = \frac{14}{1+14} \times 100\% = 93,3\%$$

e. Accuracy

$$\frac{a+d}{(a+b+c+d)} \times 100\% = \frac{33+14}{(33+22+1+14)} \times 100\% = 67,1\%$$

Based on the calculation, modified PAI yields sensitivity of 97,1%, specificity 38,9%, positive predictive value (PPV) 60%, negative predictive value (NPV) 93,3%, and accuracy of 67,1%.



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5. Comparison of PAI and modified PAI diagnostic test

Comparison of PAI and modified PAI diagnostic test is presented on the following table.

Table 10. Comparison of PAI and modified PAI diagnostic

Diagnostic test	PAI (%)	Modified PAI (%)
Sensitivity	97,1	97,1
SPecificity	2,8	38,9
PPV	48,5	60
NPV	50	93,3
Accuracy	48,6	67,1

Based on the table above, modified PAI has identical sensitivity value with standard PAI, meanwhile specificity, positive predictive value, negative predictive value, and accuracy of modified PAI are higher compared with PAI.

DISCUSSION

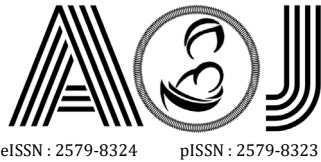
1. Subjects Characteristics

The results showed that subjects' age ranged from 26-44 years and the oldest age in this study was 35 years old. This was in line with the study conducted by Tovbin et al at the University of Tel Aviv (2016) that the mean age of patients on the sonographic evaluation of placenta accreta was 33.8 ± 4.5 years.¹⁵

In this study, subjects' parity ranged between 2 to 6 parities. The lowest subject's parity was 2, and the highest was 6 and 2 was the most found parity (40%). This, as reported Belfort et al. study in 2010, was associated with multiparity, but the frequency of placenta accreta (PA) incident is undetermined.^{4,16,17}

This study showed subjects' c-section history was between 2 to 4 times. The lowest c-section history was 2 times and the highest was 4 times and 2 history of previous c-section was the most found in this study (55 %). This result was in line with the study conducted by Baughman et al. in 2008 that Placenta previa and history of previous cesarean section were the most significant risk factors for placenta accreta (PA). Placenta previa in patients with two or more history of previous section cesarean increased the risk of placenta accreta (PA) up to 40% to 60%.^{3,18,19}

Based on this research, it is also known that the highest PAI score frequency was 8.5. Rac in 2014 also stated that risk of invasion was proportional to placenta accreta Index (PAI) score, where score of > 8 increased the risk of placental invasion up to 96%. So it can be concluded that the higher the PAI score, the higher the risk of placenta accreta.¹² The most common modified PAI score was 7,5. Modified PAI reduced the PAI score by one point in the history of previous c-section ≥ 2 times. Hence, if the standard PAI score is known to be 8.5, then the modified PAI will automatically be 7.5.



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Cohen's Kappa statistical analysis showed that PAI has low to poor Strength of Agreement with the results of Pathology examination, while PAI modification has sufficient / fair Strength of Agreement with the result of Pathology examination. Modification PAI has a better Strength of Agreement than PAI. In line with this results, the diagnostic test results also show that modified PAI has a higher sensitivity, specificity, Positive Predictive Value (PPV), Negative Predictive Value (NPV) and accuracy than PAI.

Diagnostic test is a test performed to strengthen conclusions about the comparison of the accuracy of modified PAI and PAI in predicting the diagnosis of placenta accreta. The diagnostic test used in this study consisted of sensitivity, specificity, Positive Predictive Value (PPV), Negative Predictive Value (NPV) and accuracy.

The calculation of the sensitivity value aims to determine the percentage of samples diagnosed with placenta accreta based on PAI score and diagnosed with placenta accreta according to the results of the anatomical pathology examination, or in other words it is also known as True Positive. The results of this study indicated that modified PAI and PAI have the same sensitivity.

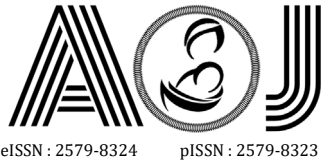
The calculation of the specificity aims to determine the percentage of samples not diagnosed with placenta accreta based on PAI score and not diagnosed with placenta accreta according to the results of anatomical pathology examination, or in other words also known as True Negative. The results of this study indicated that modified PAI has better specificity than PAI.

Positive predictive value (PPV) is calculated to see the percentage of samples diagnosed with placenta accreta based on PAI score but not diagnosed with placenta accreta according to the results of anatomical pathology examination, which also known as False Positive. In this study, modified PAI has a better PPV than PAI.

Negative predictive value (NPV) is calculated to determine the percentage of samples not diagnosed with placenta accreta based on PAI score but diagnosed with placenta accreta according to the results of the anatomical pathology examination, which also known as False Negative. In this study, modified PAI had better NPN than PAI.

From the overall value of the diagnostic test, it can be summarized in a value called accuracy. Accuracy is the proportion of true value/test correctly (true positive + true negative) among all the samples examined. The accuracy of modified PAI in this study was better than the accuracy of PAI.

Here are some of the previous studies on the Placenta Accreta Index (PAI). Study conducted by Nelson et al (2017) in 66 cases showed that the application of the PAI method



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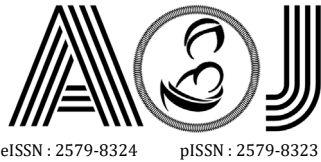
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increased diagnostic accuracy by 80.3% compared to the diagnostic accuracy of ultrasound (66.6%) and increasing the sensitivity of ultrasound diagnosis (34% to 60%, $p = 0.005$). Specificity (100%), PPV (100%), and NPV (55%) were also higher using the PAI score in patients with at least 1 previous history of c-section, whereas the application of PAI in all cases of placenta accreta resulted in 52% sensitivity, 100% specificity, PPV 100% and NPV 73%.¹¹ Ellakwa et al. research in 2019 showed that all parameters of the placenta accreta index were statistically significant and score 4 was found to be the best cut-off point in diagnosing placenta accreta. In that study, the sensitivity of score 4 of placenta accreta index was 89,5%, while the specificity was 97.6%.^{12,20}

Another research conducted Samosir et al (2017) regarding the use of placenta accreta index (PAI) to predict abnormal placenta invasion at Hasan Sadikin Hospital in Bandung, showing that placenta accreta index (PAI) has a sensitivity of 70%, specificity of 81.8%, positive predictive value (PPV) 77.8%, and negative predictive value (NPV) 75%.⁹ According to the research of Tovbin et al (2016), the overall sensitivity (Sn) of the high probability score was 69.6% (16/23). Specificity (Sp) of a high probability score was 98,7% (235/239). Positive predictive value (PPV) and negative predictive value (NPV) were 84.2% (16/19) and 97.1% (232/237), respectively. The overall detection/sensitivity rate for high or moderate probability scores was 91.3% (21/23) and the specificity was 94.6% (220/235).¹⁵ Study conducted by Li Luo et al (2019) using a threshold score showed that this scoring system produces high positive predictive values (PPV 95.44% and 81.81%) for without PAS (Placenta Accreta Spectrum) and percreta, and moderate (80.26% and 75.47%) for accreta and increta. In addition, the system received a high negative predictive value (NPV=5.44%) and a low false positive rate=3.32%. Without Placenta Accreta Spectrum (PAS) had shown a very low false positive rate at 4,56%. The threshold scores for the predictive accreta, increta, and percreta were 2.25-6.2, 6.2-8.95, and ≥ 8.95 , respectively, with positive and negative predictive values, and false-positive rates of the scoring systems were 96.68%, 95.44%, and 3.32% respectively.^{15,16}

The Placenta Accreta Index (PAI) is an index determined from the assessment of various parameters to simplify diagnosing placenta accreta. The diagnosis of placenta accreta is established at the time of admission by converting the score of placenta accreta Index (PAI). Patients was diagnosed with placenta accreta if the score > 4 .¹¹ Placenta accreta Index (PAI) covers a wide range of parameters, one of them is previous history of c-section. previous history of c-section had the following scores :^{8,11}

- a) History of c-section < 2 times is assigned a score of 0
- b) History of c-section ≥ 2 times is assigned a score of 3



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The gap scores in points a) and b) above is very large (3 points apart). In this study, the researchers tried to compare the diagnostic accuracy of PAI (PAI with a history score of c-section ≥ 2 times = 3) and through calculating modified PAI (PAI with a history score of c-section ≥ 2 times = 2).¹⁵ The results of this study proved that modified PAI had better accuracy.

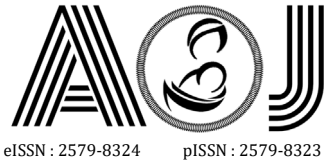
Based on the diagnostic test theory approach as previously described, the authors will explain why modified PAI has better accuracy than PAI.

a) PAI modification tend to have a statistically better test results than PAI due to the following reasons:

- 1) The *Cohen's Kappa* statistical test is a test to compare any differences between two types of measuring instruments. The measuring instruments intended in this study was PAI and the results of the anatomical pathology examination. Because in this study there were two types of PAI scores (modified PAI and PAI), the Cohen's Kappa statistical test was carried out twice, including:
 - *Cohen's Kappa* test PAI * Anatomical Pathology
 - *Cohen's Kappa* test modified PAI * Anatomical Pathology
- 2) The *Cohen's Kappa* test is expressed in Kappa value (< 0.0 2-1.00), where the PAI value of Kappa < 0.02 means that the value of strength of agreement is low (poor) and modified PAI of the Kappa value = 0.353 means the value of the strength of agreement is sufficient (fair). Hence, the conclusion obtained was that modified PAI was better than PAI in predicting the placenta accreta.
- 3) True diagnosis can be true positive and true negative (can be seen in 2x2 table). This means that the diagnosis obtained by calculating the PAI score which is the same as the outcome of Anatomic Pathology examination, known as true diagnosis.
- 4) Modified PAI is PAI with the score is lowered by one point, on the former parameter c-section ≥ 2 times. A decrease in this score can lead to a change in the diagnosis from placenta accreta to non-placenta accreta, as illustrated by the arrow shown in the illustration below (2x2 Table):

		Anatomical Pathology (PA)	
		Placenta Accreta	No Placenta Accreta
PAI	Placenta Accreta	(a) True Positive	(b) False Positive
	Not Placenta Accreta	(c) False Negative	(d) True Negative

- 5) As can be seen in the table above, changing the diagnosis will also shift the position of sample from quadrant (a) to quadrant (c) and from quadrant (b) to quadrant (d)



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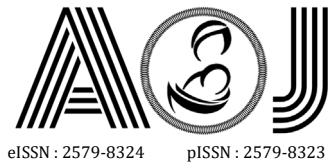
- 6) The shifting of samples to quadrant (c) is probably in small number because the average sample diagnosed with placenta accreta has a PAI score > 5 , so that if it is lowered by one point, it will change to > 4 (which still converted as placenta accreta).
- 7) The shifting of sample from quadran (b) to quadran (d) causes an increase in the significance of the Cohen's Kappa test results on modified PAI.

b) Modified PAI tend to have a better diagnostic test results compared to PAI due to the following reasons:

- 1) The diagnostic test used in this study consists of sensitivity, specificity, Positive Predictive Value (NPP), Negative Predictive Value (NPN) and accuracy.
- 2) As explained in point a) above, that a decrease in the PAI score will have an impact on a change in diagnosis, in turn, it will also have an impact on increasing the true negative value/specificity, while true positive/sensitivity may decrease, but not too significant, or even there may not be any decrease in true positive/sensitivity. True positive/sensitivity and true negative/specificity are indicators that determine the accuracy of a diagnostic test.
- 3) From the overall value of the diagnostic test, it can be summarized in a value called accuracy. Accuracy is the proportion of true values (true positive + true negative) among all examined samples. By increasing the True Positive and True Negative values, the accuracy value of modified PAI will automatically increase.

CONCLUSION

1. PAI had high sensitivity, weak specificity, moderate Positive Predictive Value (PPV), moderate Negative Predictive Value (NPV) and moderate accuracy.
2. Modified PAI had high sensitivity, moderate specificity, moderate positive predictive value (PPV), high negative predictive value (NPV) and high accuracy.
3. Diagnosis with PAI had low (poor) strength of agreement with the results of anatomic pathology examination.
4. Diagnosis with modified PAI had sufficient (fair) strength of agreement with the results of anatomic pathology examination.
5. Modified PAI has the same sensitivity as standard PAI, while the specificity, Positive Predictive Value (PPV), Negative Predictive Value (NPV) and the accuracy of modified PAI were higher than PAI.



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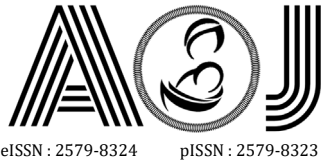
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