Case Reports

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Management of Placenta Accreta Spectrum Cases (PAS) by Uterine Artery Emobolisation: A Hybrid Approach

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Abstract

Background: Conservative methods for the management of placenta accreta spectrum disorders includes all the methods which aims to reduce the morbidity associated with peripartum hysterectomy, intraoperative complications, blood loss during surgery and mainly to preserve future fertility. These methods are to be practiced as much as possible in appropriate cases after weighing risks and benefits.

Objective: To report two cases of placenta accreta which were managed by uterine artery embolization followed by caesarean section in a hybrid operation theatre in our tertiary care centre.

Cases: This is a case series of two cases of pregnant women who were diagnosed to be having placenta accreta spectrum disorder. Here, we describe the steps and outcomes of the above-mentioned method.

Conclusion: Uterine artery embolization prior to caesarean section in selected cases of placenta accreta spectrum disorders is a feasible and advantageous procedure. It decreases the operating time, intraoperative blood loss and complications, and ICU stay. Larger studies may be needed to confirm the advantages.

Keywords: Uterine artery embolization, Conservative management, Placenta accreta spectrum.

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INTRODUCTION

Placenta accreta spectrum disorder occurs because of pathological adherence of placenta to the uterine wall due to abnormal trophoblastic invasion.[1] Depending on the depth of invasion of placenta, it can be classified as placenta accreta, placenta increta and placenta percreta. The incidence of placenta accreta is increasing due to rising rates of caesarean deliveries. These clinical situations can cause life threatening obstetric haemorrhage during manual separation of placenta often requiring peripartum hysterectomy. Historically, hysterectomy was performed as a last measure to save the life of the mother in severe life-threatening haemorrhage. However, this can be avoided by performing selective uterine devascularisation either by ligation or embolization of pelvic vessels before the placental removal in elective cases. Because of the morbidity associated with peripartum hysterectomy, conservative approach is gaining the popularity.[2,3] Here we present a case of placenta increta which was managed successfully by multidisciplinary approach while conserving uterus and with minimal intra operative blood loss. Uterine devascularisation was done by embolization of anterior division of internal ileac artery in a hybrid operation theatre which was more feasible and time saving.

CASE PRESENTATIONS

Case Report 1

31 years old married woman G2P1L1 at 34 + weeks was referred to emergency department in view of grade 4 placenta previa with antepartum haemorrhage. Her vitals were stable on arrival with minimal brownish discharge per vagina. She had no previous h/o uterine surgeries and was noted to have low lying placenta at 20 weeks of gestation. Obstetric Ultrasound showed type 4 placenta previa, with loss of clear zone and placental lacunae with suspected placenta accreta. Further evaluation done with MRI showed type 4 placenta previa with few areas of invasion of myometrium along anterior aspect s/o placenta accreta with? focal increta (Fig. 1a & b). She was planned for elective caesarean section at 36 weeks 6 days. Caesarean section was performed in a hybrid OT with provision for C arm. USG guided bilateral femoral artery access was obtained followed by sequential cannulation and check angiogram of bilateral internal iliac artery was done using cobra catheter and 6x40 mm balloon, (Fig. 2, 3) prior to obstetric procedure by the interventional cardiology team. Later classical caesarean section with extraction of live baby followed by cord clamping was done. Following which bilateral internal iliac artery transient balloon

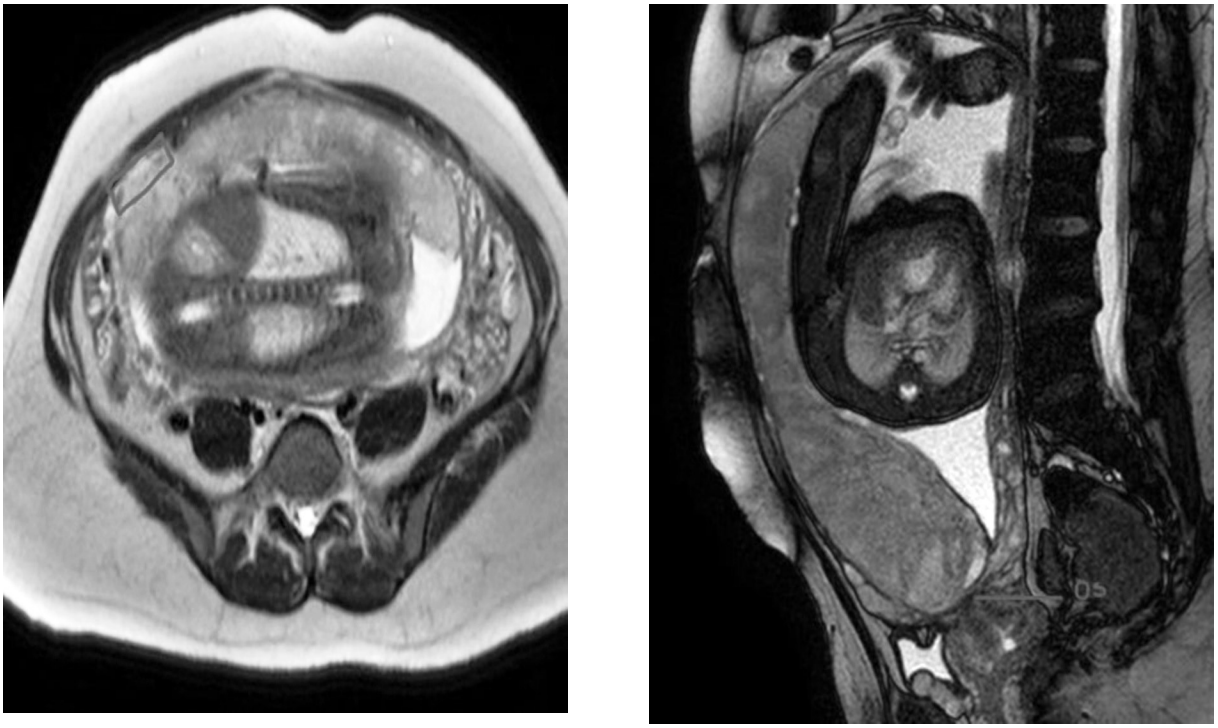

Fig. 1a & b: MRI showing type 4 placenta previa with few areas of in vasion of myometrium along anterior aspects/oplacentaaccreta with? focalincreta

Fig. 2: Arteriogram show in gengorged left internal iliac artery

Fig. 3: Placement of balloon in left internal iliac artery

occlusion was done. (Fig. 4) Subsequent placenta and membranes delivered manually with no active bleed from the placental bed. Uterine closure performed and B/L uterine arteries embolised with gel foam. (Fig. 5) Intra-abdominal drain was put. Patient withstood the procedure well. Total blood loss of 500 ml noted. Pre op Hb was 11gm/dl, 1-pint PRBC transfused intraoperatively, and post op Hb was 10.5gm/dl. Her vitals were stable, and she was shifted to ICU for elective extubation, intra-abdominal drain was minimal, sheath was removed on first postoperative day and patient got discharged after 7 days.

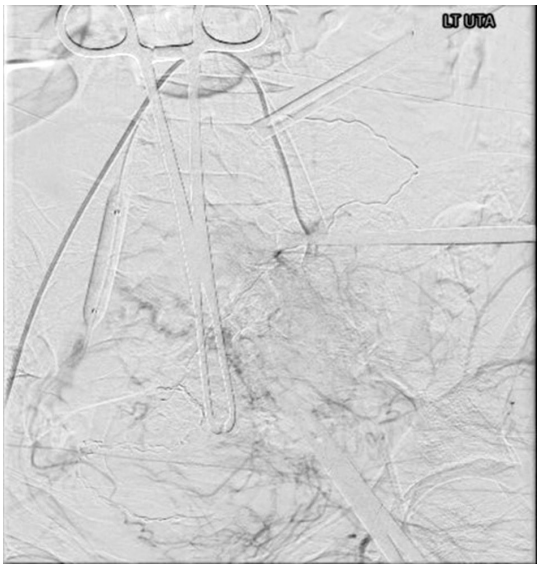

Fig. 4: Post balloon occlusion after delivery of the baby

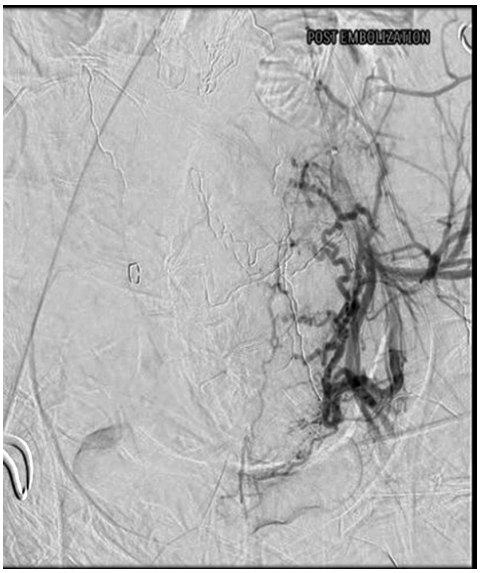

Fig. 5: Post gelfoame mbolization of left internal iliac artery

Case Report 2

36 years old, Elderly G2P1L1 at 33 weeks with previous LSCS with type 4 placenta previa came to our hospital for routine ANC. USG done showed placenta anterior, completely covering the os going posteriorly, and Nitabuchs membrane couldn't be clearly made out, hence she was subjected to higher imaging. MRI done showed type IV placenta previa with possibility of placenta Accreta (increased vascularity at placenta myometrial interface). (Fig. 6) She had no h/o APH and underwent Elective Caesarean section at 37 weeks 3 days

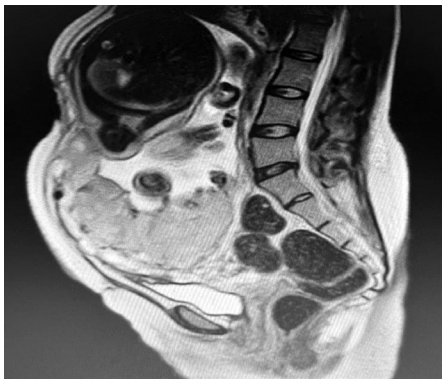

Fig. 6: MRI image of placenta previa with accreta

with transient bilateral internal artery balloon occlusion and bilateral uterine artery embolization with gel foam in hybrid OT and significant devascularization achieved. (Fig. 7-10). Placenta was delivered manually. Post procedure sheath removed. Intra operative blood loss was noted to be 450ml. Preoperative Hb of 12.1 mg/dl and post op Hb of 13.2 mg/dl with post operative 1-pint PRBC transfusion prophylactically. Post operative period was uneventful, and our patient achieved successful outcome, conserving the uterus and without encountering any morbidity during the process, hence was discharged on POD7.

INVESTIGATIONS

2D ultrasonography was the main modality of diagnosis in our cases. Both patients had placenta previa with loss of nitabuch's membrane. Myometrial thickness was reduced with loss of interface between myometrium and bladder. Vascularity between the placenta and myometrium was increased. MRI in the first case showed type 4 placenta previa with few areas of invasion of myometrium along anterior aspect s/o placenta accreta with? focal increta (Fig. 1a & b). MRI in the second case showed type IV placenta previa with possibility of placenta Accreta (increased vascularity at placenta myometrial interface). (Fig. 6). USG is the mainstay of diagnosis as MRI costlier and not easily available in every centre.

MANAGEMENT

Both the patients were admitted and were posted for elective LSCS at around 37 weeks. Section was conducted in hybrid OT with provision of C arm.. USG guided bilateral femoral artery access was obtained followed by sequential cannulation and check angiogram of bilateral internal iliac artery was done using cobra catheter and 6x40mm balloon, (Fig. 2, 3) prior to obstetric procedure by the interventional cardiology team. Later classical caesarean section with extraction of live baby followed by cord clamping was done. Following which bilateral internal iliac artery transient balloon occlusion was done. (Fig. 4) Subsequent placenta and membranes delivered manually with no active bleed from the placental bed. Uterine closure performed and B/L uterine arteries embolised with gel foam. Significant devascularisation was achieved in both the cases. (Fig. 7-10). Both patients were shifted to ICU for elective extubation. post operative recovery was excellent and femoral sheath was removed on next day. Patients were discharged on 7th post op day with healthy mother and healthy baby.

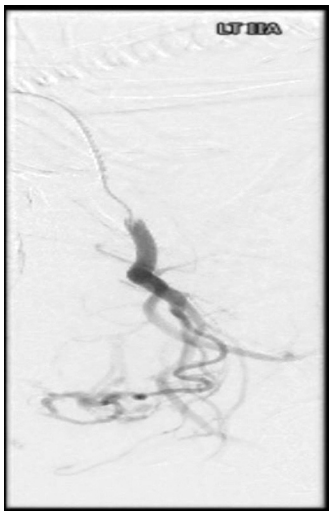

Fig. 7: Arteriogram showing engorged left internal iliac artery

Fig. 8: Placement of balloon in left internal iliac artery

Fig. 9: Post balloon occlusion after delivery of the baby

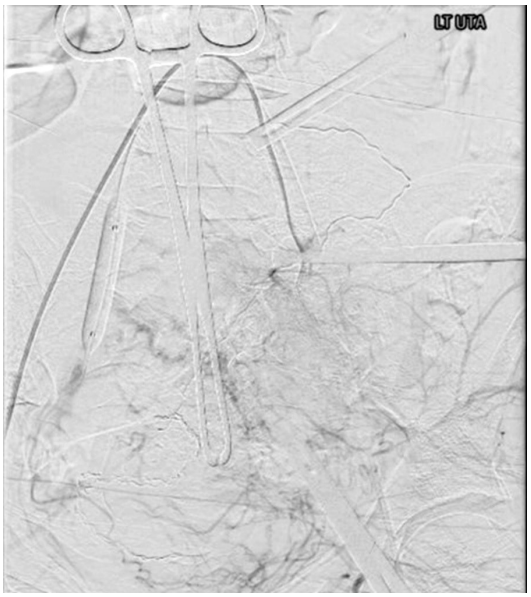

Fig. 10: Post gelfoame mbolization of left internal iliac artery

OUTCOME AND FOLLOW-UP

Post operative outcome was very good. Patients were called for follow up on post operative day 20. It was observed that, on follow up both patients were healthy, with stable vitals and normal examination findings. Quality of life was noted to be good. Baby status was satisfactory.

Second follow up was on post operative day 45. General condition of both the patients was good. Normal involution of the uterus was observed. Babies were healthy and active.

DISCUSSION

Abnormally invasive placenta (AIP) or placenta accreta spectrum (PAS) is classified into three types depending on the level of invasion of trophoblast into the myometrium.

- ***Placenta accreta*** - placenta is simply attached to the myometrium.
- ***Placenta increta*** - placenta invades the myometrium.
- ***Placenta percreta*** - placenta enters serosa and invades adjacent organs.[4]

Placenta accreta spectrum occurs approximately in one out of 7000 pregnancies, of which 75–80% are accreta, 17% are increta and remaining are percreta.[5] Well known risk factors for invasive placenta are history of caesarean or uterine surgery, placenta previa, manual removal of placenta, dilatation and curettage and advanced maternal age.[6] Our patient had no risk factor, she was a young multigravida with previous normal delivery. Incidence has increased remarkably from 1 in 2500 births (1980-1989) to 9 in 1000 births in 2018 due to increased caesarean rates.[7-9]

These are high risk obstetric conditions and can lead to severe obstetric haemorrhage, peripartum hysterectomy, ICU admissions, Disseminated Intravascular Coagulation, maternal and foetal mortality and morbidity. Prediction of PAS and early diagnosis is very much necessary to prevent such complications. Evidence shows that peripartum blood loss and amount of blood product transfusion is considerably lower in planned caesarean when compared to emergency surgeries in these patients.[10]

Diagnosis: Currently the diagnosis of PAS relies on typical sonographic findings such as placental lacunae and loss of retroplacental clear zone.[11] MRI can aid in the diagnosis of level of invasion of placenta, but its use is limited due to cost and availability. Unified descriptors, as suggested by the European Working Group on Abnormally Invasive Placenta (EW-AIP), are helpful for ultrasound (US) findings in AIP.[12]

RAIL SIGN (Fig. 11) defined as two parallel neovascularisation and perpendicular interconnecting bridging vessels between the bladder mucosa and placenta by colour doppler is shown to be having higher sensitivity according to recent studies.[13] A positive rail sign had a significantly higher degree of invasion and adverse clinical outcomes.

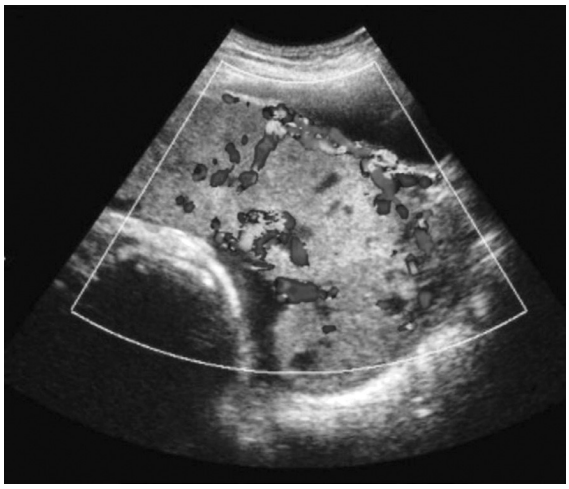

Fig. 11: Rail Sign

MANAGEMENT

Antenatally diagnosed placenta accreta spectrum patients should be admitted at 32 weeks unless patient stays very near to tertiary care. Elective surgery may be planned at 34 weeks of gestation in most of the large centres where availability of facilities to handle neonatal complications at that gestational age and the increased risk of bleeding after 36 weeks. A window of 34 0/7–35 6/7 weeks of gestation is recommended as the preferred gestational age for scheduled surgery in a stable patient.[14,15] Complications include loss of future fertility, haemorrhage, and injury to other pelvic organs. There may be need to peripartum hysterectomy to control the haemorrhage, however this procedure is associated with 40–50% increased risk of severe maternal morbidity. In women with placenta percreta, the mortality rates can be as high as 7%, mainly due to pelvic organs injury and massive haemorrhage. The risks of mortality and severe morbidity increases in cases of placenta percreta managed in emergency, and that's why planned elective procedure is preferable.[16] These complications were curtailed by implication of conservative management in these condition as shown in many clinical studies.[17,18] Our patient was diagnosed to be having placenta accreta in early 3rd trimester. She was admitted at 32 wks and cesarian was terminated electively at 37 weeks.

The conservative options for management of PPH includes uterotonics, external compression with uterine sutures (B-Lynch, Hayman, Cho), intrauterine packing (Bakri balloon), selective devascularization by ligation or embolization of the uterine artery.16,19 In expectant management, the cord is ligated near the placenta leaving the entire placenta in situ, or only the placenta which gets spontaneously separated is evacuated before uterine closure. Data are limited to case series when evaluating expectant management. In the largest clinical case series, 22% (36/167) of patients required hysterectomy after an attempt at expectant management, whereas 78% (131/167) patients did not require hysterectomy. These data are consistent with other smaller case series where hysterectomy was required in 42% (14/33) and 94% (17/18) of patients.[2,3,19]

Legro *et al*. reported a successful nonsurgical treatment of placenta percreta by leaving placenta in situ, and later on used Methotrexate chemotherapy in which the patient was able to carry a normal pregnancy 2 years later. In contrast to this study, Butt *et al*. declared that conservative management with methotrexate chemotherapy is unsuccessful and would result in subsequent hysterectomy because of postpartum bleeding.[20,21]

Pan *et al*. study showed that prophylactic intraoperative uterine artery embolization was most effective and safest procedure in context of reducing blood loss among patients with an invasive placenta. Besides arterial embolization, prophylactic balloon occlusion of the abdominal aorta, common iliac, internal iliac, or uterine arteries has been reported to minimize intraoperative blood loss.[22-24] A retrospective study conducted by Kung Long Huang *et al* concluded that, prophylactic arterial embolization intraoperatively significantly reduced the blood loss arising from the removal of the placenta in patients with an invasive placenta.[25] Our case had a blood loss of 500ml and no intra op organ injury.

Complications associated with arterial embolization are very rare (7%). Severe complications are secondary postpartum haemorrhage and hysterectomy. early minor complications are posting embolic fever, puncture site hematoma, numbness of lower limbs. late complications may be endometritis, amenorrhoea due to endometrial destruction and secondary infertility.[26-28] In our case post operatively, patient was shifted to ward on day 1, with no post op complications.

We performed our surgery in a hybrid operation theatre which had provision for C arm and other equipment for arterial balloon placement and embolization. Average operating time for our case was one and half hours. Studies have shown that such hybrid operation theatres will decrease the operating time and also reduce the chances of sheath displacement, arterial tear that can occur while transporting patients to radiology department for

embolization. However, maintenance of asepsis and space for neonatal care may not be sufficient in hybrid operating theatres.[29,30]

LEARNING POINTS

- In conclusion, management of PAS should be considered clinically very crucial because of unpredictable amount of bleeding, morbidity and mortality.
- In this context, multidisciplinary strategy with hybrid procedure involving classical caesarean section in conjunction with transient internal ileac artery balloon occlusion followed by placental evacuation and uterine artery embolization in hybrid operating room not only reduces amount of bleeding but also more feasible and time saving.
- However, safety and efficacy of hybrid operating room needs to be assessed in further clinical studies.

CONCLUSIONS

Placenta accreta spectrum (PAS) disorders were once upon a time a rare condition, but now the incidence is rising because of increase in primary caesarean rates. Postpartum hemorrhage, if occurs in the back ground of PAS, can be potentially life-threatening. Though peripartum hysterectomy most of the times arrests pelvic hemorrhage, but there are times, when bleeding can be intractable because of vast collateral circulation in the pelvis, warranting additional measures. Peripartum hysterectomy also results in permanent loss of reproductive and menstrual function. The recent advances in pelvic intraventional radiology techniques help to reduce postoperative morbidity and preservation of child bearing function. Evidences are gathering significantly these days, making intraoperative arterial ballon tamponade, followed by gel foam embolization, a safe procedure to reduce bleeding without loss of fertility. We are of the opinion that all pregnancies complicated by PAS disorders should be managed in the tertiary centers with availability of OT theatre with equipments for performing interventional radiological procedures.

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