International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 2, February 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_14.2.2025.22

ORIGINAL RESEARCH

The Surgical Management and Maternal Outcome In Placenta Accreta Spectrum In A Tertiary Centre In Punjab- A Retrospective Single Centre Observational Study

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Received: 27 December, 2024 Accepted: 23 January, 2025 Published: 05 February, 2025

ABSTRACT

Background: The incidence of placenta accrete spectrum(PAS) has increased dramatically over the last few decades in concordance with the increase in caesarean section rate. The torrential haemorrhage associated with this condition results in severe maternal morbidity and mortality. **Aim:** To analyse the various surgical procedures used in PAS to achieve effective haemostasis with the objective of reducing maternal morbidity and mortality. **Methods:** We conducted a retrospective analysis of the data from 36 cases of PAS managed from October 2023 to December 2024 at a tertiary care academic medical centre in Government Medical College, Amritsar. The study protocol included demographic data, obstetrical history, surgical manoeuvres used, operation time, estimated blood loss, pregnancy outcome and maternal complications, length of hospital stay and re-admission. The comparison group included cases of major degree placenta praevia with no features of placenta accretism. **Results:** The mean age of patients with PAS was 31.1±4.2 years. All patients had undergone previous caesarean delivery with average of previous two caesarean sections. 29 patients had planned surgery as they were diagnosed in the antenatal period while the rest were diagnosed during the caesarean delivery.33 patients were operated upon between 32 to 38 weeks of gestation. Elective surgeries were performed in 33cases. Caesarean hysterectomy alone was performed in 11cases while it was combined with hypogastric artery ligation in 8 cases. Uterine sparing surgery in the form of stepwise uterine devascularisation with or without hypogastric artery ligation was performed in 7 cases. However, compression sutures alone or with IIAL or the use of Bakri balloon was effective in a few cases of PAS where placenta accretism was focal in aspect. Average blood and blood components therapy was 6 to 8 units. Ionotropic support was required in 22 cases and ICU and HDU care in 13 cases. Ventilator support was used in 8 cases. Bladder injury occurred in 2 cases. There was one case of maternal mortality. **Conclusion:** Hypogastric artery ligation combined with caesarean hysterectomy or stepwise uterine devascularisation had much better outcomes especially in women undergoing planned surgery for PAS with fewer blood transfusions, lesser ionotropic support and shorter hospital stay. This significantly decreased the maternal morbidity and mortality.

Keyword: Placenta accreta spectrum disorders. Accerta. Increta. Percreta. Caesarean hysterectomy.

INTRODUCTION

PAS(Placenta accreta spectrum disorder), also called morbidly adherent placenta (MAP), and placenta praevia are high risk obstetric problems causing torrential haemorrhage which results in significant maternal morbidity and mortality. The maternal mortality of PAS disorder is 5-7% and the extensive surgery related morbidities include haemodynamic imbalance due to excessive blood loss, massive blood transfusion complications, infections, urologic injuries and fistula formation. There is a steep rise in the incidence of PAS disorders over the past few decades due to the increase in the rate of caesarean sections. However, other conditions resulting in endometrial tissue damage followed by a secondary collagen repair can also cause PAS such as myomectomy for

DOI: 10.69605/ijlbpr_14.2.2025.22

submucous fibroids, vigorous uterine curettage, manual placental delivery and hysteroscopic endometrial resection or previous hysteroscopic surgery.

Placenta accrete[1] occurs when a defect in the deciduas basalis allows chorionic villi to invade the myometrium. Depending on the degree of abnormal placental invasion, the condition is classified as placenta accrete(reaching the myometrium),placenta increta(into the myometrium) and placenta percreta(right through the myometrium to reach the serosa and beyond).The incidence of morbidly adherent placenta are placenta accreta(79%), placenta increta(14%) and placenta percreta(7%).[2]

The incidence has increased ten fold in the last few decades with a frequency from 1 in 2500 deliveries to 1 in 500 deliveries[3]. The ominous risk factor for PAS is placenta praevia in a patient with previous caesarean section with the incidence being 3%,11%,40% 61% and 67% for the first second, third, fourth and fifth or more caesarean births respectively.

Optimal management of PAS disorder involves accurate preoperative diagnosis based on clinical risk factors and radioimaging techniques including ultrasound, colour doppler and MRI along with meticulous planning by a standardized multidisciplinary approach at the time of delivery. Ultrasonography is usually the primary diagnostic tool where intraplacental sonoluscent areas(6 or more placental lacunae) and retroplacental myometrial interface are the most reliable findings. Colour Doppler findings of intraplacental bridging, with turbulent blood flow usually confirm the diagnosis. An adequately stocked blood bank and postoperative care in intensive care unit are required.

The surgical modalities include caesarean hysterectomy alone or in combination with hypogastric artery ligation, uterine sparing surgery in the form of stepwise uterine devascularisation with or without hypogastric artery ligation, lower segment transmural compression sutures along with the use of balloon tamponade of the placental bed(Bakri balloon).[4] Also, pelvic devascularisation by balloon occlusion of the hypogastric artery in the triple-P procedure and subsequent placental nonseparation and myometrial excision and repair helps in sparing the uterus.In focal area of placental accretism, placental myometrial enbloc excision and repair or over sewing of the implantation site can be done after removing the majority of the placenta.

MATERIAL AND METHODS

A retrospective cohort study was conducted from October 2023 to December 2024 at Bebe Nanki Mother and Child Care Centre (BNMCCC), Department of Obstetrics and Gynaecology, Government Medical College, Amritsar which is a tertiary obstetric referral hospital. We retrospectively analyzed all patients of placenta praevia and PAS disorder in particular, who were surgically managed during this period. A total of 7407 deliveries were conducted in the department during this period with 3970 babies getting delivered by Caesarean section. All patients with potential risk of morbidly adherent placenta (MAP) were counselled and admitted for a planned delivery at 36 weeks after ultrasound confirmation of the diagnosis with a multidisciplinary approach with sufficient units of PRBC,FFP and RDPC available. Demographic data and obstetrical history was searched from the records and the following relevant data was recorded: maternal characteristics such as age, parity, the number of previous caesarean sections, events of previous delivery, previous history of curettage, ultrasonographic findings, gestational age at delivery and associated maternal complications. The operative notes were scanned for the mode of delivery, surgical procedure performed, use of resuscitative measures adopted, preoperative and postoperative haematocrit values and transfused blood products. Admission to the ICU/HDU and cause were noted. Neonatal outcome including Apgar score at one and five minutes, birth weight and admission to ICU was also noted.

The women included in the study were aged 20 to 42 years, gestational age >35weeks with administered antenatal corticosteroids, suspected PAS confirmed by ultrasound, colour Doppler or magnetic resonance imaging(MRI). Exclusion criteria included women <20 yrs and more than 42 years, preoperative haemoglobin level<8g%,coagulation defects, impaired liver or renal functions, associated medical illnesses, multiple pregnancy, those with sponataneous intraoperative separation of placenta, patient admitted with severe bleeding and operated in exsanguinated state as this will certainly affect the final outcome measures.

RESULTS

A total of 98 patients were included (36 of PAS all of whom had previous caesarean scar and 62 of major degree placenta praevia used as control all of whom underwent caesarean section).The mean age for patients with PAS was 31.1±4.2 yrs, the mean parity was 2.6±1.1 yrs and the number of previous caesarean sections was 2.8±1.2.The gestational age at the time of delivery was 35.1 ±0.6weeks with the ultrasound estimated age being 35.9±0.8weeks.The mean gestational age at surgery was 35 weeks ,the earliest was 26±4 weeks.12 patients were at 36±4weeks,and one patient got admitted at 38weeks.

DOI: 10.69605/ijlbpr_14.2.2025.22

Table I shows the demographic data and obstetrical history of women with placenta praevia(PP) and morbidly adherent placenta(MAPP).

	PP(n=62)	MAPP(n=36)	p value
Age(mean±SD)yrs	31.5±4.1	31.1±4.2	0.934
Parity(mean±SD)yrs	3.6±1.4	3.4±1.2	0.624
Bleeding in antenatal period	25(40.32%)	10(27.78%)	0.654
Gestational age at time of bleeding			
<32weeks	13(52.00%)	03(23.08%)	0.845
≥32weeks	12(48.00%)	07(19.44%)	0.875
Type of delivery			
Elective	35(56.45%)	23(63.89%)	0.035
Emergency	27(43.55%)	10(27.78%)	0.046
Emergency delivery≥35 weeks	23(37.10%)	5(13.89%)	0.045

Table I shows the clinical course of women with MAP compared to patients with placenta praevia. The mean gestational age at time of bleeding was similar. However, the emergency delivery rate of cases of placenta praevia was significantly higher due to premature placental separation causing active bleeding.

Table II shows the clinical characteristics and outcome of women with PAS:

	Delivery		
	Planned(*n*=29)	Emergency(*n*=7)	*p* value
Parity(mean±SD)	3.2±1.2	3.4±1.4	0.125
Previous caesarean sections			
1	6(20.69%)	1(14.28%)	0.165
2	19(65.52%)	5(71.43%)	0.177
3	4(13.79%)	1(14.28%)	0.175
Timing of the diagnosis			
Preoperative	29(100.00%)	3(42.86%)	
Intraoperative	0(0.00%)	4(57.14%)	
Gestational age at the time of diagnosis			
First trimester(≤12 weeks)	1(3.45%)	0(0.00%)	
Second trimester(13-26weeks)	08(27.58%)	1(14.29%)	
Third trimester(≥26weeks)	20(68.97%)	6(85.71%)	
Degree of PAS according to FIGO classification			
1	12(33.33%)	1(14.28%)	
2	9(25.00%)	2(28.58%)	
3a	3(8.33%)	2(28.58%)	
3b	3(8.33%)	1(14.28%)	
3c	2(5.56%)	1(14.28%)	
Bleeding in the antenatal period	4(13.79%)	4(57.14%)	0.036
Gestational age at time of bleeding			
<32weeks	2(50.00%)	1(25.00%)	0.015
≥32weeks	2(50.00%)	3(75.00%)	0.010
No.of FFPs(mean±SD)	8±6.2	10±5.8	0.486
No.of PRBCs(mean±SD)	8±5.6	9±6.4	0.484
ICUadmission	16(55.17%)	6(85.71%)	
DIC	1(3.45%)	1(14.29%)	

Table II shows the maternal characteristics and outcomes of women with PAS in elective and emergency delivery. The two groups varied significantly in the incidence of bleeding during the antenatal period, bleeding before 32 weeks and postoperative hospital stay. Four (57.14%) women underwent emergency delivery due to severe bout of bleeding versus nine (31.03%) women in the planned delivery group who had bleeding during the antenatal group. (p= 0.03). The need for blood and blood products was almost the same in both the groups. The incidence of intrapartum complications was more in the emergency group due to the unplanned nature of surgery following sudden heavy bleeding during pregnancy.

DOI: 10.69605/ijlbpr_14.2.2025.22

Table III shows the treatment modality in cases of PAS:

Treatment modality:	Number of MAP cases(*n*=36)	Approximate blood loss(litres)	Approximate operative time
Elective caesarean hysterectomy alone with placenta in situ	8(22.22%)	2-2.5	1 hr-1hr20min
Elective caesarean hysterectomy with IIAL	6(16.67%)	1.5-1.8	1hr-1hr45min
Emergency caesarean hysterectomy alone	3(8.33%)	2.2-3.0	1 hr-2hr
Emergency caesarean hysterectomy combined with IIAL	2(5.56%)	1.8-3.2	1hr20min-2hr20min
Stepwise uterine devascularisation alone	3(8.33%)	1.8-2.4	1 hr-1hr10min
Stepwise uterine devascularisation with IIAL	4(11.11%)	1.2-1.6	1 hr10min-1hr20min
Compression sutures alone	2(5.56%)	1-1.5	1hr
Compression sutures with IIAL	3(8.33%)	0.8-1.1	1hr10min
Compression sutures combined with Bakri balloon	3(8.33%)	1-1.5	1hr 20min
Placental myometrial en bloc excision and repair of implantation site	2(5.56%)	1-1.5	1hr

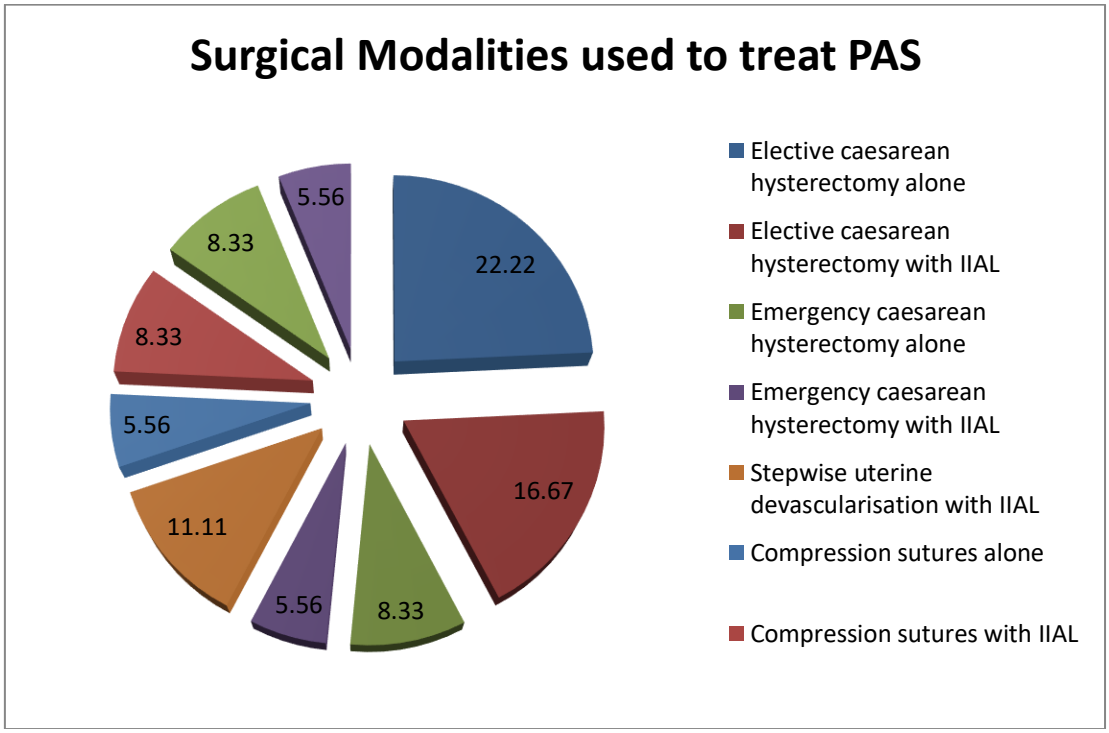

Fig I compares the various treatment modalities to treat PAS.

Among the various treatment modalities used, caesarean hysterectomy with or without internal iliac artery ligation keeping the placenta in situ using a standardized multidisciplinary approach was done in 19(52.78%) cases, with elective procedure being done in 14(38.89%) cases. Lower segment compression sutures (Cho sutures, horizontal B lynch brace sutures) were used in 8 (22.22%) selected patients of lesser degree of abnormal placental invasion only with very good results especially when combined with IIAL or balloon tamponade of the placental bed (Bakri balloon).In focal cases of PAS, after majority of the placental tissue had been removed, wedge resection and repair or oversewing of the implantation site was performed. However, the triple P procedure with perioperative placental localization with USG, pelvic devascularisation by inflation of prepositioned occlusion balloons in the hypogastric artery and myometrial excision could not be performed as interventional radiological procedures are not performed in our hospital.

DOI: 10.69605/ijlbpr_14.2.2025.22

Table IV shows the complications at surgery in cases of PAS:

Perioperative complication	Number of patients affected(*n*)
Torrential Haemorrhage	21(58.33%)
Dense bladder adhesions to uterine segment	25(69.44%)
Broad ligament haematoma	4(11.11%)
Bladder/ureteric injury	6(16.67%)
DIC	2(5.56%)
Sepsis	4(11.11%)

Table V shows the maternal outcome in cases of PAS:

Average blood loss(litres)	2.3±1.8
Preoperative haemoglobin(g/dl)	10.5±0.8
Postoperative haemoglobin(g/dl)	08.5±0.6
Average operative time(hrs)	1.5
Average blood transfusion units	6
ICU/HDU care(n)	22(61.11%)
Ventilatory support(*n*)	8(22.22%)
Ionotropic support(*n*)	22(61.11%)
Average hospital stay(days)	10-15
Maternal mortality(*n*)	1

Table V shows the maternal outcome in patients of PAS with the ionotropic support needed in 22(61.11%) case and ICU/HDU care in 22(61.11%) .Ventilatory support was needed inas many as 8(22.22%) patients. The average hospital stay was longer in most cases of caesarean hysterectomy.

DISCUSSION

The overall incidence of PAS in our study was 0.49% which is comparable to the studies by Zhang and Siqin showing the incidence of PAS from 0.12% to 0.31% in the last 30 years and 0.91% by Gelani et al. The higher incidence in our tertiary hospital is due to it being the largest referral centre for cases of PAS in the region.[5]

In our study we found the mean age of patients of PAS as 31.1±4.2yrs.The mean gestational age at the time of delivery was 35.1±0.6weeks which was similar to the results by Sak et al where the mean gestational age was 34.9±3.2weeks.All cases had a history of previous caesarean scar. 80% cases showed the placenta completely covering the os.Our study showed 19.44% had a history of one caesarean section, 66.67% had two prior caesarean sections and 13.89% had previous three caesarean sections. The anterior uterine wall in the lower uterine segment was the site of placental attachment(no fundal or posterior attachment)in all the cases.

Studying the clinical features during the antenatal period of cases of MAP and PP helped in deciding the optimal time of delivery. In our study, PAS had less emergency deliveries (27.78%) than PP(43.55%) due to lesser episodes of APH consequent to morbid placental adhesion. The risk of emergency delivery in the PP group(52.00%in patients <32 weeks and 48.00% in patients>32 weeks) was more than the PAS group(23.08%in patients <32 weeks and 19.44% in patients>32 weeks) due to premature placental separation and consequent bleeding.

Seven patients (19.44) of PAS needed emergency delivery with four (57.14%) of them having frequent episodes of bleeding in the third trimester. One patient was less than 32 weeks of gestation when she was operated upon. This is in accordance with the findings of Fishman et al that bleeding before 32 weeks is a risk factor for preterm delivery in PAS.

There was a higher frequency of blood transfusions in the unplanned surgical management of PAS cases which is comparable to the findings by Warshak et al. The intraoperative blood loss and operative time was considerable in emergency caesarean hysterectomy procedures as they were usually unplanned and preceding severe bouts of bleeding. Saldarriaga-Hoyos JJ.et al[6] stated that more perioperative blood loss in emergency caesarean hysterectomies as compared to planned surgeries adversely affected the maternal outcome. The extensive surgery related morbidities include haemodynamic imbalance due to excessive blood loss, massive blood transfusion complications, urinary tract injury, acute haemorragic shock, coagulation failure , renal shut down, fistula formation and sepsis. This has reflected in our study.

Comparing the various surgical manoeuvres used in the management of PAS patients, our study showed that combining IIAL with Caesarean hysterectomy[7] keeping the placenta in situ or stepwise uterine devascularisation using a standardized multidisciplinary approach gave very good results and significantly decreased the maternal morbidity and mortality of these cases.[8-10] The procedure decreased the blood loss, especially the torrential haemorrhage due to the presence of engorged abnormal vascular connections present at the site of MAP and the interface between the bladder and the anterior uterine wall. As the anterior branch of the internal iliac artery supplies branches to the pelvic viscera, namely the uterus, urinary bladder,vault and the vagina, ligating it

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controlled the excessive blood loss, consequently decreasing the number of blood transfusions and the postoperative fall in haemoglobin.[11-15]

Internal iliac artery ligation being a time consuming and meticulous procedure, has not gained widespread popularity, primarily due to limited surgical training and concerns regarding possible complications. However, in our study it showed a considerable reduction in perioperative blood loss, hence improving the maternal outcome.[16-18]

A limitation to our study is the lack of equipment and trained personnel to do interventional radiology in our hospital. Hence, prophylactic preoperative catherterisation of the hypogastric arteries with balloon occlusion or arterial embolization could not be assessed as a treatment modality in the surgical management of PAS cases in our study.

The rate of bladder injury was comparable to the study by Asicioglu et al (31.4%) and the meta-anlysis by Washecka and Behling(26%).We had no case of ureteric injury which is in contrast to the study by Asicioglu et al (5.7%)and Washecka and Behling(6.0%).[19]

ICU admission was high(61.11%)which is comparable to the reports by Brookfield et al(64%), Weiniger et al(45.8%)and Upson et al(48.4%).The role of ureteric stenting in cases of PAS remain inconclusive as we did not find any difficulty in identifying the ureter during IIAL which is comparable to studies by Ellar and Belfort.

Zhang and Siqin reported the mortality rate of approximately 7.0%.However, our study showed one case(2.78%)of maternal death due to the already exsanguinated condition of the patient when she landed up for emergency surgery ultimately ending up with multiorgan failure and DIC.

CONCLUSION

Hypogastric artery ligation combined with caesarean hysterectomy or stepwise uterine devascularisation had much better outcomes especially in women undergoing planned surgery for PAS with fewer blood transfusions, lesser ionotropic support and shorter hospital stay. This significantly decreased the maternal morbidity and mortality. To improve the clinical outcome in PAS cases, the involvement of multidisciplinary teams in well equipped hospitals using the appropriate surgical techniques and expertise is the need of the hour.

ACKNOWLEDGEMENTS

The authors would like to thank all women who participated in the study. Their overall health and well being is the motivation for performing this work.

DECLARATIONS

Funding: Not applicable.

Conflict of interest: There is no conflict of interest, financial or otherwise.

Ethical approval: Not required.

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