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MANAGEMENT STRATEGIES FOR PLACENTA ACCRETA SPECTRUM: A RETROSPECTIVE STUDY

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ABSTRACT

Introduction: Placenta accreta spectrum is a life-threatening condition caused due to abnormal placentation and decidualisation. The absence of nitabuch layer leads to abnormal trophoblastic invasion and thus forming a morbidly adherent placenta. This may result into life-threatening antepartum and post-partum haemorrhage and thus causing severe maternal morbidity and mortality. The incidence of placenta accreta spectrum has increased over the last decade, causes being increased rate of caesarean section, other uterine procedures like myomectomy, dilatation and curettage, manual removal of placenta, isthmocele, etc. There is not enough research and data regarding its management in a low resource set-up like our institute. This study aims at solving these doubts and acknowledging multiple surgical methods and complications during management of PAS at a tertiary care centre in a low resource set-up. **Materials And Methods:** A retrospective cross-sectional study was performed from the year 2022 to 2024. 32 cases were found to have PAS and were managed in our institute using various surgical methods which involved caesarean hysterectomy, leaving placenta in situ, myometrial segmental resection, complete removal of placenta. These methods were combined with bilateral internal iliac artery ligation in few cases. It also includes management of some rare cases of PAS which underwent obstetric hysterectomy with foetus in situ and management of placenta percreta in caesarean scar pregnancy with scar rupture. **Observations and Results:** It was observed that uterine conservative surgery was successful in 59.36 % and 40.62% patients underwent caesarean hysterectomy. All cases had history of uterine procedure in previous pregnancies. Foetal outcomes were good in 78.11 % cases. The overall incidence of PPH (primary and secondary) in entire study was 50 %. There was 1 maternal mortality (3.12%) due to PAS. Other maternal morbidities observed were prolonged hospitalisation due to intraoperative complications of bladder and ureter injury followed by repair and/ or DJ stenting in 21.87 % cases, post operative ICU admission in 25 % cases, post operative ventilatory support in 18.75 cases, intra- and /or post operative inotropic support in 18.75% cases, surgical site infection in 9.39 % cases. **Conclusion:** In a case of PAS, planned delivery at 35+0 to 36+6 weeks of gestation is recommended. Overall, all surgical methods in this study have good maternal outcomes but the choice of surgical method depends entirely on clinical judgement, surgical expertise, type of institution, availability of multidisciplinary team, pre-operative ultrasound findings, availability of resources to manage complications (i.e. blood and blood products, broad interventions and post operative care in ICU).

KEYWORDS: PAS (Placenta accreta spectrum), Antepartum and Post-partum haemorrhage.

INTRODUCTION

Placenta accreta spectrum (PAS) is a condition caused due to trophoblastic invasion into the myometrium causing abnormal placentation. It is a potentially life-threatening condition and requires multidisciplinary approach along with high amount of vigilance and surgical skills for successful management. The major classification of PAS includes placenta accreta, increta and percreta. It is caused due to absence of nitabuch layer which causes unopposed placental invasion and thus forming morbidly adherent placenta. There is defect in the endometrial–myometrial interface that leads to a failure of normal decidualization in the area of a uterine scar, which allows abnormally deep placental anchoring villi and trophoblast infiltration. Though the mortality due to placenta accreta has fallen from the early 20th century, the incidence of adherent placenta has increased from 0.025% in 1970s to 0.04% in 1990s. The incidence of PAS has increased significantly in the last decade from 1 in 2500 in 1980s to 1 in 270 births in 2016 [11]. Various risk factors of PAS are increased maternal age, multiparity, previous uterine surgery (e.g. caesarean section, myomectomy, dilatation and curettage), isthmocele, manual removal of placenta in previous

pregnancy, adenomyosis, endometriosis. In case of placenta previa with history of one or more caesarean deliveries, the risk of placenta accreta spectrum is dramatically increased. For women with placenta previa, the risk of placenta accreta is 3%, 11%, 40%, 61%, and 67%, for the first, second, third, fourth, and fifth or more caesarean, respectively. It can cause life-threatening haemorrhage and can lead to significant morbidity and mortality and has been a major concern amongst obstetricians. There is still some uncertainty regarding the management of PAS. This study aims at solving these doubts and acknowledging multiple surgical methods in management of PAS and that caesarean hysterectomy is not the only option, and that uterus can be conserved even in extreme conditions with good maternal outcome provided availability of multidisciplinary team, proper case selection, surgical expertise.

AIMS AND OBJECTIVES

To study various surgical methods for management of PAS and their outcomes.

MATERIALS AND METHODS

Retrospective cross-sectional study was performed from the year 2022 to 2024. 32 cases were found to have PAS. These were patients coming to obstetric casualty and outpatient department and were diagnosed with PAS antenatally or intraoperatively as an incidental finding and were managed by using various surgical methods in the Department of Obstetrics and Gynaecology of our institute which is a tertiary care hospital in low resource set-up.

The various surgical methods used were:

1. Caesarean hysterectomy after delivery of full term/ preterm foetus with bilateral internal iliac arteries.
2. Caesarean hysterectomy with foetus in situ.
3. Caesarean hysterectomy.
4. Caesarean hysterectomy in a case of placenta percreta with scar rupture.
5. Classical caesarean section with Placenta left in situ followed by post operative methotrexate.
6. Caesarean section with fundal incision with Placenta left in situ with bilateral internal iliac artery ligation.
7. Lower segment caesarean section/ hysterotomy followed by bilateral internal iliac artery ligation followed by complete removal placenta.
8. Myometrial segmental resection and repair after delivery of foetus with bilateral internal iliac artery ligation.

OBSERVATIONS

Table No. 1: Surgical methods used in management of PAS.

Sr. No.	Method	No. of Patients Undergoing the Surgery	Percentage
1	Caesarean hysterectomy after delivery of foetus with bilateral internal iliac artery ligation	7	21.87
2	Caesarean hysterectomy with foetus in situ	1	3.12
3	Caesarean hysterectomy	4	12.50
4	Caesarean hysterectomy in a case of placenta percreta with scar rupture	1	3.12
5	Classical caesarean section with Placenta left in situ followed by post operative methotrexate	4	12.50
6	Caesarean section with fundal incision with Placenta left in situ with bilateral internal iliac artery ligation	4	12.50
7	Lower segment caesarean section/hysterotomy followed by complete removal placenta with bilateral internal iliac artery ligation	8	25
8	Myometrial segmental resection in Lower segment caesarean section with complete removal of placenta with bilateral internal iliac artery ligation	3	9.39
	Total	32	100

Table No. 2: No. of patients having risk factors of PAS.

Procedure	No. of patients	Percentage
Previous 1 LSCS	13	40.62
Previous 2 LSCS	15	46.87
Previous Hysterotomy	3	9.39
Previous dilatation and curettage	1	3.12
Total	32	100

Table No. 3: Various foetal outcomes.

Foetal outcome	No. of patients	Percentage
Full term healthy	19	59.36
Preterm NICU admission	6	18.75

Death NICU admission	**3**	**9.39**
Abortion (MTP)	**4**	**12.50**
Total	**32**	**100**

Table No. 4: Broad interventions required.

Intervention required	No. of patients	Percentage
ICU admission	**8**	**25**
Ventilatory support	**6**	**18.75**
Inotropic support	**6**	**18.75**
Dialysis	**3**	**9.39**

Table No. 5: Intra- and Post- operative complications.

Complications	No. of patients	Percentage
Bladder injury and repair +/- DJ stenting	**7**	**21.87**
Primary postpartum haemorrhage	**8**	**25**
Secondary postpartum haemorrhage in late post operative period after initial recovery	**8**	**25**
Sepsis	**1**	**3.12**
Surgical site infection	**3**	**9.39**
Secondary hysterectomy	**3**	**9.39**

Table No. 6: Blood and blood products required.

Blood and blood products	No of patients	Percentage
PCV/ WHOLE BLOOD	**11**	**34.36**
PCV / WHOLE BLOOD + FFP	**21**	**65.64**
TOTAL	**32**	**100**

Table No. 7: No. of patients who underwent hysterectomy.

Type of hysterectomy	No. of patients	Percentage
Primary caesarean hysterectomy	**13**	**40.62**
Secondary hysterectomy	**3**	**9.39**
Total	**16**	**50.01**

Table no. 8: Mortality rate encountered during the study.

Mortality	No. of patients	Percentage
	1	**3.12 %**

RESULTS

It was observed that uterine conservative surgery was successful in 59.36 % and 40.62% patients underwent caesarean hysterectomy. The various methods used were: Caesarean hysterectomy after delivery of foetus with bilateral internal iliac artery ligation 21.87% cases.

1. Caesarean hysterectomy with foetus in situ 3.12%
2. Caesarean hysterectomy 12.50%.
3. Caesarean hysterectomy in a case of placenta percreta with scar rupture 3.12%.
4. Classical caesarean section with Placenta left in situ followed by post operative methotrexate in 12.50 % cases.
5. Caesarean section with fundal incision with placenta left in situ with bilateral internal iliac artery ligation 12.50% cases.
6. Lower segment caesarean section/hysterotomy followed by complete removal placenta with bilateral internal iliac artery ligation 25% cases.
7. Myometrial segmental resection with complete removal of placenta with bilateral internal iliac artery ligation in 9.39 % cases.

All cases had history of uterine procedure in previous pregnancies including maximum cases with history of Previous 2 LSCS in 46.87% cases followed by Previous 1 LSCS in 40.62 % cases, Previous Hysterotomy in 9.39 % and Previous dilatation and curettage 3.12 % cases.

Foetal outcomes were good in 78.11 % cases out of which 59.36 % were full term healthy baby and 18.75 % were preterm and required NICU admission. 21.89 % foetuses had unfavourable outcomes, out of which 9.39 % babies died in NICU due to prematurity and complications and 12.50 % were a result of medical termination of pregnancy.

There was 1 maternal mortality (3.12%) due to PAS during the entire 3 years duration of study. Other maternal morbidities observed were prolonged hospitalisation due to intraoperative complications of bladder and ureter injury followed by repair and/ or DJ stenting in 21.87 % cases, post operative ICU admission in 25 % cases, post operative ventilatory support in 18.75 cases, intra- and /or post operative inotropic support in 18.75% cases, surgical site infection in 9.39 % cases.

Out of 8 cases where placenta was kept in situ and post operative methotrexate was given followed by USG with doppler study, 1 case had sepsis and underwent secondary hysterectomy, 4 cases had secondary PPH out of which 2 cases underwent secondary hysterectomy and 2 cases had spontaneous placental expulsion. The rest 4 cases had spontaneous placental autolysis, making the overall success rate of this method 75%. There was no maternal mortality due to this method.

Out of 10 cases who underwent caesarean hysterectomy the most important complication was inevitable bladder injury / elective cystostomy during bladder dissection in cases of placenta percreta which was observed in 5 cases. This was managed by multidisciplinary approach and involvement of general surgeon. Bladder injury was also observed in 2 other cases of placenta accreta while doing Lower segment caesarean section followed by complete removal placenta with bilateral internal iliac artery ligation. The overall incidence of bladder injury in entire study was 21.87 % cases.

The overall incidence of PPH in entire study was 50 %. Out of these, 25 % cases had primary PPH during intra-operative and/or immediate post operative period while 25 % cases had secondary PPH in delayed operative period.

100 % cases required packed cell volume/ whole blood transfusion as per availability, 65.64 % cases were transfused additional fresh frozen plasma due intra-operative or post-operative haemorrhage or early signs of DIC.

DISCUSSION

Placenta accreta spectrum is morbid condition with high maternal morbidity and mortality. Placenta percreta is associated with a maternal mortality as high as 10% and significant maternal morbidity.[1] It is an iatrogenic defect of the endometrium–myometrial interface leads to a failure of normal decidualization at the site of a uterine scar, enabling abnormally deep trophoblast infiltration.[9] A recent commentary on PAS highlighted the importance to abandon the old terminology focusing on PAS as an invasive trophoblastic disease and to start to consider PAS as a disease resulting from a combination of many factors such as a defective decidua, abnormal trophoblastic attachment, abnormal angiogenesis and vascular remodelling, and progressive uterine scar dehiscence.[9]

Risk factors

Various risk factors of PAS are increased maternal age, multiparity, placenta previa, history of PAS in previous pregnancy, previous uterine surgery (e.g. caesarean section, myomectomy, dilatation and curettage), isthmocele, manual removal of placenta in previous pregnancy, adenomyosis, endometriosis. The risk of recurrence 20% in women with history of PAS in previous pregnancy.

Caesarean scar pregnancy is closely associated with PAS and acts as a precursor of PAS. Early rupture uterus and haemorrhage is not uncommon and MTP maybe required.[11] One such case was encountered during this study in which a patient was diagnosed to have PAS with hemoperitoneum in her second trimester ultrasound. She presented to the obstetric casualty in shock. She was resuscitated and immediately shifted to operation theatre. Intraoperatively she was found to have caesarean scar pregnancy that had resulted in scar rupture and haemorrhage causing massive hemoperitoneum along with placenta percreta with bladder invasion. Bilateral internal iliac artery ligation followed by hysterectomy was done. Patient was given 4 packed red cells and 4 fresh frozen plasma and was admitted in obstetrical ICU for further management and post-operative care.

Classification[10]

As per newer guidelines given by FIGO (2019) PAS has been classified as[10]:

Grade 1- Abnormally adherent placenta (Accreta)
Grade 2- Abnormally invasive placenta (Increta)
Grade 3- Abnormally invasive placenta (Percreta)
3a - Limited to the uterine serosa.
3b- With urinary bladder invasion.
3c- With invasion of other pelvic tissue or organs.[10]

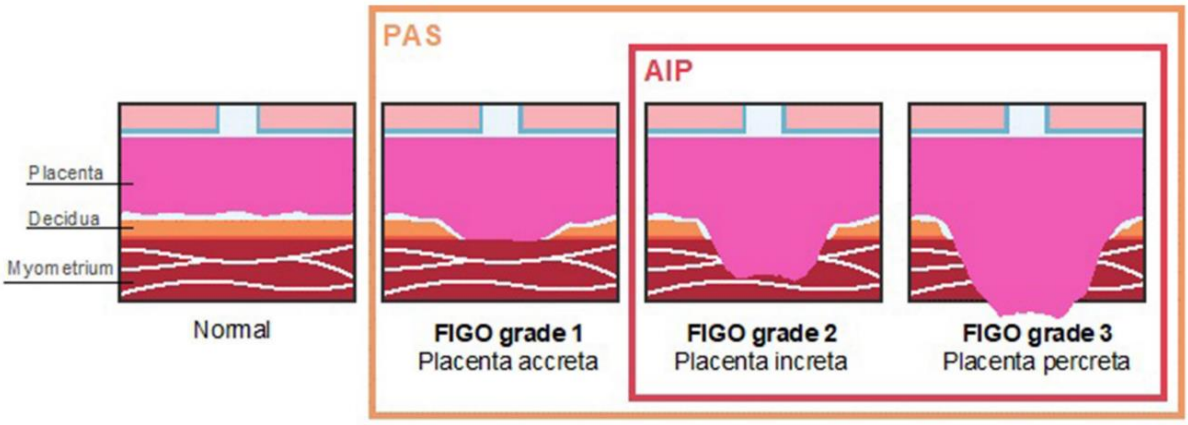

Figure No. 1: Grading of Placenta Accreta Spectrum.[10]

Radiological Findings[10]

Ultrasound findings on 2D Gray scale:

1. Loss of 'clear zone'.
2. Abnormal placental lacunae.
3. Bladder wall interruption.
4. Thinning of myometrium overlying placenta to < 1 mm or undetectable
5. Placental bulge.
6. Focal exophytic mass.

Ultrasound findings on doppler studies:

1. Uterovesical hypervascularity.
2. Sub placental hypervascularity.
3. Bridging vessels.
4. Placental lacunae feeder vessels

3D ultrasound +/- power doppler can also be done and has similar findings. As ultrasound findings may be unreliable, MRI is considered the best modality for confirmation of diagnosis.[1]

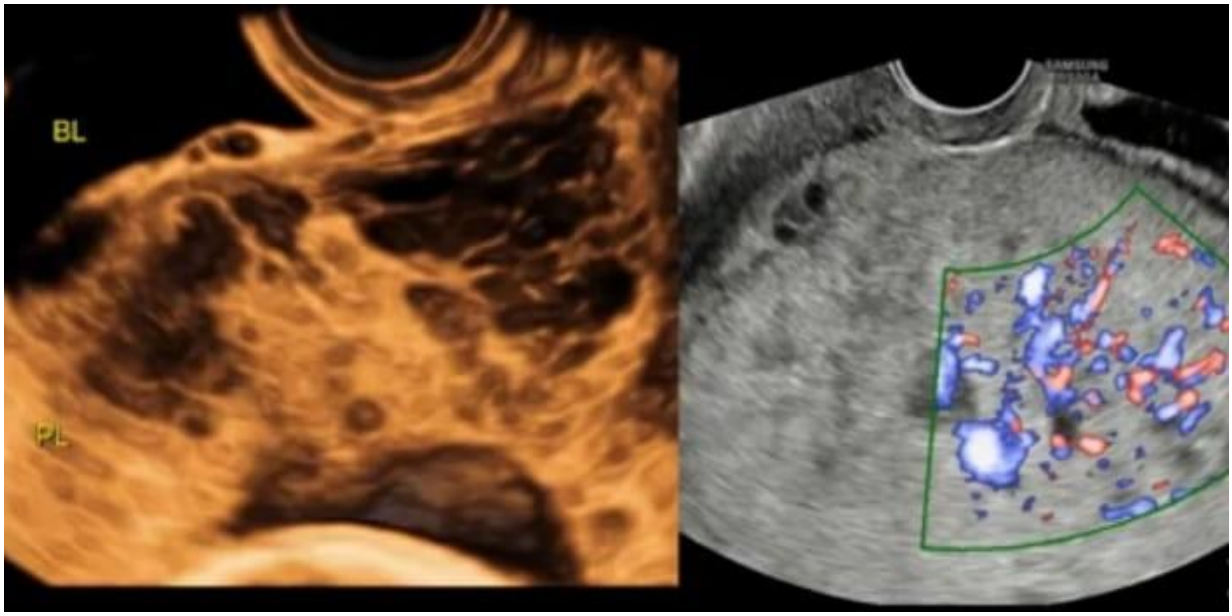

Figure No. 2: Placental Lacunae Suggesting Placenta Accreta Spectrum.

Management strategies

There is a stigma and uncertainty among obstetricians about management of PAS. This study depicts that caesarean hysterectomy is not the only method to manage cases diagnosed with PAS provided availability of multidisciplinary team, proper case selection, surgical expertise.

Accurate antenatal diagnosis of PAS has been demonstrated to improve maternal outcomes, allowing appropriate risk assessment and planned delivery in a tertiary referral centre with an experienced multidisciplinary team[9]. Management of placenta accreta spectrum requires a multidisciplinary approach, which should also include preoperative checklist[123]. Once the diagnosis of placenta accreta spectrum is made, a contingency plan for emergency delivery should be developed in partnership with the woman, including the use of an institutional protocol for the management of maternal haemorrhage[3]. In case of unsuspected placenta accreta spectrum diagnosed after the birth of the baby, the placenta should be left in situ and an emergency hysterectomy performed[3]. Caesarean hysterectomy is a life-saving procedure in cases where uterine conservation is not possible and PAS has caused or is estimated to cause life-threatening haemorrhage which can further result in increased morbidity and mortality of the patient.

In this study, after delivery of foetus, no attempt was made to remove the placenta and caesarean hysterectomy was commenced along with appropriate blood and blood product transfusion. It may/ may not be combined with bilateral internal iliac arteries ligation.

Bilateral internal iliac artery ligation is considered a life-saving procedure in management of PAS. It is highly recommended as it reduces blood loss during surgery and further morbidity, provided surgical expertise in this procedure is taken into consideration. It has helped in reducing the requirement of blood and blood products in intra-operative and post-operative period. This procedure can be combined with any of the above-mentioned surgical procedures to reduce further morbidity and mortality and improve the maternal outcome.

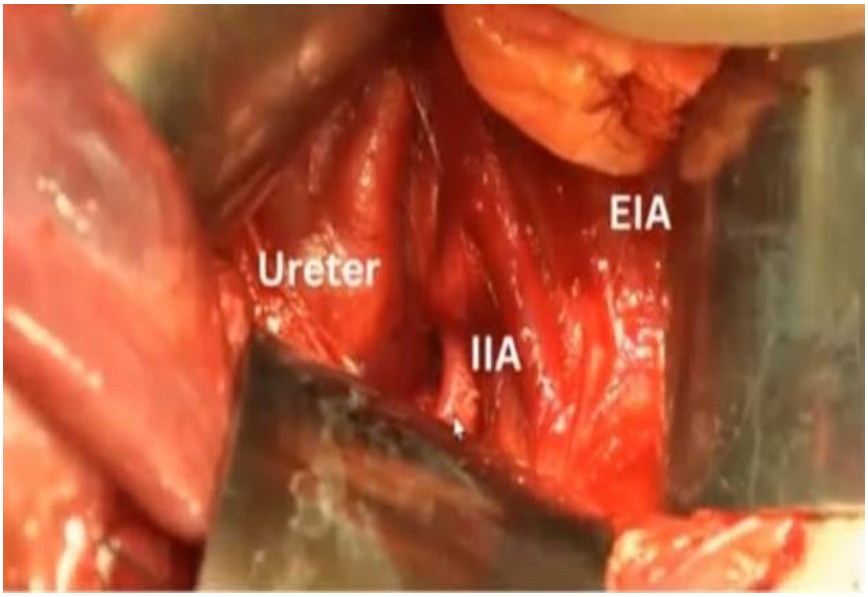

Figure No. 3: Internal Iliac Artery Ligation.

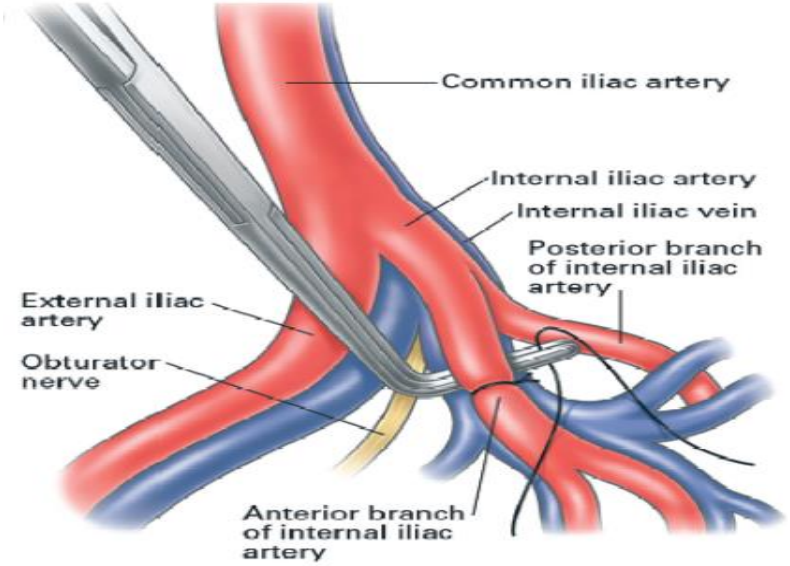

Figure No. 4: Diagram of Internal Iliac Artery Ligation.

Tasneem et al. have used non-surgical conservative method by leaving the placenta in situ to reabsorb and institute treatment with chemo- therapeutic agents, such as methotrexate.[1] Elective peripartum hysterectomy may be unacceptable to women desiring uterine preservation or considered inappropriate by the surgical team.[3] In such cases, leaving the placenta in situ should be considered. When the placenta is left in situ, local arrangements need to be made to ensure regular review, ultrasound examination and access to emergency care should the woman experience complications, such as bleeding or infection.[3] Women should be warned of the risks of chronic bleeding, sepsis, septic shock, peritonitis, uterine necrosis, fistula, injury to adjacent organs, acute pulmonary oedema, acute renal failure, deep venous thrombosis or pulmonary embolism. Prophylactic antibiotics may be helpful in the immediate postpartum period to reduce the risk of infective complications.[3]

In our study, 1 case where placenta was left in situ landed up into sepsis and underwent delayed hysterectomy. All cases were given higher antibiotics and high vigilance was ensured while using methotrexate. As methotrexate is known to cause GI toxicity, nephrotoxicity, hepatotoxicity, myelosuppression and folic acid deficiency, patients were monitored at regular intervals and folinic acid was given along with methotrexate. In this study none of the patients developed toxicity from methotrexate and placenta was either expelled or autolysed within a span 3 months (12-14 weeks).

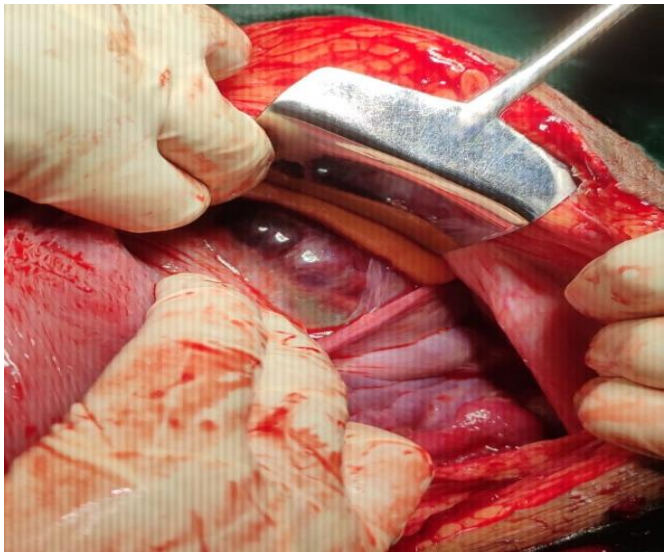

Figure No. 5: Intra-operative finding suggestive of placenta percreta invading bladder.

Figure No. 6: Caesarean section with fundal incision taken.[1]

Figure No. 7: Delivery of full-term foetus after fundal incision.[1]

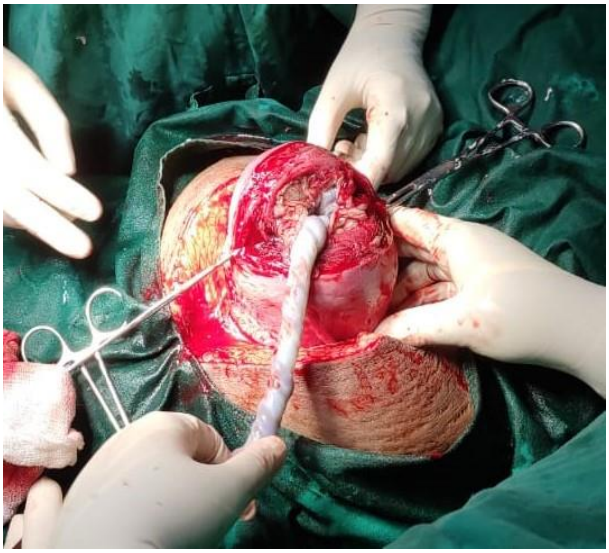

Figure No. 8: Placenta left in situ after tying umbilical cord.

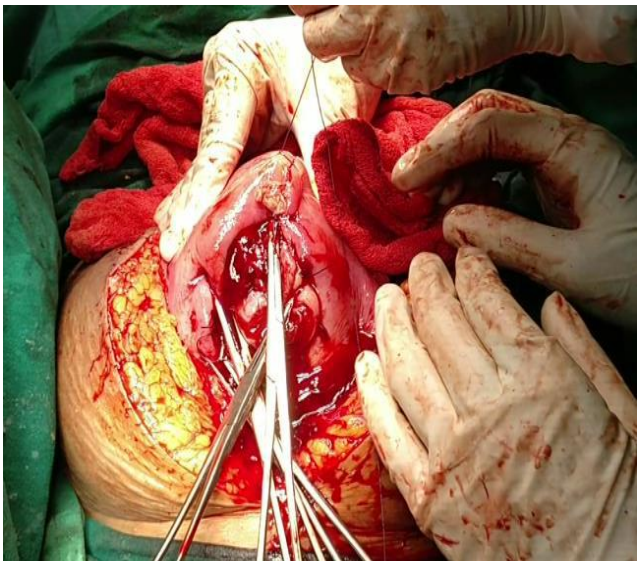

Figure No. 9: Uterine closure in layers after leaving placenta in situ.[1]

Myometrial segmental resection is another surgical conservative approach in cases of placenta accreta. While using this method, case selection is of utmost importance and should be done by the operating surgeon intra operatively with precise clinical judgement such that after resecting the uterine segment there must be adequate uterine tissue left for repair. Here, surgical skills play an important role and may be life-saving. Kumari M et al. stated that a one-step conservative surgery can be performed if 2 cm of healthy segment left above the uterine cervix and repair after resection is possible when segmental tissue destruction is less than 50% of axial circumference otherwise one should proceed for hysterectomy.[2] When the extent of the placenta accreta is limited in depth and surface area, and the entire placental implantation area is accessible and visualised (i.e. completely anterior, fundal or posterior without deep pelvic invasion), uterus preserving surgery may be appropriate, including partial myometrial resection.[3]

Kumari M et al. stated that Triple P technique is preferred in some cases having partially adherent or invasive placenta (<50% involvement of placental surface area). Chandaran et al described triple P technique in 2006 in a case series of 4 women with anterior placenta percreta. In this procedure firstly horizontal incision was made 2 finger breadths above the placental edge. Then, preoperatively placed intraarterial balloon catheters were inflated post-delivery. Lastly en-bloc myometrial excision was made and new zone was repaired.[2]

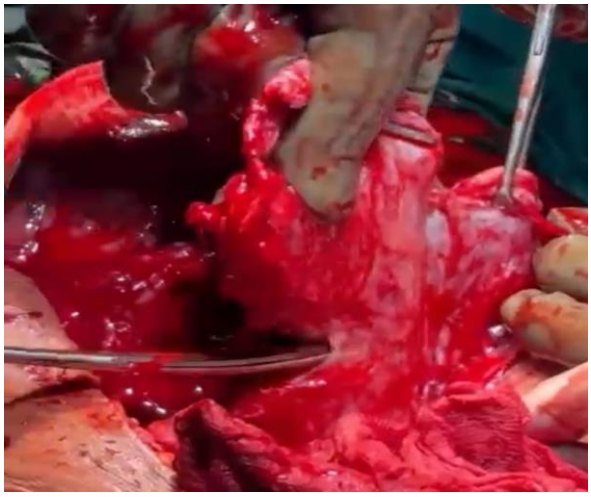

Figure No. 10: Myometrial segmental resection after delivery of foetus.

Complications

Bladder injury was encountered as most common intra-operative complication in this study (21.87 %). Bladder repair +/- DJ stenting was done by general surgeon and urosurgeon experts. There are currently insufficient data to recommend the routine use of ureteric stents in placenta accreta spectrum. The use of stents may have a role when the urinary bladder is invaded by placental tissue.[3]

Primary postpartum haemorrhage and secondary postpartum haemorrhage are the most dreaded complications and were seen in 25% of cases each in this study. Here there is role of multidisciplinary team which involves availability of blood and blood products, intraoperative blood loss estimation during surgery and vigilance to supply blood and blood products in time. Here, the anaesthesia and internal medicine team also plays an important role in pre-, intra- and post- operative fluid resuscitation and further management.

In patients where placenta is left in situ post operative methotrexate with folinic acid, serial USG follow-up, repeated complete blood count and vitals at regular intervals, keeping a check over bleeding per vaginum or placenta expulsion and counselling of patients and relatives regarding risk of delayed post operative secondary PPH, sepsis and need for delayed hysterectomy is of utmost importance.

Post operative surgical site infection is another complication encountered in our study in 9.39 % cases. The causes can be increased operative time, severe morbidity, anaemia due to blood loss, poor maternal hygiene and sepsis.

Overall, there was 1 (3.12 %) maternal death encountered during the entire 3 years of this study due to PAS.

Other methods in management of PAS include pre-operative uterine artery embolization to reduce intra-operative blood loss, aortic balloon occlusion have been tried but require more studies and research.

Prevention

PAS is believed to be an iatrogenic condition as its incidence has increased in the last decade along with increased rate of caesarean section and other uterine surgeries. Thus, preventive aspect plays an important and may help in reducing the incidence of PAS in near future. Avoiding vigorous curettage, using correct surgical technique during uterine closure in LSCS, timely diagnosis and treatment of post-partum endometritis, trial of labour in previous caesarean section may be some ways to prevent morbid conditions like Placenta accreta spectrum.

CONCLUSION

PAS is a potentially life-threatening condition contributing to severe maternal morbidity and mortality if not managed properly. Management of placenta accreta spectrum requires a multidisciplinary approach, which should also include proper imaging studies preoperative checklist[1], involvement of senior anaesthetists, obstetricians and gynaecologists with appropriate experience in managing the condition and other surgical specialties if indicated. In cases of placenta accreta spectrum, planned delivery at 35+0 to 36+6 weeks of gestation provides the best balance between foetal maturity and the risk of unscheduled delivery [3]. Uterus preserving surgical techniques should only be attempted by surgeons having appropriate expertise and team to manage such cases and after appropriate counselling regarding risks and with informed consent like in a tertiary care centre. Use of methotrexate still requires more research and studies. The choice of surgical method depends entirely on type of institution, pre-operative ultrasound findings, availability of resources (i.e. blood and blood products, broad interventions and post operative care in ICU managed by multidisciplinary team), clinical judgement and surgical expertise.

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