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Placenta Accreta Spectrum

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# Experience on placenta accreta spectrum disorders and multidisciplinary way of approach in its management: a retrospective study over 2 years in a tertiary care centre

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**Introduction:** Placenta accreta spectrum (PAS) refers to the pathologic adherence of the placenta at the defective endometrial myometrial interface leading to defective decidualization causing life-threatening haemorrhage when attempted to separate at the time of delivery thus requiring attention for a multidisciplinary approach in its management. **Aims and objectives:** To study the risk factors, antenatal diagnosis, and different management approaches, associated with placenta accreta and also to compare the maternal and fetal outcomes by different management strategies. **Methods:** A retrospective analysis was done for two years from October 2019 to October 2021 with clinically diagnosed cases of PAS. We examined antenatal risk factors favouring diagnosis, peripartum morbidity and different management approaches such as vaginal delivery and curettage, by planned or emergency hysterectomy. **Results:** 18 cases were studied showing a proportion of 1.48 per 1000 live births. The median age for diagnosis was made around 33 weeks of gestation using ultrasonography evidence in 77% of cases. Placenta accreta was seen in 66%, placenta increta in 27% and percreta in 5%. the median amount of blood loss was around 2500 ml, 83% of cases required blood transfusions, 44% required ICU admission and 27% of newborns required NICU admission **Conclusion:** PAS should be managed with a well-coordinated team in good settings to reduce maternal morbidity and mortality preferably at the tertiary care level

**Keywords:** Placenta accreta spectrum, Defective decidualization, Massive PV bleeding

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# Introduction

Placenta accreta spectrum (PAS) refers to the pathologic adherence of the placenta at the defective endometrial myometrial interface leading to defective decidualization that can complicate deliveries when attempted to separate by unexpected massive bleeding. Despite leaps and bounds in incidence, having lost tons of blood and many a mother, however, the antenatal diagnosis is made in around 50% of cases only thus far. Many risk factors are associated with PAS, like multiple pregnancies, and ART in rising trends, along with operative interventions like myomectomy, and suction curettage, with the highest observed prevalence among previous caesarean sections and placenta previa [2,3].

Many biochemical markers like HPL (human placental lactogen), HCG, PAPP-A, high MSAFP, and pro-B-type natriuretic peptide have been newly used for diagnosis, however, ACOG & SMFM state that they are too non-specific for clinical use. So, diagnosis of PAS can rely upon 2D-USG and colour doppler imaging with a sensitivity of 90% and negative predictive values of 95%-98%.[4] However, the prepartum diagnosis of placenta accreta in ultrasound is still limited [5] and devastating bleeding occurs when a regular attempt is made to remove unknown PAS in the absence of risk factors [6].

Optimal conditions for delivery include thorough prenatal consultation and management by experienced multidisciplinary teams at a well-equipped tertiary care centre is essential to deal with the complications. [7-10]. However, the preferred approach in PAS is individualized to the personal experience depending on the various clinical situations [11-14].

Several guidelines have been developed regarding the treatment options, which includes leaving the placenta in situ after delivery, with attempted removal of the placenta to often primarily used caesarean hysterectomy. [15-16].

Consent regarding risks of PAS namely massive obstetric haemorrhage, increased risk of lower urinary tract damage, the need for blood transfusion, risk of hysterectomy, interventional radiology, and conversion to general anaesthesia has to be explained well in advance.

To prepare for prospective clinical trials in this respect, a detailed description of the status of the PAS problem and the strategies currently applied to inexperienced treatment centres to solve is essential. Therefore, we analysed cases of PAS disorders treated in a tertiary perinatal centre over 2 years, focusing on risk factors, diagnosis and clinical treatment outcomes. Different individual management approaches were studied regarding blood loss and hysterectomy rate.

# Aims and objectives

01. To study the risk factors, antenatal diagnosis, and different management approaches, associated with placenta accreta.
02. To study the maternal and fetal outcome of Placenta Accreta Spectral disorders.

# Materials and Methods

**Study setting:** A retrospective analysis was done for two years from October 2019 to October 2021 with clinically diagnosed cases of PAS from the total number of births during that period at the department of obstetrics and gynaecology at Krishna Institute of Medical Sciences, Karad.

**Inclusion criteria:** All Pregnant women irrespective of gestational age with risk factors like the previous caesarean, placenta previa, history of myoma excision, history of the previous curettage, placental insufficiency, whose USG/MRI findings were suggestive of PAS attending either on an outpatient basis or emergency basis for treatment.

**Exclusion criteria:** Pregnant women who were diagnosed with the retained placenta after delivery, or findings inconclusive of placenta accreta or atonic PPH were excluded.

**Data collection methods:** Pregnant women attending the Out-Patient department and admitted on an emergency basis at Krishna Institute of Medical Sciences, over the study period of 2 years were included and 18 cases with a confirmed diagnosis of PAS were studied for their demographics, maternal medical history, obstetric and gynaecological history, along with USG reports, other comorbidities, gestational age at the time of diagnosis, gestational age at delivery, management plan of delivery and the surgical procedures performed, blood loss during surgery, additional treatment approaches were studied.

Maternal outcomes were studied in the form of the requirement of blood transfusion during surgery, ICU admission, post-partum morbidity, duration of stay in the hospital and neonatal outcomes in the form of birth weight, prematurity, and APGAR score, admission to NICU and the length of stay were studied.

**Ethical considerations**: The study was approved by the Ethical Research Committee by the institution. Written informed consent was obtained before conducting the present study.

**Statistical analysis:** The data was entered using semi-structured, pre-validated, standard case record proforma. The descriptive analysis was used to describe the cohort. All the statistical analyses were done using SPSS software. Proportion and frequency were described using tables and charts. Necessary statistical methods were used.

# Results

The total number of births between October 2019 to October 2021 at Krishna Institute of Medical Sciences was around 12,162. Out of which, 21 patients with the diagnosis of PAS during the study period were documented. After analysis, 2 cases were excluded for retention of placenta, 1 for miscarriage before reaching viability age. The remaining 18 cases had met the inclusion criteria resulting in an incidence of 1.48 per 1000 live births in the study centre. (Table 1)

**Table:1: Demographic and Obstetric characteristics.**

| S.No | Cohort data: Demographic and Obstetric characteristics | Women with PAS(n=18) |
|---|---|---|
| 1 | Maternal age (years) median (Q1, Q3) | 31(27,35) |
| 2 | Gravidity Median (Q1, Q3) | 3(1,4) |
| 3 | Parity median (Q1, Q3) | 1(0,2) |
| 4 | Gestational age at diagnosis (weeks) median (Q1, Q3) | 30(28,34) |
| 5 | Gestational age at delivery (weeks) median (Q1, Q3) | 35(32,37) |

The median age among the pregnant women where PAS was found was 31 years (27 years at 25 th centile and 35 years at the 75th centile) and the median gravidity, and parity was 3,1 respectively. The median gestational age at diagnosis was around 30weeks and delivery was 33 weeks (32 at 25th centile, 37 at 75th centile).

**Table 2: Placenta accreta spectrum.**

| Placenta accreta spectrum | Number of women n=18(%) |
|---|---|
| 1.Placenta accrete | 12(66%) |
| 2.Placenta percreta | 5(27%) |
| 3.Placenta increta | 1(5%) |
| Total | 18 |

Placenta accreta, placenta increta, and placenta percreta were diagnosed in 12 patients (66%), 5 patients (27%), and 1 patient (5%) respectively. (Table 2)

**Table 3: Risk factors for the development of placenta previa.**

| S. No | Risk factors for the development of placenta previa | | Number of women diagnosed with PAS(n=18) |
|---|---|---|---|
| 1. | Previous caesarean section | 0 | 11(61%) |
| | | 1 | 6(33%) |
| | | 2 | 1(6%) |
| | | 3 | 0 |
| | | Total | 18(100%) |
| 2. | Placenta Praevia | | 6(34%) |
| 3. | Placenta Praevia with history of caesarean section | | 3(17%) |
| 4. | Previous curettage | 0 | 15(82%) |
| | | 1 | 1(6%) |
| | | 2 | 1(6%) |
| | | 3 | 1(6%) |
| | | Total | 18(100%) |
| 5. | History of myoma excision | | 1(6%) |

Around 11(61%) patients were primiparous among which 3(17%) were associated with placenta previa, 7(39%) had a history of previous caesarean section in which 3 (17%) were associated with placenta previa comprising placenta previa to a total of about 34% of cases (6) (Table 3)

**Table :4: Antenatal Diagnosis for PAS.**

| S.No | Mode of Antenatal diagnosis | No women diagnosed with PAS(n=18) |
|---|---|---|
| 1. | Radiological diagnosis | 16(88.8%) |
| 2. | Intraoperative diagnosis | 2(11.2%) |
| 3. | Confirmatory histopathological diagnosis | 10(54%) |

Out of 18 cases, 2 cases (11.2%) were unbooked, 1 case (5%) had PV bleeding with pain and other risk factors like previous lower segment cesarian section (LSCS) on admission

Was diagnosed as PAS intraoperatively, and other case was primigravida with no risk factors where the placenta was not separated even after oxytocin infusion, where she had to undergo hysterectomy for massive bleeding and histopathology report confirmed of PAS. The majority of PAS (16cases) diagnosis was made by radiological diagnosis constituting 88.8%. (Table 4)

In 54% (*n* = 10) of the cases, histopathological findings were available, and in 7(68%) cases, PAS was confirmed histopathologically. In 44% (*n* = 8) of the cases analysed, the degree of PAS was consistent with the clinical diagnosis.

**Table 5: Management of women with PAS: delivery approach.**

| S. No | Management of women with PAS: delivery approach | Women with PAS n=18(100%) |
|---|---|---|
| 1. | Vaginal delivery and curettage | 1(5%) |
| 2. | Caesarean section with removal of placenta | 2(12%) |
| 3. | Caesarean section with placenta left in situ | 1(5%) |
| 4. | Caesarean section with planned hysterectomy | 10(56%) |
| 5. | Caesarean section with emergency hysterectomy | 4(22%) |

Around 56% (10 women) of pregnant women underwent planned hysterectomy during caesarean section, 22%(4women) underwent an emergency hysterectomy, 2 women(12%) underwent successful removal of the placenta during caesarean section, for 5% of cases (1 Woman), the placenta is left in situ and the other 5% of cases vaginal delivery followed by curettage was done. (Table 5)

**Table 6: Maternal outcome.**

| S.No | Maternal outcome | Women with PAS (n=18) |
|---|---|---|
| 1. | Estimated intra-operative blood loss(ml), median (Q1,Q3) | 2200 (1560,3540) |
| 2. | Blood transfusions | 15(83.3%) |
| 3. | Hysterectomy | 14(77.7%) |
| 4. | Surgical complications (bladder injury) | 1(5%) |
| 5. | Anemia | 17(94.4%) |
| 6. | Post-operative complications | 5(27.7%) |
| 7. | Admission to ICU | 3(17%) |
| 8. | Duration of hospital stay | 8(7,9) |

Almost 77.7% required hysterectomy with Estimated intraoperative blood loss of around 2200 ml and almost 83.3% (15cases) required blood transfusions, with 5% of cases sustained Bladder injury intraoperatively, postoperative complications like endometritis, urinary tract infections, being 27.7%, 94.4% being anemic, 17% requiring intensive care admissions, duration of hospital stay was approximately 8 days. (Table 6)

**Table 7: Neonatal outcome.**

| S.No | Neonatal outcome | In women with PAS |
|---|---|---|
| 1. | Birth weight | 2350 ( 2120, 2850) |
| 2. | APGAR score after 5 min | 9 (7,10) |
| 3. | Umbilical cord artery pH | 7.29 (7.25,7.35) |
| 4. | Length of stay at the intensive care | 7(0,12) |
| 5. | Admission to intensive care | 8 (45%) |

Neonatal outcomes measured were average birth weight being 2350grams, median APGAR scores after 5 min being 9, Umbilical cord artery pH being 7.29, with intensive care admissions up to 45% (8cases) with an average duration of stay at intensive care being 7-12 days. (Table 7)

# Discussion

After analysing 18 cases, the incidence of PAS disorders was 1.48 per 1000 live births at the study centre. This was higher than the pooled data of a recent meta-analysis considering studies of the last four decades [18]. One reason could be because increasing treatment of PAS disorders in experienced centres, [10]. which is recommended in the ACOG guidelines [15, 20]. the other is increasing incidences of PAS due to rising CS rates. [19].

Out of which 66%, 27%, and 5% were placenta accreta, increta and percreta respectively. The incidence of severe PAS disorders increases with the number of previous CS [21]. Therefore, the lower proportion of placenta increta and percreta could be due to the lower percentage of performed CS in the area. In the study cohort, 18% had neither a placenta previa nor a previous CS but had a history of curettage. In particular, repeated previous curettage should raise awareness of the possibility of a PAS disorder and also encourage targeted screening.

A high proportion of PAS was found in women with a history of CS (39%), placenta previa (34%) or a history of curettage (18%). This was similar to the study done by Robert et al, where the incidence of placenta accreta spectrum disorder with previous LSCS and placenta previa

Ranges from 0.24% to 0.57%. [17]. The median age for diagnosis was made around 30 weeks of gestation and delivery was around 35 weeks of gestation. The majority of PAS (16cases) diagnosis was made by radiological diagnosis constituting 88.8%.

Ultrasound signs of PAS can be detected as early as 11- 14 weeks [19,2]. In PAS serial follow-up scans are recommended starting from 28 weeks to predict the degree and extent of invasion. The ideal timing for such evaluation of PAS is between 18 and 24 weeks of gestation [3]. In this study, PAS is detected in the second or third trimester as most cases are referred and due to the presence of placenta previa and other risk factors like previous LSCS. The median gestational age at delivery was 35 weeks in the entire study, similar to the international recommendations of the FIGO guidelines. [20]. Planned delivery in the absence of risk factors between 36 and 37 weeks of gestation can only be performed in PAS with prenatal diagnosis. Ultrasound signs were detected during ultrasound screening or after referral in the second trimester, especially in the presence of risk factors. There is no proven single approach for the management of PAS disorders and optimal treatment depends on the expertise of the local team. (22) At our centre, planned management using an inter-disciplinary approach based on individualization for each patient was done. In 56% of antenatally diagnosed PAS cases, a planned caesarean hysterectomy was performed (n = 10), which is the preferred management option for known PAS according to expert opinion. [22]. 22% of cases with no risk factors landed up in emergency hysterectomy. In the other5% cases (n = 1) of prenatally diagnosed PAS, after delivery of the fetus by CS, the placenta was left in situ. This uterus-preserving ('conservative') and expectant management options for placental delivery during laparotomy have also found entrance into guideline recommendations. [15]. Intentional vaginal delivery is not a widely accepted option in known PAS. [16]. There was 1 case (5%) who underwent vaginal delivery followed by check curettage as the patient has come into the second stage of labour. However, there was no case of vaginal delivery with the unexpected intrapartum diagnosis of placenta increta or percreta. Extended invasive placentation such as placenta percreta is attributed to deep uterine scars such as caesarean scars.

[21]. Patients with PAS disorders suffered from increased peripartum blood loss with a median of 2200ml and had to be treated with blood transfusions in more than half of the cases (83.3%) with a median of two units of packed red blood cells. In the present study, the most massive blood losses occurred in situations where no prenatal diagnosis was made and where the attempt to remove the placenta led to a hysterectomy. However, in 12% of the cases of placenta accreta, placental removal was done successfully. In all planned caesarean hysterectomies, no attempt at placental removal was made by the guidelines. [20]. So, a planned multidisciplinary approach should be followed during treatment. Neonatal outcomes measured were average birth weight being 2350grams, median APGAR scores after 5 min being 9, Umbilical cord artery pH being 7.29, with intensive care admissions up to 45%(8cases) with the average duration of stay at intensive care being 7-12 days.

**Limitations of the study**

01. The present analysis has a restricted statistical power due to the number of cases of a still very rare disorder.
02. The diagnosis of PAS disorders was based on intraoperative and clinical findings, whereby the classification as placenta accreta, increta or percreta remained subjective despite orientation to the FIGO standard.
03. Due to the retrospective nature of the study, the blood loss reported was an individual estimate rather than a truly measured volume.
04. 4. Valid evaluations of the outcome of different management strategies in PAS are limited not least by the discrepancy between clinical and pathological diagnosis.

# Conclusion

Women diagnosed with PAS and with risk factors should be advised for regular antenatal check-ups along with regular sonography and prompt intervention should be done to avoid complications.

**What does the study add to existing knowledge?**

PAS should be managed with a well-coordinated team in good settings to reduce maternal morbidity and mortality preferably at the tertiary care level.

**Authors Contribution:** GP: Data collection, data entry and data analysis, ML: Manuscript preparation, review of literature, NSK: Article review, revisions, Data analysis.

# Reference


01. Thurn L, Wikman A, Westgren M, Lindqvist PG. Massive blood transfusion in relation to delivery: incidence, trends and risk factors: a population-based cohort study. BJOG. 2019 Dec;126(13):1577-1586. *doi: 10.1111/1471-0528.15927 [Crossref] [PubMed][Google Scholar]*

02. Bhide A, Sebire N, Abuhamad A, Acharya G, Silver R. Morbidly adherent placenta: the need for standardization. Ultrasound Obstet Gynecol. 2017 May;49(5):559-563. *doi: 10.1002/uog.17417 [Crossref][PubMed][Google Scholar]*

03. Garofalo A, Pilloni E, Alemanno MG, Garofalo G, Sciarrone A, Todros T, et al. Ultrasound accuracy in prenatal diagnosis of abnormal placentation of posterior placenta previa. Eur J Obstet Gynecol Reprod Biol. 2019 Nov;242:86-91. *doi: 10.1016/j.ejogrb.2019.09.021 [Crossref][PubMed] [Google Scholar]*

04. Jauniaux E, Ayres-de-Campos D; FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: Introduction. Int J Gynaecol Obstet. 2018 Mar;140(3):261-264. *doi: 10.1002/ijgo.12406 [Crossref][PubMed][Google Scholar]*

05. Comstock CH. The antenatal diagnosis of placental attachment disorders. Curr Opin Obstet Gynecol. 2011 Apr;23(2):117-22. *doi: 10.1097/GCO.0b013e328342b730 [Crossref] [PubMed][Google Scholar]*

06. Mulla BM, Weatherford R, Redhunt AM, Modest AM, Hacker MR, Hecht JL, et al. Hemorrhagic morbidity in placenta accreta spectrum with and without placenta previa. Arch Gynecol Obstet. 2019 Dec;300(6):1601-1606. *doi: 10.1007/s00404-019-05338-y [Crossref][PubMed][Google Scholar]*

07. Couret M, Huang Y, Khoury-Collado F, Friedman A, Hou JY, St Clair CM, et al. Patterns of care for women with placenta accreta spectrum. J Matern Fetal Neonatal Med. 2021 Oct;34(20):3370-3376. *doi: 10.1080/14767058.2019.1684471 [Crossref] [PubMed][Google Scholar]*

08. Stanleigh J, Michaeli J, Armon S, Khatib F, Zuckerman B, Shaya M, et al. Maternal and neonatal outcomes following a proactive peripartum multidisciplinary management protocol for placenta creta spectrum as compared to the urgent delivery. Eur J Obstet Gynecol Reprod Biol. 2019 Jun;237:139-144. *doi: 10.1016/j.ejogrb.2019.04.032 [Crossref][PubMed] [Google Scholar]*

09. Fratto VM, Conturie CL, Ballas J, Pettit KE, Stephenson ML, Truong YN, et al. Assessing the multidisciplinary team approaches to placenta accreta spectrum across five institutions within the University of California fetal Consortium (UCfC). J Matern Fetal Neonatal Med. 2021 Sep;34(18):2971-2976. *doi: 10.1080/14767058.2019.1676411 [Crossref][PubMed][Google Scholar]*

10. Silver RM, Fox KA, Barton JR, Abuhamad AZ, Simhan H, Huls CK, et al. Center of excellence for placenta accreta. Am J Obstet Gynecol. 2015 May;212(5):561-8. *doi: 10.1016/j.ajog.2014.11.018 [Crossref][PubMed] [Google Scholar]*

11. Cırpan T, Akdemir A, Okmen F, Hortu I, Ekici H, Imamoglu M. Effectiveness of segmental resection technique in the treatment of placenta accreta spectrum. J Matern Fetal Neonatal Med. 2021 Oct;34(19):3227-3233. *doi: 10.1080/14767058.2019.1702019 [Crossref] [PubMed][Google Scholar]*

12. Piñas Carrillo A, Chandraharan E. Placenta accreta spectrum: Risk factors, diagnosis and management with special reference to the Triple P procedure. Womens Health (Lond). 2019 Jan-Dec;15:1745506519878081. *doi: 10.1177/1745506519878081 [Crossref][PubMed] [Google Scholar]*

13. Shih, J-C. , et al. Nausicaa'compression suture: a simple and effective alternative to hysterectomy in placenta accreta spectrum and other causes of severe postpartum haemorrhage. " BJOG: An International Journal of Obstetrics & Gynaecology 126. *3 (2019): 412-417 [Crossref][PubMed][Google Scholar]*

14. Slaoui A, Talib S, Nah A, Moussaoui KE, Benzina I, Zeraidi N, et al. Placenta accreta in the department of gynaecology and obstetrics in Rabat, Morocco: case series and review of the

Literature. Pan Afr Med J. 2019 Jun 6;33:86. *doi: 10.11604/pamj.2019.33.86.17700 [Crossref] [PubMed][Google Scholar]*

15. Morgan, Jamie L. , et al. Metabolic acidemia in live births at 35 weeks of gestation or greater. Obstetrics & Gynecology 126. *2 (2015): 279-283 [Crossref][PubMed][Google Scholar]*

16. Sentilhes L, Kayem G, Chandraharan E, Palacios-Jaraquemada J, Jauniaux E; FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: Conservative management. Int J Gynaecol Obstet. 2018 Mar;140(3):291-298. *doi: 10.1002/ijgo.12410 [Crossref][PubMed][Google Scholar]*

17. Silver RM, Landon MB, Rouse DJ, Leveno KJ, Spong CY, Thom EA, et al. National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. Maternal morbidity associated with multiple repeat cesarean deliveries. Obstet Gynecol. *2006 Jun;107(6):1226-32. doi: 10.1097/01.AOG.0000219750.79480.84 [Crossref] [PubMed][Google Scholar]*

18. Jauniaux, Eric, et al. Prevalence and main outcomes of placenta accreta spectrum: a systematic review and meta-analysis. " American journal of obstetrics and gynecology 221. 3 (2019): 208-218. *[Crossref][PubMed][Google Scholar]*

19. Wu S, Kocherginsky M, Hibbard JU. Abnormal placentation: twenty-year analysis. Am J Obstet Gynecol. 2005 May;192(5):1458-61. *doi: 10.1016/j.ajog.2004.12.074 [Crossref][PubMed] [Google Scholar]*

20. Allen L, Jauniaux E, Hobson S, Papillon-Smith J, Belfort MA; FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: Nonconservative surgical management. Int J Gynaecol Obstet. 2018 Mar;140(3):281-290. *doi: 10.1002/ijgo.12409 [Crossref][PubMed][Google Scholar]*

21. Jauniaux E, Chantraine F, Silver RM, Langhoff-Roos J; FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: Epidemiology. Int J Gynaecol Obstet. 2018 Mar;140(3):265-273. *doi: 10.1002/ijgo.12407 [Crossref][PubMed][Google Scholar]*

22. Cal M, Ayres-de-Campos D, Jauniaux E. International survey of practices used in the diagnosis and management of placenta accreta spectrum disorders. Int J Gynaecol Obstet. 2018 Mar;140(3):307-311. *doi: 10.1002/ijgo.12391 [Crossref][PubMed][Google Scholar]*