

## RESEARCH ARTICLE

# Maternal Outcomes of Hysterectomy and Conservative Surgery in Placenta Accreta

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**Abstract: Background:** Abnormal invasive placentation or placenta accreta spectrum (PAS) has been an emerging disease in developing countries where cesarean sections are routinely performed. Here we report our own data to contribute to the variety of techniques for reducing morbidity and mortality in placenta accreta cases across the world.

**Objective:** This study aims to analyze maternal outcomes, associated risk factors, and our surgery technique in placenta accreta patients treated at Haji Adam Malik Hospital, Indonesia.

**Methods:** We conducted a retrospective study in a tertiary hospital in North Sumatra, with a total of 70 patients suspected to have placenta accreta between January 2017 and June 2019. We compared age, gestational age, previous cesarean section, history of antepartum bleeding, placenta accreta index score, and intraoperative data, including the type of anesthesia, estimated blood loss, the need for transfusion, duration of surgery, complication, and management of the patient.

**Results:** From 70 suspected cases of placenta accreta, 52 (74.2%) patients were diagnosed with placenta accreta and 18 (25.7%) were diagnosed with placenta previa (non-accreta) during surgery. Of the 52 placenta accreta patients, hysterectomy was performed in 42 and the other 10 were treated with conservative surgical procedures. Morbidities such as bladder injury (5.8%; 3/42) and iliac vein injury (4.8%; 2/42) were reported during hysterectomy. There were two (4.8%) mortalities reported.

**Conclusion:** PAS is an emerging disease with high mortality and morbidity rates, which requires comprehensive management including referral to a multidisciplinary care team for diagnosis and management.

**Keywords:** Placenta Accreta Spectrum (PAS), Hysterectomy, Conservative Surgery, Maternal Outcomes, Risk Factors for PAS, Management of PAS.

## INTRODUCTION

Abnormal invasive placentation or placenta accreta spectrum (PAS) is an emerging disease in developing countries, where cesarean sections are routinely performed. The term PAS includes placenta accreta, placenta increta, and placenta percreta, and involves excessive penetration of the villi into the myometrium. PAS is considered an emergent, life-threatening complication of pregnancy that requires advanced ultrasonographic diagnostics and well-established management. Haji Adam Malik hospital is a tertiary hospital located in North Sumatra, Indonesia, where, for the past two years, we have found an increasing incidence of placenta accreta. Here, we report our own data to contribute to the variety of techniques used across the world to reduce morbidity and mortality in placenta accreta cases.

## MATERIAL AND METHODS

We conducted a retrospective study of 70 patients suspected to have placenta accreta between January 2017 and June 2019. Informed consent was obtained from the volunteers. Placenta accreta was first suspected upon ultrasound and was then confirmed by assessing lacunae, the thickness of myometrium, the presence of placenta anterior, and bridging vessels. From this, using a placenta accreta index (PAI) score, we predicted the percentage of placental invasion. A definitive diagnosis was made intraoperatively. The PAI score uses a nine-point scale to indicate a probability of invasion ranging from 2% to 96% [1]. The primary aim of this study was to report on the maternal outcome, including maternal survival status. The secondary aim of this study was to report on maternal complications. Accreta and non-accreta patient subgroups and outcomes were compared with respect to age, gestational age, previous cesarean section, history of antepartum bleeding, PAI score, intraoperative data including type of anesthesia, estimated blood loss, the need for

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transfusion, duration of surgery, complication, and management of the patient. The accreta patient subgroup was further divided based on hysterectomy and conservative surgery before comparing outcomes. The hysterectomy surgical technique used in this study involved midline incision through the umbilicus, followed by a transversal incision of the uterine fundus to deliver a baby. We postponed the administration of uterotonics until the decision for hysterectomy was made, and then the uterus was situationally sutured for hemostatic purposes. Next, the bilateral hypogastric artery was ligated, followed by filling of the urinary bladder with saline water. The distention of the urinary bladder minimized the risk of bladder injury. The bilateral uterine artery was identified, clamped, and sutured, and then a total hysterectomy was performed after the identification of the posterior vaginal fornix. If the placental invasion is found to be focal, conservative surgery is performed. Our conservative surgical procedure involved delivering the placenta, then excising the focal invasive placenta on the lower uterine segment.

Data were analyzed using SPSS version 25. Age, hemoglobin, hematocrit, leukocyte, thrombocyte, PAI score, surgery duration, and blood loss during surgery were analyzed using an independent t-test. Previous cesarean, antepartum bleeding, gestational age at delivery, and maternal outcome were analyzed using the chi-square test, while the type of

anesthesia, maternal complication, and maternal outcome were analyzed using Fisher's exact test.

The study was approved by the Health Research Ethics Committee, Medical Faculty Universitas Sumatera Utara/H. Adam Malik General Hospital, North Sumatra, Indonesia (03/TGL/KEPK FK USU-RSUP HAM/2017). No animals were used for the studies that are the basis of this research. The reported experiments are in accordance with the ethical standards of the committee of Sumatera Utara University and with the Helsinki Declaration of 1975, as revised in 2013.

#### AVAILABILITY OF DATA AND MATERIALS

We do not wish to share the data because they contain many personal details of the study's subjects. We are working on another related research topic and are preparing to publish it.

#### RESULTS

As shown in Table 1, from 70 suspected cases of placenta accreta, 52 (74.2%) patients were diagnosed with placenta accreta during surgery and 18 (25.7%) were diagnosed with placenta previa (non-accreta). The mean age of accreta and non-accreta patients was 34 years old. Accreta patients had a median PAI score of 6, whereas non-accreta patients had a median PAI score of 4 ( $P < 0.001$ ). All of the subjects in this

**Table 1. Characteristics of accreta and non-accreta patients.**

Characteristics	Accreta	Non Accreta	P
Age (mean)	34	34	0.682*
Hb (mean)	10,47	10,06	0.43*
Ht (mean)	31	29,7	0.259*
Leucocyte (mean)	19.358	13.731	0.386*
Trombocyte (mean)	247.288	223.722	0.145*
History of cesarean section			
• 1 times	16(30.8%)	10(55.6%)	0.177#
• 2 times	29(55.7%)	6(33.3%)	
• 3 times	7(13.5%)	2(11.1%)	
PAI score (median)	6	4	<0.001*
Antepartum bleeding	17 (32,7%)	7 (38,9%)	0.633#
Gestational age at delivery			0.421#
• < 34 weeks	5(9,6%)	3(16,7%)	
• 34-37 weeks	23(44,2%)	5(27,8%)	
• > 37 weeks	24(46,2%)	10(55,6%)	
Maternal outcome			1.00+
• Alive	50(96,2%)	18(100%)	
• Died	2(3,8%)	0(0%)	
Total	52 patients	18 patients	

\*T test Independent, #chi square, +Fisher exact test.

**Table 2. Characteristics of hysterectomy and conservative surgery patients.**

Characteristics	Hysterectomy	Conservative	P
Age (mean)	34	35	0.827*
Hb (mean)	10.43	10.63	0.766*
Ht (mean)	31	32	0.606*
Leucocyte (mean)	20.337	15.244	0.598*
Trombocyte (mean)	250.738	232.800	0.412*
PAI score (median)	6	5.75	0.431*
Duration of surgery (mean)	154 min	129 min	0.192*
Blood loss during surgery (mean)	1657 cc	910 cc	0.096*
Antepartum bleeding	16(38,1%)	1(10%)	0.087#
Type of anesthesia			0.223+
• Regional	0 (0%)	1(10%)	
• General	35 (83.3%)	8(80%)	
• Regional + General	7 ( 16.7%)	1(10%)	
Blood Transfusion			0.011#
• Yes	23(54.8%)	1(10%)	
• No	19 (45.2%)	9(90%)	
Gestational age at delivery			0.37#
• < 34 weeks	5 (11.9%)	0(0%)	
• 34-37 weeks	17 (40.5%)	6(60%)	
• > 37 weeks	20 (47.6%)	4(40%)	
Complications			1+
• Bladder injury	3(5.8%)	0(0%)	
• Iliac vein injury	2(4.8%)	0(0%)	
Maternal outcome			1.00+
• Alive	40(95.2%)	10(100%)	
• Died	2 (4.8%)	0(0%)	
Total	42 patients	10 patients	

\*T test independent, +fisher exact test, #chi square.

study had at least one previous cesarean. Most accreta patients had two previous cesareans (55.7%), while most non-accreta patients had only one previous cesarean (55.6%). Antepartum bleeding was found in 32.7% (17/52) of accreta patients and 38.9% (7/18) of non-accreta patients. Termination of pregnancy was >37 weeks gestational age for each group. There were two (3.8%) mortality cases reported in accreta patients (Table 1).

Of the 52 placenta accreta patients (Table 2), a hysterectomy was performed in 42 patients; the other 10 patients were treated with conservative surgical procedures. The mean age of hysterectomy was 34 years, whereas the mean age of conservative surgery was 35 years (Table 2). The PAI scores for hysterectomy patients and conservative surgery patients were 6 and 5.75, respectively (P=0.431). Blood transfusion was frequently necessary for the hysterectomy group (54.8%), as shown in Table 2. In addition, even though there was a higher incidence in the hysterectomy group for blood loss during surgery, antepartum bleeding, injury to the bladder and iliac vein, and maternal deaths,

these differences were not statistically significant when compared to the conservative surgery group.

#### 4. DISCUSSION

Risk factors for developing placenta accreta include advanced maternal age, multiparity, previous uterine surgeries like curettage, use of assisted reproductive techniques, and previous cesarean section [2].

In the present study, the mean age of accreta and non-accreta patients was 34 years. In Indonesia, according to UNFPA, most women (56.9%) are married between the ages of 20-24 [3] and the decision to have a child early is linked to our patients' mean ages. Maternal age greater than 35 years increases the risk of accreta 4.5-fold, although other factors such as multiparity, risk of previa, and prior uterine surgery also contribute to increased risk [4].

A study to apply standardized ultrasound parameters for predicting placental invasion using PAI shows that PAI scores may indeed be helpful in predicting the risk of accreta

[1]. A recent study conducted in a center in Bandung, Indonesia, evaluated the PAI score and showed a sensitivity of 70% and specificity of 81.8% for prenatal diagnosis of PAS [5]. In our centre, we used PAI scores to predict accreta and non-accreta in patients. Our data show that accreta patients have a median PAI score of 6 and non-accreta patients have a median score of 4 ( $p < 0.001$ ). Therefore, there are overlapping scores between accreta and non-accreta patients. Ultrasonography is an operator-dependent device and the operator is not always the same, therefore, errors such as interobserver reliability can occur.

Cases of PAS are often linked to the previous cesarean section. In a study by Irving and Hertig in 1937, the incidence of placenta accreta was found to be 1 in 30,000 for women in the United States, with only 1 woman reporting a previous cesarean [6]. In contrast, a study by Wu *et al.* in 2005 showed a PAS incidence of 1 in 535 births [7], which is comparable to the increasing cesarean rates from 12.5% in 1982 to 23.5% in 2002 [8]. A recent study from Surabaya, Indonesia, showed the incidence of PAS to be 1 in 500 births (4%) [9]. Our study shows 13.5% (7/52) of accreta patients had three previous cesareans.

In the present study, antepartum bleeding was found in 32.7% (17/52) of accreta patients and in 38.1% (16/42) of hysterectomy patients. Antepartum bleeding is a double-edged sword. On the one hand, a patient with antepartum bleeding may have an improved outcome because the placental invasion is likely to be focal and conservative surgery can be done. However, on the other hand, antepartum bleeding may be harmful due to the risk of emergency delivery and anemia in the patient.

A previous study reported the optimal time for termination of pregnancy in PAS is 34 weeks [10]. In early 2017 to 2018, it is common practice to wait for a term pregnancy to terminate in PAS patients, considering the maturity of the fetus. In contrast, preterm pregnancies are terminated earlier because of severe antenatal bleeding. Currently, in our center, PAS pregnancies are terminated at 34-36 weeks gestational age. Our study shows the termination of pregnancy at 34-37 weeks in 44.2% (23/52) of patients and after 37 weeks in 46.2% (24/52) of patients. The later termination is because of delayed diagnosis and/or referral, since our patients are mostly from rural areas. Termination of a pregnancy before 34 weeks is occurred in 9.6% (5/42) of patients due to severe antepartum bleeding.

The decision to perform a hysterectomy or conservative surgery is based on the width of the placental invasion and whether it is diffused or focally attached in the uterus. Before surgery, we identified suspected accreta cases by ultrasound using the PAI score and confirmed the diagnosis during surgery. Histopathology was done when hysterectomy was performed, although results did not influence our decision for patient management [11].

Bladder injury complications were found in 5.8% (3/42) of hysterectomy patients. A systematic review for hysterectomy in PAS showed higher rates of urinary tract injury (29%) than with hysterectomies for other gynecological disorders [12]. In a population-based descriptive study in the

UK, there was no mortality reported in accreta patients, but morbidity such as damage to the urinary tract, bladder, or bowel was found in 10 of 18 hysterectomy patients [13]. Iatrogenic iliac vein injury was found in 4.8% (2/42) of hysterectomy patients, and we routinely performed the internal iliac artery ligation procedure in all suspected accreta patients.

An estimated average blood loss of 1650 mL was observed by Clausen *et al.* and this required a transfusion of 1.8 units of packed red blood cells, where endovascular balloon occlusion of the common iliac arteries or the aorta was used [14]. We routinely performed internal iliac artery ligation; mean blood loss was 1657 mL (400-8000 mL) during hysterectomy and 910 mL (200-2000 mL) during conservative surgery. Our study showed that blood transfusion is required for 54.8% (23/42) hysterectomy patients.

The anesthesia technique used during suspected accreta cases is at the discretion of the attending anesthesiologist. In our center, the anesthesia technique used for hysterectomy is typically general anesthesia (83.3%); a combination of spinal and general anesthesia is used when the decision to perform a hysterectomy is made during surgery. The need to convert from regional to general anesthesia when there is no prior suspicion of PAS and diagnosis is made intraoperatively mainly occurs in low income countries, and case studies report that this causes higher blood loss. Therefore, general anesthesia must be considered as the primary choice for anesthesia during suspected accrete cases [15, 16-18]. In a retrospective cohort study of 50 accreta cases, there is no significant difference in blood loss or blood transfused with either regional or general anesthesia techniques [15]. A randomized clinical trial studied women specifically with placenta previa, including accreta, and showed that blood transfusion is needed more frequently when using general anesthesia [19].

We reported two mortality cases in the present study. One was a previous conservative surgery patient who underwent a second operation because of vaginal bleeding and died of cardiac arrest during surgery. The other patient died two days after surgery because of disseminated intravascular coagulopathy in the intensive care unit.

## CONCLUSION

PAI score has an important role in diagnosing PAS preoperatively, although further analysis is necessary. Management of PAS requires a well-established, multidisciplinary team to minimize potential complications.

## AUTHOR'S CONTRIBUTIONS

All the authors shared equal contribution.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the Health Research Ethics Committee, Medical Faculty Universitas Sumatera Utara/H. Adam Malik General Hospital, North Sumatra, Indonesia (03/TGL/KEPK FK USU-RSUP HAM/2017).

## HUMAN AND ANIMAL RIGHTS

No animals were used for studies that are the basis of this research. The reported experiments on women are in accordance with the Helsinki Declaration of 1975, as revised in 2013 (<http://ethics.iit.edu/ecodes/node/3931>).

## CONSENT FOR PUBLICATION

Written and informed consent was obtained from all the patients.

## AVAILABILITY OF DATA AND MATERIALS

We do not wish to share the data because it contains many personal details of the study's subjects and we are working on another related research topic and are preparing to publish it.

## FUNDING

None.

## CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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