

Placenta Accreta Spectrum: A Clinical Review

Archana Kumari,¹ M Vahini,² Meenal Singh³

Abstract

Objectives: To determine the incidence, risk factors, diagnosis, management options and outcome of placenta accreta spectrum.

Methods: Retrospective observational study over a period of 2 years. Cases with adherent placenta found during caesarean deliveries and post vaginal deliveries during manual removal were reviewed through case records.

Results: The incidence of placenta accreta spectrum was 0.31%. Out of the 43 cases that fulfilled the inclusion criteria of placenta accreta spectrum, 36 cases were observed during caesarean and 7 cases post vaginal delivery. Placenta increta was commonest (46.5%) in the spectrum followed by placenta accreta (37.2%) and placenta percreta (16.2%). Most important risk factor was previous cesarean deliveries (70%) and placenta previa (48.8%). Majority of women (72%) required hysterectomy. Conservative management with placental retention was done in 6 cases, with methotrexate in one. Maternal mortality was 4.6%.

Conclusion: It is important to anticipate placenta accreta in women with previous cesarean delivery and placenta previa. Women with risk factors for placenta accreta should have an ultrasound by experienced provider and should be counselled about potential sequelae and need for delivery at a tertiary centre. An emergency or planned hysterectomy with multidisciplinary approach reduces maternal morbidity and mortality.

Introduction

The term 'placenta accreta' has been used to describe a single pathological entity, as well as a generic term for the disease spectrum. Used singly placenta accreta occurs, if placenta attaches to but does not invade

into myometrium. The disease spectrum includes three categories- placenta accreta, increta and percreta. If placenta invades into myometrium and not beyond, the term placenta increta is employed. When placenta invades through the serosal layer and potentially beyond, the term percreta is employed.¹ In this spectrum placenta accreta is most common and placenta percreta is least common.²

The abnormal adherence of placenta has important clinical implications which can result in severe maternal and neonatal morbidity and mortality. This typically occurs when the placenta fails to separate from the uterus following delivery of the baby,

1. Associate Professor, Department of Obstetrics and Gynecology, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand.

2. Junior Resident, Department of Obstetrics and Gynecology, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand.

3. Consultant Radiologist, Health Map Diagnostic Center, RIMS, Ranchi.

Corresponding author: Dr. Archana Kumari.
E-mail dr_karchana@yahoo.co.in

leading to massive hemorrhage and other associated complications like disseminated intravascular coagulation (DIC), multiorgan dysfunction, need for emergency hysterectomy and even death.³ Fetal morbidity and mortality is related to complications of premature birth.⁴

Placenta accreta, once a rare occurrence is now becoming an increasingly common complication of pregnancy mainly due to increasing rate of cesarean deliveries. With increased recognition of risk factors and availability of ultrasonography, many cases of placenta accreta spectrum disorders can be identified antenatally. However not all population, especially from low resource countries like ours have access to qualified and experienced radiologists. Due to these factors, placenta spectrum (PAS) disorders are often diagnosed only at the time of delivery. It is therefore important that, obstetricians working at all levels, should be familiar with the risk factors, proper diagnosis and management of these disorders. With this background, the present study was done to determine the incidence, risk factors, diagnosis, management options and fetomaternal outcome of PAS.

Methods

This is a retrospective observational study conducted in the Department of Obstetrics and Gynecology of Rajendra Institute of Medical Sciences (RIMS), Ranchi between July 2016 and June 2018 over a period of 2 years.

Inclusion criteria for placenta accreta spectrum was one of the following:

1. Suspected or diagnosed cases of placenta accreta based on ultrasound and /or MRI
2. Cases of placenta accreta spectrum found during cesarean delivery, including percreta, increta, as well as cases of accreta where forced or piecemeal removal of placenta resulted in heavy bleeding from the implantation site.
3. Cases requiring manual removal of placenta (MROP) after vaginal delivery, when placental removal could not be done partially or totally due to absence of cleavage plane between placenta and uterus. We excluded the cases of MROP after vaginal delivery where placenta could be completely removed.

Case records were reviewed for demographic details like age, parity, period of gestation, risk factors like placenta previa, previous caesarean and history of other uterine surgeries, ultrasound findings about placenta, operative notes about degree of PAS- accreta, increta, and percreta, operative procedures done, requirement of blood transfusion and postoperative events. Neonatal outcomes were reviewed from birth weight, NICU admission, and perinatal mortality.

Results

During the study period, total 43 cases fulfilled the inclusion criteria and total deliveries in our institution during same period was 13,511 (vaginal deliveries - 7,555 and cesarean - 5,956). The incidence of placenta accreta spectrum in our study is thus 0.31% (1 in 322.5 deliveries).

Table 1: Demographic characteristics (n=43)

Age	Number (%)
18-24 yrs	7 (16.3%)
25-29 yrs	20 (46.5%)
30-34 yrs	11 (25.6%)
≥35 yrs	5 (11.6%)
Parity	
Primigravida	4 (9.3%)
2nd gravida	16 (37.2%)
3rd gravida	12 (27.9%)
4th gravida	6 (13.9%)
5th or more gravida	5 (11.6%)
Booking status	
Booked	13 (30.2%)
Referred	30 (69.8%)
Socioeconomic status	
Rural	17(39.5%)
Urban	26 (60.5%)

Table 1 shows demographic profile of women. Majority (46.5%) belonged to 25-29 years age group. Five women were above 35 years. Most (65%) were 2nd or 3rd gravida, four were primigravida, and five were grandmultipara. Only 13 women (30.2%) were booked cases, rest 30 (69.8%) were referred cases. About 40% women had rural background and 60% had urban background.

Table 2 depicts the associated risk factors. About 70% (30/43) women had previous cesarean. Placenta previa was associated in 21 (48.8%). Previous cesarean with previa was associated in 19 (44%) women. Ten

(23.2%) had prior uterine curettage whereas 4 (9.3%) had no risk factors.

Table 2: Risk factors for PAS

Risk factors	Number (%)
Previous 1 cesarean	17 (39.5%)
Previous 2 cesarean	12 (28%)
Previous 3 cesarean	1 (2.3%)
Both previous cesarean and placenta previa	19 (44.2%)
Placenta previa	21 (48.8%)
Prior uterine curettage	10 (23.2%)
No risk factors	4 (9.3%)

Diagnosis of placenta accreta spectrum was suspected or confirmed by antenatal ultrasonography in 13 (30.2%) cases, whereas majority (53.4%) were diagnosed intraoperatively during cesarean section. Seven cases were diagnosed after vaginal delivery, when manual removal of placenta was not possible totally or partially due to absence of proper cleavage plane between placenta and uterus. (Table 3)

Table 3: Diagnosis of PAS

Mode of Diagnosis	Number (%)
Ultrasonography	13 (30.2%)
Intraoperative during cesarean	23 (53.4%)
Post vaginal delivery	7 (16.2%)

Table 4: Gestational age at time of delivery

Gestational age	Number (%)
18 weeks	1 (2.3%)
28 w 0 d – 31 w 6 d	3 (7.1%)
32 w 0 d – 36 w 6 d	16 (37.2%)
37 w 0 d – 40 w 0 d	21 (48.8%)
≥ 40 w 1 d	2 (4.6%)

Table 4 shows that 48.8% (21/43) had term delivery between 37-40 weeks. All seven cases of retained placenta diagnosed postvaginal delivery were term deliveries. 37.2% had preterm cesarean between 32-36 weeks. Three were operated very prematurely due to massive APH, one case had hematuria too. Only seven booked cases had planned cesarean, rest all were operated on emergency basis. One case (G3, previous 2 cesarean) who had hysterotomy at district hospital for 2nd trimester MTP, was referred to us after intraoperative diagnosis of placenta increta at 18 weeks.

Table 5 and figure 1 shows distribution of PAS disorders. Placenta increta was most common in

20 (46.5%), followed by accretain 16 (37.2%), and percreta in 7 (16.2%).

Table 5: Types of PAS

Types of PAS	During Caesarean section (n=36)	Following vaginal delivery (n=7)
Placenta accreta	11 (30.5%)	5 (71.4%)
Placenta increta	18 (50%)	2 (28.6%)
Placenta percreta	7 (19.4%)	

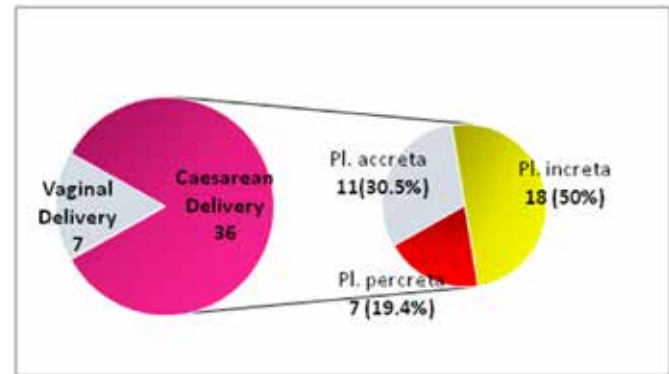


Fig. 1: Types of PAS during cesarean and vaginal delivery

Table 6: Management/ Intraoperative procedures

Interventions	Number (%)
Subtotal hysterectomy	17 (39.5%)
Total hysterectomy*	14 (32.5%)
Hemostatic sutures in placental bed	6 (14%)
Conservative management with placental retention	5 (11.6%)
Methotrexate	1(2.3%)
Bladder repair / partial cystectomy#	5(11.6%)

*Hysterectomy was done during relaparotomy in one case
Done in addition to hysterectomy

Table 6 summarises the therapeutic interventions. About 70% (31/43) had hysterectomy (14 total hysterectomy and 17 subtotal hysterectomy). Three women with percreta had placenta extending beyond the lower segment into the bladder, so partial cystectomy with repair of bladder done in addition to hysterectomy. Two women (both previous section with previa) required bladder repair for accidental injury to bladder during hysterectomy. In one referred case following hysterotomy, as mentioned in above paragraph, relaparotomy with total hysterectomy was done for massive atonic PPH. Out of the 7 cases diagnosed post vaginal delivery while performing MROP, five had focal areas of morbid adherence, partial removal could be done and adherent bits of placenta were left in situ as there was no bleeding. These women were advised serial monitoring with serum β-HCG and ultrasound, but were lost to follow

up. Other 2 women had massive hemorrhage while attempting MROP, so total abdominal hysterectomy was done, intraoperatively, both of them had placenta increta. One case of intraoperatively diagnosed placenta increta left in situ during cesarean at district hospital referred to us on day 5 of puerperium, was managed conservatively with methotrexate injection.

Table 6: Management/ Intraoperative procedures

Maternal morbidity	Number (%)
Massive hemorrhage	26 (60.4%)
Hypovolemic shock	14 (32.5%)
Blood transfusion (≥ 3 units, FFP)	31 (72.0%)
DIC	4 (9.3%)
Bladder injury/partial cystectomy	5 (11.6%)
Postoperative wound infection	9 (20.9%)
Maternal mortality	2 (4.6%)

Table 7 describes maternal outcome. Massive hemorrhage was prominent feature in most cases requiring blood transfusion of more than 3 units with FFP and platelets in about 72%. Four women developed DIC, of whom two died. Maternal mortality in our series was thus 4.6% (2/43). The main neonatal complication was prematurity (44%). There were 2 intrauterine death at term, 10 early neonatal deaths due to prematurity. Perinatal mortality was 28.5%. The mean birth weight was 2 kg.

Discussion

The incidence of PAS in our study is relatively high 0.31%, compared to other studies, 0.04% reported by Agarwal et al and 0.03% reported by Desai et al in other studies.^{5,6} This may be due to fact that our institution is tertiary referral centre catering to high risk obstetric cases of whole of Jharkhand state. The incidence of placenta accreta in literature varies between 0.001 and 0.9% of deliveries, a rate that depends upon definitions adopted for accreta (clinical or histological diagnosis) and the population studied; and has increased dramatically over last three decades parallel to increase in cesarean delivery rates.^{7,8}

Previous cesarean section is the most significant associated risk factor (70%) followed by previa (48%) in our study, similar to other studies.^{5,6} The association between increasing number of cesarean deliveries and risk of placenta accreta, might be due to malrepair of endometrium and/or decidua basalis. With the subsequent pregnancy, cytotrophoblasts invade

decidualised endometrium, but fail to encounter the Nitabuch's layer (spongiosus layer of decidua) and do not encounter the normal signal to stop invasion and hence continue invasion to an abnormal degree.⁹ Relative hypoxia of caesarean scar tissue resulting from fibroblast-based repair and decreased vessel concentration may recruit preferentially the blastocyst to implant in these areas resulting in increased risk of accreta.¹⁰ History of uterine curettage, myomectomy, hysteroscopic surgery are also associated risk factors.¹¹ Advanced maternal age and increasing parity have been reported as risk factors.¹² Age ≥ 35 years and grand multiparity was noted in 5 cases each (11.6%) in present study.

Diagnosis of placenta accreta was made by antenatal ultrasound in 13 (30.2%) cases (9 booked and 4 referred cases). In 4 booked cases, diagnosis was missed even by ultrasound. Most of the times, diagnosis was made intraoperatively. Almost all referred cases had one ultrasound done in 2nd or 3rd trimester, still the diagnosis of placenta accreta was missed. A series conducted in an accreta referral center showed sensitivity of ultrasound to be closer to 55% and specificity 88%, overall accuracy of only 65%.¹³ Ultrasonographic quality, skill and clinical experience of the provider are important contributors of accuracy for diagnosis. USG diagnosis is made by presence of lacunae (irregularly shaped vascular spaces) which give the placenta "Swiss cheese appearance", loss of retroplacental-myometrial zone and turbulent flow in Doppler velocimetry. In case of previa, there should be distinct intervening echolucent zone between placenta and bladder. If there is loss or disruption of myometrial continuity, accreta should be suspected. MRI is more useful in diagnosis of cases of posterior previas and in suspected percreta.

Earliest gestational age in placenta accreta that has been diagnosed by ultrasound is 8 to 9 weeks in case of scar pregnancy.^{5,14} In our study, 18 weeks was earliest gestational age of diagnosis that was accidental intraoperative diagnosis during hysterotomy. 43% of cases had preterm deliveries and 48% had term delivery. In booked cases, we planned cesarean between 34 and 36 weeks. But as most were unbooked cases, they were referred with antepartum hemorrhage near term.

In our study, placenta increta was most common type (46.5%) among the spectrum of placenta accreta

disorders followed by accreta (37.2%) and percreta (16.2%). This is in contrast to that reported in literature, accreta being most common (75-78%), increta (17%) and percreta (5-7%) of all women.¹⁵

Although hysterectomy is the “generally accepted” treatment of placenta accreta, several cases have been managed conservatively.¹⁶ Strategies include leaving placenta in situ, oversewing of the placental vascular bed, uterine compression sutures, methotrexate, hysteroscopic resection of retained placental tissue, uterine vessel embolization, delayed hysterectomy after 6 weeks. Conservative management has the benefits of decreased blood loss, fertility preservation and decreased morbidity.¹⁷ Majority (72%) in our study underwent hysterectomy, as about 46% had increta and 16% had percreta. Five cases were managed conservatively with placental bits left in situ but were lost in follow up. One woman was given methotrexate in the postpartum period. Methotrexate, a folate antagonist, acts primarily against rapidly dividing trophoblastic cells. It is therefore argued, that as placenta is no longer dividing, methotrexate is of no value. Methotrexate is used in various doses and routes, however there are no randomized trials and no standard protocols regarding its dosage.¹⁸ We used 5 doses of methotrexate injection (1 mg/kg) given on alternate day with folinic acid. The patient is in regular follow up with serial ultrasound showing progressive degeneration of placenta, but is amenorrhoeic since last 1 year.

The maternal morbidity in our study is mainly related to extensive surgery and includes massive hemorrhage, massive blood transfusion, DIC, bladder injury and wound infections. Maternal mortality in our study is relatively low with 2 cases (4.6%), compared to 30% and 18% reported in other studies.^{5,19} One was referred in an exsanguinated state following hysterotomy and died despite hysterectomy

relaparotomy and massive blood transfusion. The other mortality occurred in unbooked case of previous two cesarean with previa, when diagnosis of percreta was made intraoperatively during surgery by senior resident. Woman succumbed to death despite hysterectomy and massive blood transfusion. All other cases of percreta surgery was done by senior doctors. Bladder injury rate was 11.6% in our study which is relatively lower than 20% and 18% reported in other studies.^{5,19} Injury to bladder occurred owing to poor visualisation and poor dissection planes apart from placental invasion. Cystotomy is one of the most common surgical complication in the management of placenta accreta spectrum disorders.

Conclusion:

With increase in caesarean rates, placenta accreta spectrum disorders have also increased and have become important cause of maternal and fetal morbidity and mortality. PAS should always be anticipated in women with multiple cesareans or previous cesarean with previa. Women with risk factors for PAS, should have ultrasound by experienced provider and should be counselled for delivery at tertiary centres with multidisciplinary team for management and facilities for massive blood transfusion. Unfortunately, placenta accreta is not always suspected or diagnosed before the intrapartum period. After vaginal delivery, inability to remove placenta manually or increased bleeding should raise the suspicion of undiagnosed placenta accreta. Diagnosis at cesarean is easier in that invasion is visualized more easily and directly. Regardless of intraoperative diagnosis, emergency cesarean hysterectomy without attempt to remove placenta by an experienced obstetrician with multidisciplinary approach involving activation of blood bank and anesthesia team helps in reducing morbidity and mortality. Timely referral to tertiary centre is equally important in reducing morbidity and mortality.

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