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Placenta Accreta Spectrum: Trends in Diagnosis and its Outcome with Limited Resources

Meena Samant[1], Ritu Singh[1], Pooja Shinde[1,2], Jayoti Malhotra,[1] Poonam Lal,[1] Zarin Rahman[1]

ABSTRACT

Introduction: Placenta accreta spectrum (PAS) is a nightmare for every obstetrician as there is torrential bleeding during delivery. It is due to disorder of placentation caused by damage to the interface of inner and middle layer (endometrial–myometrial) of the uterus.

Objective: There are many centres in India, in which advanced services like Magnetic resonance imaging (MRI), uterine artery embolization (UAE) for diagnosis and management are not accessible. So, we have conducted this study in the resource limited setting to see the risk factors associated, trends in its diagnosis and its outcome.

Method: The cross-sectional study was conducted from January to December 2020 in limited resource private hospital located in eastern India. A predesigned and pretested questionnaire was used to record history, which included women demographic details, risk factors, ultrasound findings, intra- and post-operative events were recorded. Also, whether PAS was diagnosed pre operative on USG or intraoperatively. The outcome measure was patient morbidity or mortality. We have used part of Severe maternal morbidity (SMM) list of US Centers for Disease control and prevention, list of surgical morbidity given by Matsuzaki et al.

Result: Of the 4125 total deliveries, 17 patients had PAS, i.e., the prevalence was 0.41%. Placenta previa was present in 15 (88.23%) of patients. There are 15 (88.23%) patients with previous caesarean section and 9 (52.94%) with previous history of dilatation and evacuation (D&E). USG was not conclusive in any of the case. Caesarean hysterectomy had been done in 13 (76.47%) patients, in other 4 patients there was focal placenta accreta which was left in situ and haemostatic suture taken. 88.23% women need transfusion. 35.29% had bladder injuries.88.23% women needed ICU care

Conclusion: There is high incidence of PAS in previous caesarean with placenta previa and ultrasound is not conclusive in its diagnosis. So, high index of suspicion and proper arrangement is necessary in every placenta previa with previous caesarean section. Conservative approach is feasible with focal excision, haemostatic sutures but when it is a major degree, early recourse to hysterectomy is essential.

1. MBBS, MD (Obs & Gyn), Senior Consultant, Kurji Holy Family Hospital, Patna
2. MBBS, DGO, DNB (Obs & Gyn), Ex – DNB student, Kurji Holy Family Hospital, Patna, Senior consultant Indira IVF, Patna
Corresponding Author: Ritu Singh

Introduction

Placenta accreta spectrum (PAS) is a nightmare for every obstetrician as there is torrential bleeding during delivery. It is due to disorder of placentation caused by damage to the interface of inner and middle layer (endometrial–myometrial) of the uterus[1] either due to previous Caesarean scar, previous dilatation and evacuation, ART procedure. That leads to abnormal decidualization and abnormal anchoring of villus and trophoblast, deeply invading the myometrium. So, there will be no plane of cleavage for placenta separation.

PAS encompasses whole spectrum of disorder, abnormal adherent placenta (placenta accreta) and abnormally invasive placenta (including placenta increta and placenta percreta). In the placenta accreta, placenta is attached directly to the middle layer of the uterine wall (myometrium) without invading it, so there is no obvious plane of cleavage. In Placenta increta, invasion is into the myometrium and in percreta into surrounding pelvic tissues, vessels and organs. FIGO defines theses as Grades 1,2 and 3, respectively[2].

PAS incidence has shown its elevation as 1 in 2510 before 1994, 1 in 533 in 2002, 4 in 1000 in 2003 to 272 women in 2016[3,4]. A recent study in 2021 also reported that in PAS there is increase in maternal morbidity and maternal mortality by 18-fold and 30% respectively[5].

Now a days, there are many advanced techniques that have come for diagnosis and management of PAS like Magnetic resonance imaging (MRI), uterine artery embolization (UAE). But there are many centres in India, in which these services are not accessible. So, we have conducted this study in the resource limited setting to see the risk factors associated, trends in its diagnosis and its outcome.

Material and Method

The cross-sectional study was conducted from January to December 2020 in limited resource private hospital located in eastern India. After ethical clearance, a predesigned and pretested questionnaire was used to record history, which included women demographic details, whether women were admitted in an emergency or from an outpatient department, and what were there presenting complaints. Other than that, risk factors present for PAS or not, that is previous history of Dilatation & evacuation (D&E), number of previous Lower segment caesarean section (LSCS), previous uterine surgery, placenta previa, history of Invitro fertilization (IVF).

Other than history ultrasound findings, intra- and post-operative events were recorded. Also, whether PAS was diagnosed pre operative on USG or intraoperatively. MRI or UAE were not available for the management at the time of study. Placenta was not left in situ for delayed hysterectomy as it was not part of our protocol.

The outcome measure was patient morbidity or mortality. We have used Severe maternal morbidity (SMM) list of US Centers for Disease control and prevention [CDC 2019] for maternal morbidity[6]. The list has 21 components, of which we included blood transfusion, hysterectomy, shock, Disseminated intravascular coagulation (DIC). In surgical morbidities given by Matsuzaki et al we have included Urinary track injury, Intensive care unit (ICU) Admission[7]. We have also taken length of stay in the hospital, postoperative hospital stay.

Inclusion Criteria- Diagnosed case of PAS either intraoperatively or postoperatively at any weeks of gestation.

Exclusion Criteria- Women who have not given consent, Obstetrics Hysterectomies for cause other than PAS

Statistical analysis was done using Jamovi 2.3.28 solid version software. Qualitative variables were expressed as number and percentage whereas quantity variable was expressed as mean and standard deviation.

Result

Of the 4125 total deliveries, 17 patients had PAS, i.e., the prevalence was 0.41%. Almost half of the patient (52.94 %) admitted for vaginal bleeding. (Table 1) In patients who were admitted with no complaints, one was for oligohydramnios, other was Rhesus (Rh) Negative with severe anaemia for blood transfusion and other five was at term gestation for safe confinement.

Table 1: Demographic characteristics, Presenting complaints

Parameter	Cases (N=17) N %
Age (years) (mean ± SD)	32.4±5.48
Occupation	
Housewife Employed	15(88.23%) 2(11.76%)
Education	
Illiterate Matriculation and below Higher Secondary Graduation	2 (11.76%) 7 (41.17%) 4 (23.52%) 4 (23.52%)
Religion	
Hindu Muslim	13 (76.47%) 4 (23.52%)
Gravidity % (n)	
1 2 3 4 or more	1(5.9%) 2(11.76%) 8 (47.05%) 6 (35.29%)
Period of gestation at admission	
14-28 Weeks 28 +1 -34 weeks 34+1 - 37 weeks >37 weeks Postpartum Post-abortal	0 (0%) 8 (47.05%) 7 (41.17%) 2 (11.76%) 0 (0 %) 0 (0 %)
Admission From	
Outpatient department (OPD) Casualty	4 (23.52%) 13 (76.47%)
Booked /Un booked	
Booked Unbooked Referred	9 (52.94%) 7 (41.17%) 1 (5.89%)
Presenting complaints	
Vaginal bleeding Leaking Per vaginum No Complaint/ Safe	9 (52.94%) 1 (5.89%) 7 (41.17%)

Talking about risk factors, out of total 17, 15 (88.23%) were previous caesarean section in which 7 were previous 2 caesarean. 9 (52.94%) had history of previous dilation and curettage. (Table 2) Placenta previa was present in all patients except 2, of which one was a diamniotic dichorionic twin and others had anterior placenta. IVF twin was present in 2 (11.76%). Only one had pre-op ultrasound diagnosis of PAS, rest all diagnosed intraoperatively during caesarean section. MRI was not done in any of the patients, as it is not accessible to the patients.

Table 2: Risk factor and Diagnosis of PAS

Risk Factor	
Previous Dilatation and curettage Previous Cesarean section/hysterotomies Previous Uterine surgery Placenta Previa Invitro fertilization - twin	9 (52.94%) 15 (88.23%) 0 (0%) 15 (88.23%) 2 (11.76%)
PAS (diagnosed before surgery)	
Yes No	1 (5.89%) 16 (0.94%)

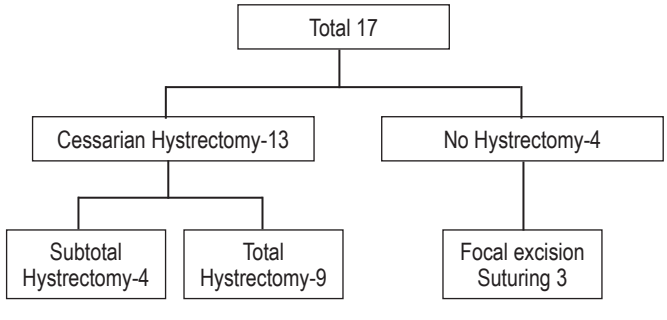
As these cases where not diagnosed preoperative, we have used Pfannenstiel incision in abdominal incision and Lower segment uterine incision in all uterine incisions. There were 10 emergency caesarean section.

Talking about outcome measures, we don't have any mortality. Morbidity factors have been listed in (Table 3) (figure 1). In hospital stay, patients mostly get admitted for duration between 4–14 days. The one patient that stayed for > 28 days that is 37 days is mainly preoperative admitted at 28 weeks then emergency LSCS was done for bleeding at 32+ 5 days had bladder injury. Bladder injury had increased hospital stays, but PAS itself is a risk factor for antepartum haemorrhage that increases duration of hospital stays. There was no patient of DIC in our study.

Table 3: Maternal morbidities

Parameter (N=17)	Yes	No
Blood transfusion	15 (88.23%)	2 (11.76%)
Shock	10 (58.82%)	7 (41.17%)
Cesarean Hysterectomy	13 (76.47%)	4 (23.52%)
Urinary track injury - Bladder	6 (35.29%)	11 (64.70%)
Intensive care unit Admission	15 (88.23%)	2 (11.76%)
Disseminated intravascular coagulation	0 (0)	17 (100%)
Duration of Surgery	Number of patients	
< 1 hour	2	
1-2 hours	10	
> 2 hours	5	

Figure 1: Outcome of PAS patients in term of hysterectomy



Disscusion

Placenta accreta spectrum prevalence was 0.41%, similar to other studies that reported 0.01–1.1%[2], 0.12% (range 0.036 –0.36)[8].

Risk Factors

Foremost risk factor in PAS is placenta previa with previous caesarean section[9]. In our study placenta previa was present in 15 (88.23%) of patients, which is similar to the studies which showed 86%[8] and also 90 % of PAS patient[10].

There are 15 (88.23%) patients with previous caesarean section and 9 (52.94%) with previous history of dilatation and evacuation (D&E). Other study also found 98.7% of patient of PAS have caesarean section and D&E as risk factor[8]. There is also documentation that, the risk of PAS increases with increase in number of prior caesarean deliveries, from 3% in previous one caesarean delivery to 11% in second and 40 % in previous 3 caesarean deliveries[9].

This is because of the uterine insult due to caesarean section, this is also true for insult due to myomectomy, dilation and evacuation operation for abortion. Disorder of endometrial scarring like Asherman's syndrome, prior endometrial ablation, invitro fertilization also counts in risk factors. There is also data that multifetal pregnancy is also a risk factor for PAS[11,12,13].

Diagnosis

According to recent study by Brett D et al., there are many flaws in the diagnosis of PAS, and they are not diagnosed till delivery[14]. If diagnosis is not made before hand, delivery can occur in hospital which doesn't have facilities that leads to poor consequences[15].

There are many biomarkers understudy[16], but they are not ready to use. MRI is a better alternative but it can't be used routinely because of its high price and restricted accessibility of competent person to diagnose PAS by MRI[14]. As a result, we have to consider risk factor assessment and ultrasound as a standard for PAS diagnosis. Despite that, if ultrasound is normal also it doesn't rule out PAS[17].

USG findings are also mostly subjective, and sensitivity is based on the competency of the radiologist. In our study, USG was not conclusive in any of the case. In other eastern Indian studies also USG was able to diagnose only 57% of women only[8]. In the literature, estimate of missed diagnosis is up to 50 %[18,19] In our study, only one patient was diagnosed as PAS, was also overdiagnosis in which placenta has come out completely.

Morbidity

According to evaluation by Leonard SA 2020, PAS leads to more endangering morbidity than situations that are contemplated for not continuing the pregnancy like chronic kidney disease, heart disease, pulmonary hypertension[20].

Talking about Hysterectomy, In our study, caesarean hysterectomy had been done in 13 (76.47%) patients, in other 4 patients there was focal placenta accreta which was left in situ and haemostatic suture taken. In a study by Crocetto et al. it showed that PAS is a primary cause of caesarean hysterectomy[21]. In United States also, caesarean hysterectomy has existed for a long period as standard treatment for PAS[22]. In a retrospective study by Kong et al. caesarean hysterectomy due to PAS has increased, 45 % to 73.3% from 2011 to 2014[23]. There is study[8] which showed that in focal placenta accreta, haemostatic sutures and balloon tamponade had prevented hysterectomy in 12 of their patients.

In Blood transfusion- According to study, in PAS, 50 % of delivery need transfusion[24]. In our study 88.23% women need transfusion, this can be explained by the fact that almost all Indian women are anaemic in pregnancy.

For ICU Admission- PAS patients commonly go to intensive care unit (ICU)[15,24]. In our study also 88.23% women needed ICU care.

In Urinary track injury- According to studies 5-30% of women suffers urinary track injury intraoperatively[15,30]. This is consistent with our study with 35.29% injuries.

Conclusion

There is high incidence of PAS in previous caesarean with placenta previa and ultrasound is not conclusive in its diagnosis. So, high index of suspicion and proper arrangement is necessary in every placenta previa with previous caesarean section. Conservative approach is feasible with focal excision, haemostatic sutures but when it is a major degree, early recourse to hysterectomy is essential. With the advanced techniques (UAE) we could have saved the uterus and further decreased the maternal morbidity

Reference

1. Jauniaux E, Collins S, Burton GJ. Placenta accreta spectrum: pathophysiology and evidence-based anatomy for prenatal ultrasound imaging. Am J Obstet Gynecol. 2018 Jan;218(1):75-87. doi: 10.1016/j.ajog.2017.05.067. Epub 2017 Jun 24. PMID: 28599899.
2. Jauniaux E, Ayres-de-Campos D, Langhoff-Roos J, Fox KA, Collins S. FIGO placenta accreta diagnosis and management expert consensus panel. FIGO classification for the clinical diagnosis of placenta accreta spectrum disorders. Int J Gynaecol Obstet. 2019; 146: 20-24.
3. Cahill AG, Beigi R, Heine RP, Silver RM, Wax JR. Placenta accreta spectrum. Am J Obstet Gynecol. 2018;219(6):B2–b16. doi:10.1016/j.
4. Berezowsky A, Pardo J, Ben-Zion M, Wiznitzer A, Aviram A. Second trimester biochemical markers as possible predictors of pathological placentation: a retrospective case-control study. Fetal Diagn Ther. 2019;46(3):187–192. doi:10.1159/000492829
5. Shazly SA, Hortu I, Shih JC, et al. Prediction of success of uterus-preserving management in women with placenta accreta spectrum (CON-PAS score): a multicenter international study. Int J Gynaecol Obstet. 2021;154(2):304–311. doi:10.1002/ijgo.13518
6. Centers for Disease Control and Prevention . How does CDC identify severe maternal morbidity? appendix 2: severe maternal morbidity indicators and corresponding ICD-9-CM/ICD-10-CM/PCS codes during delivery hospitalizations. Centers for Disease Control and Prevention. Updated December 26, 2019. Accessed January 7, 2022. https://www.cdc.gov/reproductivehealth/maternalinfanthealth/smm/severe-morbidity-ICD.htm
7. Matsuzaki S, Mandelbaum RS, Sangara RN, et al. Trends, characteristics, and outcomes of placenta accreta spectrum: a national study in the United States. Am J Obstet Gynecol. 2021;225(5):534.e1-534.e38. doi: 10.1016/j.ajog.2021.04.233 [DOI] [PubMed] [Google Scholar]
8. Radhika AG, Bhaskaran S, Singh S, Samant M, Kumari A, Saxena P, Beck M, Srivastava R, Chaudhary R, Singh10 A, Pandey11 U. Current Practices in Management of Placenta Accreta Spectrum in Low-resource Settings. Journal of South Asian Federation of Obstetrics and Gynaecology. 2022 Mar;14(2):172-8.
9. Silver RM, Landon MB, Rouse DJ, et al. Maternal morbidity associated with multiple repeat cesarean deliveries. Obstet Gynecol 2006;107(6):1226–32. d.o.i 10.1097/01.AOG.0000219750.79480.84 [published Online First: 2006/06/02] [PubMed: 16738145]
10. Jauniaux ERM, Alfirevic Z, Bhide AG, et al. placenta praevia and placenta accreta: diagnosis and management: green-top guideline No. 27a. BJOG 2019;126(1):e1–e48. DOI: 10.1111/1471-0528.15306
11. Kohn JR, Shamshirsaz AA, Popek E, et al. Pregnancy after endometrial ablation: a systematic review. BJOG 2018;125(1):43–53. doi: 10.1111/1471-0528.14854 [published Online First: 2017/09/28] [PubMed: 28952185]
12. Modest AM, Toth TL, Johnson KM, et al. Placenta Accreta Spectrum: In Vitro Fertilization and Non-In Vitro Fertilization and Placenta Accreta Spectrum in a Massachusetts Cohort. Am J Perinatol 2020 doi: 10.1055/s-0040-1713887 [published Online First: 2020/07/06]
13. Miller HE, Leonard SA, Fox KA, et al. Placenta Accreta Spectrum Among Women With Twin Gestations. Obstet Gynecol 2021;137(1):132–38. doi: 10.1097/aog.0000000000004204 [published Online First: 2020/12/06]
14. Einerson BD, Gilner JB, Zuckerwise LC. Placenta accreta spectrum. Obstetrics & Gynecology. 2023 Jul 1;142(1):31-50.
15. Eller AG, Bennett MA, Sharshiner M, et al. Maternal morbidity in cases of placenta accreta managed by a multidisciplinary care team compared with standard obstetric care. Obstet Gynecol 2011;117(2 Pt 1):331–7. doi: 10.1097/aog.0b013e3182051db2 [published Online First: 2011/02/12] [PubMed: 21309195]
16. Afshar Y, Dong J, Zhao P, et al. Circulating trophoblast cell clusters for early detection of placenta accreta spectrum disorders. Nat Commun 2021;12(1):4408. doi: 10.1038/s41467-021-24627-2 [published Online First: 2021/08/05] [PubMed: 34344888]
17. Arakaza A, Zou L, Zhu J. Placenta accreta spectrum diagnosis challenges and controversies in current obstetrics: a review. International Journal of Women's Health. 2023 Dec 31:635-54.
18. Fitzpatrick KE, Sellers S, Spark P, et al. Incidence and risk factors for placenta accreta/increta/ percreta in the UK: a national case-control study. PLoS One 2012;7(12):e52893. doi: 10.1371/ journal.pone.0052893 [published Online First: 2013/01/10]
19. Bailit JL, Grobman WA, Rice MM, et al. Morbidly adherent placenta treatments and outcomes. Obstet Gynecol 2015;125(3):683–9. doi: 10.1097/AOG.0000000000000680 [published Online First: 2015/03/03] [PubMed: 25730233]
20. Leonard SA, Kennedy CJ, Carmichael SL, et al. An Expanded Obstetric Comorbidity Scoring System for Predicting Severe Maternal Morbidity. Obstet Gynecol 2020;136(3):440–49. doi: 10.1097/aog.0000000000004022 [published Online First: 2020/08/10] [PubMed: 32769656]
21. Crocetto F, Saccone G, Raffone A, et al. Urinary incontinence after planned cesarean hysterectomy for placenta accreta. Urol Int. 2021;105(11–12):1099–1103. doi: 10.1159/000518114 [DOI] [PubMed] [Google Scholar]

22. Placenta accreta spectrum. Obstetric Care Consensus No. 7. American College of Obstetricians and Gynecologists. Obstetrics and Gynecology 2018;132:e259–75. [DOI] [PubMed] [Google Scholar]

23. Kong X, Kong Y, Yan J, Hu JJ, Wang FF, Zhang L. On opportunity for emergency cesarean hysterectomy and pregnancy outcomes of patients with placenta accreta. Medicine. 2017;96(39):e7930. doi: 10.1097/MD.0000000000007930 [DOI] [PMC free article] [PubMed] [Google Scholar]

24. Jauniaux E, Bunce C, Grønbeck L, et al. Prevalence and main outcomes of placenta accreta spectrum: a systematic review and meta-analysis. Am J Obstet Gynecol 2019;221(3):208–18. doi: 10.1016/j.ajog.2019.01.233 [published Online First: 2019/02/05] [PubMed: 30716286]

25. Morlando M, Schwickert A, Stefanovic V, et al. Maternal and neonatal outcomes in planned versus emergency cesarean delivery for placenta accreta spectrum: A multinational database study. Acta Obstet Gynecol Scand 2021;100 Suppl 1:41–49. doi: 10.1111/aogs.14120 [published Online First: 2021/March/14] [DOI] [PubMed] [Google Scholar]