

Diagnostic Limitation and Outcome of Definitive Surgical Approach in Placenta Accreta Spectrum Disorders - A Prospective Case Series Study

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ABSTRACT

BACKGROUND

Placenta accreta spectrum (PAS) disorders have become an emerging obstetric issue associated with risk of massive obstetric haemorrhage on placental separation following delivery. Antenatal diagnosis is of utmost importance but miserably limited due to lack of imaging expertise in this issue. We wanted to evaluate antenatal diagnosis of PAS disorders and analyse the outcome of definitive surgical approach.

METHODS

This is a prospective case series analysis done in the Department of Obstetrics and Gynaecology, RG Kar Medical College & Hospital, Kolkata. In a series, we have discussed 10 cases dealt well in our institution in the last one year (pre-Covid-era). Main outcome measures were operative blood loss, bladder injury, high dependency unit (HDU) admission, component transfusion, and neonatal morbidity.

RESULTS

Imaging expertise for prenatal diagnosis of PAS disorders was found miserably limited where 7 out of 10 cases were diagnosed intra-operatively. During Caesarean section (CS), longitudinal fundal incision was given to take out the baby with blood loss even less than usual CS. Bladder injury was diagnosed in one occasion intra-operatively. Peripartum total hysterectomy without touching placental bed was done in all cases, where uneventful bladder dissection and bilateral internal iliac artery ligation minimised component transfusion (8 out of 10) and HDU support (5 out of 10). Neonatal outcome was good in cases of planned CS at 36 weeks (6 out of 10).

CONCLUSIONS

Clinical suspicion plays an important role in our scenario due to lack of imaging experience & expertise to diagnose PAS disorders. Planned Caesarean delivery at late preterm period in equipped centre in expert hands improves outcome of such cases. Peripartum total hysterectomy without touching placental bed is the most definitive (surgical) approach with sound post-operative recovery.

KEYWORDS

Massive Obstetric Haemorrhage, Prenatal Diagnosis, Clinical Suspicion, Peripartum Total Hysterectomy, Internal Iliac Artery Ligation

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BACKGROUND

The term "PAS disorders" once proposed by Luke et al¹ covers² the entire range of villous infiltration into or even beyond myometrium, variable lateral extension of myometrial invasion and combination of different depths of invasiveness in the same accreta placentation. Importantly, it includes both abnormally adherent & invasive placentas whereas commonly used terminology like morbidly adherent placenta (MAP) technically excludes the invasive form.²

Depending on the depth of trophoblast invasion into the myometrium, three subtypes are considered: (1) adherent placenta accreta, when the villi adhere to the myometrium without invasion; (2) placenta increta, when the villi invade into the myometrium; and (3) placenta percreta, when villi penetrate through the uterine serosa after invasion through the myometrium and sometimes adheres with adjacent pelvic organs.^{3,4} Depending on the number of placental cotyledons involved, the lateral extension of myometrial invasion divide PAS disorders into the focal, partial, or total categories.² The prevailing hypothesis regarding pathophysiology is that a defect in the endometrium – myometrial junction, particularly at the site of a prior uterine scar (surgical / non-surgical), leads to a failure of normal decidualization so that trophoblastic tissue including its circulation develops deeply within the myometrium, and sometimes penetrates to reach the surrounding pelvic organs.⁴ The cellular changes in the invasive trophoblast are probably secondary to the unusual myometrial biological environment, and not to a primary defect of trophoblast biology.^{3,4} Caesarean delivery rate has increased throughout the world from less than 10 % to over 30 %; and simultaneously, there is 10-fold worldwide increase in incidence in last few years.⁵ The main associated risk is massive obstetric haemorrhage on placental separation, often leading to coagulopathy, multi-organ failure and significant maternal morbidity, even mortality.^{6,7}

Prenatal diagnosis of PAS disorders rests mainly on typical sonographic findings with 2 D grey scale & Doppler flow.^{8,9} Magnetic resonance imaging (MRI) is currently only recommended as an adjunct to ultrasound imaging by most of the professional bodies throughout the world. But imaging still remains subjective with accuracy depending on the experience & expertise of USG-operators.¹⁰ Clinical suspicion, thus, must not be neglected. The optimal management of PAS disorders is still undefined and is determined by the capacity to diagnose invasive placentation, local expertise and presenting symptoms.¹¹ Peripartum total hysterectomy remains the most definitive (surgical) approach,⁷ especially for invasive forms. Main idea is not to touch placental bed; even uterotonics should be avoided to keep placenta-in-situ undisturbed.¹²

Conservative approach with repair of uterine wound after baby delivery keeping placenta-in-situ might be tried: but is still not supported by RCTs. Careful follow-up in centres with adequate expertise is needed; but chances of complications & secondary hysterectomy are not excluded.¹³⁻¹⁵ We wanted to evaluate antenatal diagnosis of PAS disorders; and analyse the outcome of definitive surgical approach i.e.

peripartum hysterectomy what we are practicing in our set-up at present.

METHODS

The present prospective case series study was conducted in the Department of Obstetrics and Gynaecology of RG Kar Medical College & Hospital over a period of one year (January 2019 to December 2019). We describe 10 cases of PAS disorders, elective or emergency, managed well during this period. Recruitment for the study was done after confirmation of diagnosis intra-operatively; and after having proper written informed consent post-operatively. Cases not given consent or incorrectly suspected PAS disorders pre-operatively were excluded.

All cases, booked or referred, with anterior low-lying placenta on USG, even without documentation of invasive features but with history of scarred uterus, according to institutional protocol, were dealt by senior personnel during Caesarean section with anticipation of encountering invasive placentation. Longitudinal skin incision extending even above umbilicus was given and uterus with fetus in-situ was exteriorised. Appearance of lower uterine segment was assessed for features of placental invasion and noted. When typical features like bulged and thinned out segment or engorged vessels were found, baby was delivered by fundal longitudinal incision. Umbilical cord was clamped, cut and tied near to its insertion. Uterine wound closed keeping placenta in-situ followed by bilateral internal iliac artery ligation. Where typical features of invasion in lower segment were absent, baby was delivered by lower segment transverse incision and PAS disorders was diagnosed during placental separation. Total hysterectomy was done with opportunistic bi-lateral salpingectomy while keeping bi-lateral healthy ovaries in-situ in all cases. Haemostasis was secured and intra-peritoneal drain was given when required. Intra-operative categorization of placental adherence was made according to International Federation of Gynecology and Obstetrics (FIGO) clinical grading system.¹⁶ We have assessed operative blood loss, bladder injury, HDU admission, component transfusion, and neonatal morbidity for all cases.

Data was tabulated in Excel sheet (Microsoft Office Excel 2013) for analysis.

RESULTS

Out of total 9224 Caesarean cases in 2019 in our institution, reported anticipation as placental invasion was in 28 cases; but only 10 cases were finally diagnosed as PAS disorders. All cases are summarised in Table 1 & 2. Six out of 10 cases were with history of single prior CS and 3 with prior 2-CS; one primigravida (case-5) was unfortunately encountered with such disorders where there were history of myomectomy and conception following IVF-ET. (Table 1)

Case No.	Age (Years)	Gravida / Parity / Living Issue	Interval from Last CS (Years)	Gestational Age at Delivery (Weeks)	Type of Admission	Mode of Diagnosis of PAS
1	35	G3P (1+1) L1	7	36	OPD	Anticipation & intra-operative
2	34	G3P2L1	10	32	Emergency	Intra-operative
3	32	G2P1L1	11	36	OPD	Anticipation & intra-operative
4	32	G3P2L2	5	34 ⁺⁴	Emergency	Anticipation & intra-operative
5	26	G2P (0+1)	NA	30	Emergency	Anticipation & intra-operative
6	24	G2P1L1	7	36	OPD	Prenatally by USG
7	29	G2P1L1	8	36	OPD	Prenatally by USG
8	24	G2P1L1	3	36	OPD	Anticipation & intra-operative
9	30	G2P1L0	9	34	OPD	Prenatally by USG
10	30	G3P2L1	5	34 ⁺⁶	Emergency	Intra-operative

Table 1. Summary of Cases (General Issues)

Case No.	Type of Anaesthesia	Type of Skin Incision	Appearance of Lower Uterine Segment	Type of Uterine Incision	TH with Placenta-in-Situ (Y / N)	FIGO Clinical Grade of PAS Disorders	Bladder Injury (Y / N)	HDU Support (Days)	Component Transfusion (Units)	Baby Prognosis
1	GA	Longitudinal	Bulged & thinned out	Fundal, longitudinal	Y	4	N	0	2	Poor-good recovery
2	SA converted to GA	Low-transverse converted to inverted-T	Bulged with engorged vessels	Fundal, longitudinal	Y	5	Y	1	2	Poor-good recovery
3	GA	Longitudinal	Bulged with engorged vessels	Fundal, longitudinal	Y	4	N	1	0	Good
4	GA	Longitudinal	Bulged & thinned out	Fundal, longitudinal	Y	4	N	0	0	Good
5	GA	Longitudinal	Normal	Lower segment transverse	N	2	N	4	12	Poor-delayed recovery
6	GA	Longitudinal	Bulged with engorged vessels	Fundal, longitudinal	Y	6	N	1	2	Good
7	GA	Longitudinal	Bulged & thinned out	Fundal, longitudinal	Y	4	N	0	0	Good
8	GA	Longitudinal	Bulged & thinned out	Fundal, longitudinal	Y	4	N	0	2	Good
9	GA	Longitudinal	Bulged with engorged vessels	Fundal, longitudinal	Y	5	N	0	0	Poor-good recovery
10	SA converted to GA	Low transverse	Normal	Lower segment transverse	N	2	N	1	4	Good

Table 2. Summary of Cases (Intra & Post-Operative Issues)

Three out of 10 cases prenatally diagnosed; another 3 clinically suspected with PAS disorders; were admitted through out-patient department (OPD) where planned CS was done at 36 weeks. In one case (case 9), where USG done after admission reported anterior placenta with leading edge covering internal OS with several features of PAS disorders, CS was planned at 34 weeks after single course of steroid administration to avoid emergency CS in odd hours. Rest 4 cases were with emergency admission when CS had to be done in early preterm period. (Table 1)

We relied upon typical sonographic findings with 2 D grey scale & colour Doppler for prenatal diagnosis; but most of the cases (7 out of 10) were diagnosed intra-operatively although all cases had undergone prenatal USG where no documentation was found regarding accreta placentation. (Table 1) On entering into peritoneal cavity, appearance of lower uterine segment in cases with accreta placentation was mainly bulged and thinned out (Figure 1); with engorged vessels (Figure 2) found in 4 cases. Longitudinal fundal incision was given to take out the baby with blood loss even less than average loss in uneventful CS. But lower segment appearance could be deceptive as with our case-5 & 10, where incision made in lower segment; invasiveness was detected during placental removal which led to profuse intra-operative loss with really challenging peri-operative consequences. (Table 2)

Five out of 10 cases were diagnosed as FIGO Grade-4 PAS disorders whereas Grade 2 & 5 were with 2 cases each. Case-6 was diagnosed as FIGO Grade-6 disorders where little amount of placental tissue attached with bladder flap

and right parametrial tissue had to be left in-situ after proper haemostasis. (Table 2)



Figure 1.
Bulged & Thinned Out
Lower Segment in Case-1



Figure 2.
Engorged Vessels in Lower
Segment on Entering
Abdomen in Case-3

Bladder injury was diagnosed in one occasion (case 2) intra-operatively; repaired well and post-operative outcome was uneventful. (Table 2)

HDU support was mostly not needed (5 out of 10) and 24 hours monitoring was done in 4 cases. Component transfusion was required in minimum or even nil in most occasions. In one case (case 5), extensive HDU support for

4 days with 12 units of component transfusion was required to combat hemodynamic instability. (Table 2)

In 6 out of 10 cases, neonatal outcome was good. In 3 cases, APGAR-1 was poor & babies were admitted to sick newborn care unit (SNCU); but subsequently, recovery was good. But in case-5, APGAR-1 was poor, and the girl-baby was admitted to SNCU where she developed jaundice with sepsis. Baby received phototherapy & broad-spectrum antibiotics; and was given to mother after 7 days. We discharged mother with baby after 10-days monitoring in stable condition. (Table 2).

DISCUSSION

On the world-wide rise in CS rate, PAS disorder has become an often-encountered obstetric issue. Maternal mortality and morbidity are reduced when women with PAS disorders are accurately diagnosed prenatally, transferred to a center of excellence and delivered by an equipped and experienced multidisciplinary care team.¹⁷⁻¹⁹

European Working Group on Abnormally Invasive Placenta (EW-AIP) proposed a standardised description and name for all the ultrasound signs used for the prenatal diagnosis of placenta accrete.⁹ Unfortunately, population studies have shown that PAS disorders remain undiagnosed before delivery in half²⁰ to two-thirds of cases.²¹ Possible explanation as given in literature¹⁰ is that irrespective of the imaging modality used, accuracy has so far been limited by the rarity of the condition and the lack of dedicated training programs.

In our series, 7 out of 10 cases were diagnosed intra-operatively although they had all undergone prenatal USG but no documentation of placental invasiveness was found. Thus, clinical suspicion definitely plays a pivotal role.

Most authorities^{13,14} recommend in favour of late preterm delivery in cases of planned CS. In our series, prenatally diagnosed or clinically suspected cases of PAS disorders were admitted through OPD and planned CS was done at 36 weeks with mostly good neonatal outcome. C-sections done in early preterm period were emergency cases with mostly poor baby prognosis.

Our institutional anaesthesia team always prefers general anaesthesia in cases with PAS disorders. In 2 out of 10 cases with neither diagnosed nor suspected disorders, CS initially was started under spinal anaesthesia but later converted to general anaesthesia as per operative requirement.

A midline skin incision is recommended by most authors for PAS disorders to allow for a high upper-segment uterine incision, importantly above the upper margin of the placenta.^{12,22} In our series and in institutional practice, we always prefer longitudinal incision, even on anticipation of such disorders.

Peripartum total hysterectomy remains the most definitive (surgical) approach, especially for invasive forms.⁷ The role of bilateral internal iliac artery ligation at the time of Caesarean hysterectomy for PAS disorders is currently unclear due to lack of documentations / studies.^{23,24} In our series, total hysterectomy keeping placenta-in-situ with prior

bilateral internal iliac artery ligation without touching placental bed gave good intra & post-operative outcomes in terms of less blood loss, hemodynamic instability, HDU stay, transfusion requirement and hospital stay.

Importantly, PAS disorders with clinical grade 4 & 5 were found relatively easy to handle even if diagnosed intra-operatively, if we follow the principle of not touching placental bed with uneventful bladder dissection; but in grade-6, principle is to leave some placental tissue adherent with other structures for aseptic autolysis. But, PAS disorders with clinical grade 2 & 3 were challenging where accrete diagnosis is made during placental separation when bleeding occurs profusely as in our case-5 & 10 with possible unfavourable outcomes.

In our series, specimens (Figure 3) from all cases were sent for histopathological examination (HPE) (Figure 4); but pathological classification mostly did not co-relate well with clinical stratification, as mentioned in literature.¹



Figure 3.
Hysterectomy Specimen of Case 4



Figure 4.
Chorionic Villi Invading into Myometrium without any Intervening Decidua (Case-7)

CONCLUSIONS

Lack of imaging experience & expertise in a growing obstetric concern like PAS disorders make prenatal diagnosis often challenging. Clinical suspicion plays a very crucial role; operative preparation and arrangements in suspected cases along the line of PAS disorders is very important.

Planned Caesarean delivery at late preterm period in equipped centre with expert team improves outcome in cases with PAS disorders. Peripartum total hysterectomy without touching placental bed is the most definitive (surgical) approach with sound post-operative recovery. Bilateral internal iliac artery ligation before giving clamps for hysterectomy definitely gives intra-operative benefit.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

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