Efficacy and safety of management of placenta accreta spectrum by transverse uterine fundal incision in a single tertiary care centre: A retrospective study

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ABSTRACT

Background. We assessed the efficacy and safety of management of morbidly adherent placenta by the transfundal uterine incision approach. As a secondary outcome measure, we compared ultrasound and magnetic resonance imaging (MRI) for the diagnosis of adherent placenta.

Methods. We retrospectively analysed the records of 5 years of women with adherent placenta. Twenty-five women with an antenatal diagnosis of placenta increta and percreta operated by transfundal uterine incision were included. Blood loss, transfusion requirements, operative injuries, and maternal and neonatal intensive care unit (ICU) stay were compared among three different types of adherent placenta. Surgical and other outcome measures were also analysed.

Results. On antenatal screening with ultrasound, an accurate diagnosis could be achieved in all cases of increta and two-thirds of percreta. Antenatal diagnosis by MRI detected 93.3% of increta and all percreta cases. The mean (SD) gestation at delivery was 34 (4.9) weeks in accreta, 34.9 (2.7) weeks in increta and 31 (4.8) weeks in percreta patients. The mean blood loss encountered intraoperatively was 1012.5 (193.1) ml, 1566.67 (566.52) ml and 1591.67 (629.61) ml in accreta, increta and percreta patients, respectively. Inadvertent bladder injury occurred in 3 women who had placenta percreta invading the bladder. There was no long-term morbidity and no mortality.

Conclusion. Transfundal incision for delivery of baby is associated with the advantage of avoiding the placenta thereby minimizing blood loss.

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INTRODUCTION

Placenta accreta spectrum (PAS) is characterized by abnormal placental invasion and is a major cause of considerable maternal morbidity and mortality.[1] The risk factors include previous caesarean section or other surgical procedures on the uterus such as myomectomy and curettage, advanced maternal age and in particular, placenta previa.[2] With a worldwide increase in number of caesarean sections, the prevalence and incidence of PAS disorders is increasing.[3] Wherever possible PAS disorders should be diagnosed in the antenatal period as this helps in timely referral and management at a tertiary level hospital with availability of multidisciplinary team and resources such as blood bank with facility for massive transfusion. Due to the risk of major maternal haemorrhage with attempts to remove the placenta, the most accepted approach to adherent placenta is caesarean hysterectomy without interfering with the placenta.[4–6] Various methods have been described to minimize blood loss during surgery in PAS disorders including intervention radiology for embolization of uterine or internal iliac arteries, ligation of hypogastric artery, retrograde hysterectomy[7] and pelvic pressure packing.[8]

We studied the efficacy and safety of the transfundal incision technique in adherent placenta, which is likely to be associated with lower operative blood loss and practically no foetal blood loss. We present the retrospective data of 25 women with an antenatal diagnosis of placenta increta or percreta managed by transfundal uterine incision for delivery of the baby.

METHODS

The study was approved by the Institute Ethics Committee. Patients with an antenatal diagnosis of placenta increta or percreta variety of adherent placenta operated using transfundal incision for delivery of the baby over the past 5 years (January 2014 to December 2019) in a single unit were included. Records of all patients with a diagnosis of PAS were reviewed and those of women operated by the transfundal incision technique were used to extract detailed information. Transfundal incision is an incision made along the fundus of the uterus avoiding the placenta in an anterior PAS disorder. All women operated by transfundal incision had either an ultrasound or MRI diagnosis of placenta increta or percreta. All antenatal, peroperative findings and postoperative management were noted, which included blood loss, ultrasound and MRI findings, maternal intensive care unit (ICU) stay and need for ventilatory support,

number of units of blood and blood products transfused, any unexpected additional surgical procedures (including repair of other organs), length of hospital stay and neonatal outcomes. Comparison of outcome measures was also done based on type of PAS disorder and position of placenta (anterior/posterior). Neonatal outcomes noted were gestational age at delivery, Apgar score and length of neonatal ICU stay.

Statistical analysis

Data analysis was done using STATA version 14.0. Continuous variables were tested for normality assumptions using appropriate statistical tests. Since the sample size was small, median and interquartile range (IQR) were calculated. Comparison of median values between subgroups was done using non-parametric Mann–Whitney U test/Kruskal–Wallis test as appropriate. Qualitative data were expressed as frequency and percentage. Comparison of categorical data between the groups was done using chi-square/Fisher exact test as appropriate. For all statistical tests a 2-sided probability of $p<0.05$ was taken as statistically significant.

RESULTS

Our study included 25 women with a median age of 29 years with pregnancy complicated by morbidly adherent placenta. On antenatal screening with ultrasound an accurate diagnosis could be achieved in all cases of increta and two-thirds of percreta whereas all cases of accreta were misdiagnosed as placenta increta with a measurement of agreement across the categories of placentae of 0.476 (kappa), which was statistically significant ($p<0.001$). Antenatal diagnosis by MRI correctly detected 14 of 15 (93.3%) of increta and all percreta cases, whereas all the accreta cases were diagnosed as cases of placenta increta with a measurement of agreement of 0.601, which was statistically significant ($p<0.001$). On comparison between the two imaging modalities in identifying morbidly adherent placenta, clinically significant correlation was noted with measurement of agreement of 0.658 ($p<0.001$; Table I).

The mean (SD) period of gestation at admission of these

patients was 31.2 (4.0) weeks. Three of 25 (12%) women were delivered before 29 weeks of gestation of which 2 were cases of placenta percreta and 1 of placenta accreta. Another 5 women were delivered between 29 and 32 weeks, of which 3 had placenta increta and 2 had placenta percreta. The remaining 17 women were delivered after 32 weeks of gestation of which 70.6% had increta, 17.6% had accreta and 11.8% had placenta percreta.

Emergency delivery was required in all the patients because of either antepartum haemorrhage or preterm labour (Table II). Intraoperatively, 16% of patients were identified to have placenta accreta, 60% placenta increta and 24% placenta percreta (Fig. 1). This was confirmed on histopathological examination.

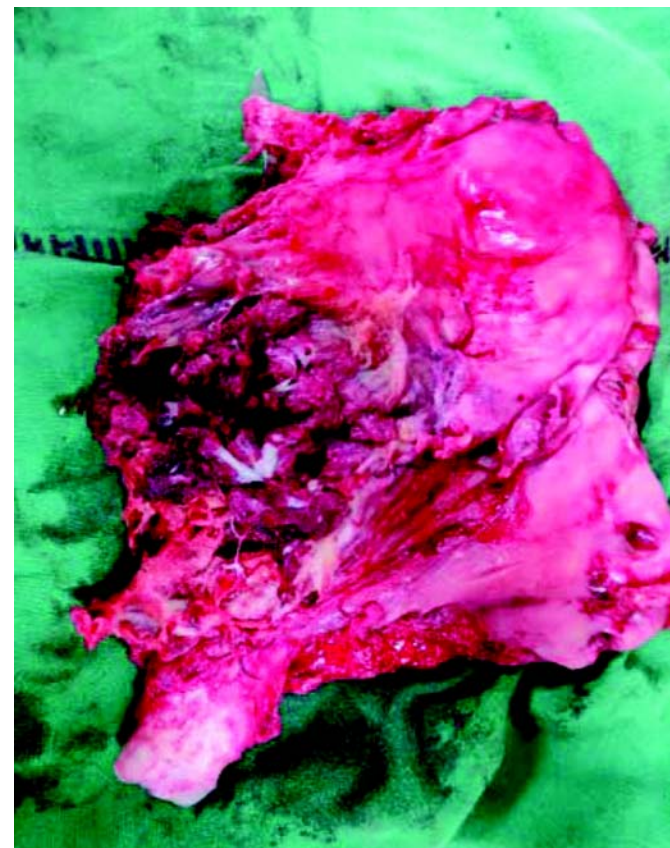Bleeding was maximum during bladder dissection in 18 of 25

FIG 1. Specimen of the uterus and cervix with placenta percreta seen invading the uterine serosa

TABLE I. Accuracy in assessment of type of adherent placenta by various imaging modalities

Intraoperative finding	Ultrasound finding		MRI finding	
	Increta	Percreta	Increta	Percreta
Placenta accreta (n=4)	4 (100)	0	4 (100)	0
Placenta increta (n=15)	15 (100)	0	14 (93.3)	1 (6.7)
Placenta percreta (n=6)	2 (33.3)	4 (66.7)	0	6 (100)

TABLE II. Intraoperative and postoperative variables in the three groups of placentae

Variable	Placenta accreta	Placenta increta	Placenta percreta	p value
Incision to delivery time (minutes)	3.32 (0.15)	3.51 (0.37)	3.48 (0.34)	0.63
Blood loss (ml)	1012.50 (193.11)	1566.67 (566.52)	1591.67 (629.61)	0.19
Packed red blood cell transfusion (units)	2.25 (0.95)	2.67 (1.2)	2.83 (1.1)	0.74
Platelet (units)	1.25 (1.5)	1.87 (1.7)	2.83 (1.1)	0.29
Fresh frozen plasma (units)	2.0 (2.3)	1.53 (1.5)	3.17 (1.7)	0.18
Duration of surgery (minutes)	102.50 (12.58)	164.00 (47.63)	153.33 (73.12)	0.13
Postoperative ICU stay (days)	0.75 (0.95)	1.20 (1.42)	2.67 (1.21)	0.05
Period of gestation at delivery (weeks)	34 (4.96)	34.93 (2.76)	31 (4.85)	0.11
Postoperative hospital stay (days)	11 (5.29)	8.93 (5.40)	17.50 (9.24)	0.04
Baby weight (g)	2064.00 (883.70)	2241.53 (450.29)	1511.00 (848.39)	0.08
Neonatal ICU stay (weeks)	7.50 (7.14)	5.07 (7.61)	11.00 (14.39)	0.45

ICU intensive care unit

patients (72%) and from the placental site in the remaining. All women had minimal bleeding during uterine incision for delivery of the baby, as placenta was avoided by the transfundal incision even in anterior placentation (84%).

The mean (SD) blood loss encountered intraoperatively was 1012.5 (193.1) ml, 1566.67 (566.52) ml and 1591.67 (629.61) ml in accreta, increta and percreta cases, respectively. However, on comparison between the three groups no statistically significant difference in blood loss was noted (p=0.193).

In terms of blood product transfusions, mean packed red blood cell (PRBC), platelet and fresh frozen plasma (FFP) transfusions in accreta cases were 2.25 (0.95), 1.25 (1.5) and 2.0 (2.3), respectively. The mean (SD) PRBC, platelet and FFP transfusion rates in increta cases were 2.67 (1.2), 1.87 (1.7) and 1.53 (1.5), respectively, while slightly higher transfusion rates of 2.83 (1.1) PRBCs, 2.83 (1.1) platelets and 3.17 (1.7) FFPs occurred in percreta cases. However, there was no statistically significant difference in transfusion rates of the groups (p>0.05).

The mean (SD) birth weight was 2064 (883.7) g in women with accreta, 2241 (450.2) g in increta and 1511 (848.3) g in percreta cases. The mean (SD) Apgar scores at 1 minute of birth were 5.5 (4.1) in accreta cases, 7.2 (1.7) in increta cases and 4.5 (2.8) in percreta cases. The median Apgar score at the end of 1 minute was 7 (IQR 4) whereas median Apgar score recorded at 5 minutes was 8 (IQR 2). On comparison between groups of placentae, Apgar scores at the end of 5 minutes showed a statistically significant decrease in cases of placenta percreta when compared to increta and accreta cases. The mean (SD) duration of stay in the neonatal intensive care unit (NICU) in the three categories was 7.5 (7.1) weeks in accreta cases, 5.07 (7.6) weeks in increta and 11 (14.3) weeks in percreta cases.

The mean (SD) duration of stay of the mother in the ICU in accreta cases was 0.75 (0.9) weeks, 1.2 (1.4) weeks in increta cases and 2.67 (1.2) weeks in percreta cases. Eight women did not require to be in the ICU—3 had accreta and 5 increta. Correlating between the categories of placentae and their influence on duration of ICU stay there was a statistically significant increase in duration of ICU stay in placenta accreta, increta and percreta cases in ascending order. Of the 25 women included in our study, uterine preservation was possible in 3 women who were diagnosed to have placenta accreta intraoperatively. All these women had anterior placenta accreta. In one of these, placenta was removed in bits and the placental bed was sutured with haemostatic box sutures followed by uterine packing with roller gauze for 24 hours. Two of these women had partial myometrial excision followed by haemostatic sutures and uterine packing for tamponade for 24 hours. The average blood loss was around 1 litre in all the cases and postoperative course after 24 hours of surgery was uneventful.

In terms of complications and injury to adjacent viscera, the bladder was opened inadvertently in 3 women with placenta percreta invading into the bladder. Placental tissues were removed as much as possible from the bladder followed by repair of the bladder rent. Indwelling Foley's catheter was kept for 14 days in all the 3 women after repair of bladder injury. There was no long-term morbidity or mortality in any of the patients.

DISCUSSION

Morbidly adherent placenta is associated with major maternal morbidity due to blood loss from massive postpartum haemorrhage (PPH), multiple transfusion of blood and blood products, coagulopathy, sepsis and multi-organ failure.[9]

Therefore, antenatal diagnosis is useful because outcomes are better when delivery occurs at a level III or IV maternal care facility before the onset of labour or bleeding. Surgeries for PAS disorders are also associated with additional surgical complications such as injuries to urinary bladder and ureters leading to fistulae or incontinence.[9,10]

A retrospective study on histopathological examination of hysterectomy specimen of women with PAS disorders stated that of total 18 peripartum hysterectomy specimens, 10 (55.5%) had placenta accreta, 7 (38.3%) had placenta increta and 1 (5.5%) had placenta percreta.[11] In our study, 16% of patients were identified to have placenta accreta, 60% placenta increta and 24% placenta percreta with findings confirmed on histopathological examination. The percentages in our study do not depict the actual incidence as we took patients with an antenatal diagnosis of placenta increta and percreta only in our study. A systematic review by D'Antonio *et al.* of 23 ultrasound studies including 3707 pregnancies at risk of placenta accreta found that when performed by a skilled operator, ultrasound had a sensitivity of 90.7% and a specificity of 97% in detection of placenta accreta, and of all the ultrasound features, use of colour Doppler had the best sensitivity.[12] Another study by Riteau *et al.* found ultrasound to be 100% and MRI to be 76.9% sensitive in the diagnosis of placenta accreta (p=0.03). They found a higher specificity of 50% with MRI and 37.5% with ultrasound, which was not statistically significant (p=0.6). They also found ultrasound and MRI to be concordant in 28 of 41 cases (68.3%).[13] We found ultrasound and MRI to be comparable in identifying varying degree of adherent placenta with clinically significant correlation.

The Green-top guidelines by the Royal College of Obstetricians and Gynaecologists (RCOG) state that MRI and ultrasound have similar diagnostic accuracy in detecting PAS when done by experts. MRI may be a useful complementary imaging technique to assess the depth of invasion and lateral extension of myometrial invasion, especially with posterior placentation.[14]

A retrospective study by Wang *et al*. was conducted in 180 women, of these 54 (30%) were delivered by urgent caesarean delivery and 126 (70%) by elective caesarean section.[15] A planned delivery at 35+0 to 36+6 weeks of gestation provides the best balance between foetal maturity and the risk of unscheduled delivery, provided there are no risk factors for preterm delivery.[14]

Elective surgery is associated with slightly better outcomes that may be due to proper preparedness.[16] In our retrospective study, emergency termination was required in all the patients in view of either antepartum haemorrhage or preterm labour.

In a review by Clausen *et al.* including 119 women with placenta percreta, 66 women (58%) were managed by caesarean hysterectomy, in 36 women placentae were left *in situ* and of these 58% needed hysterectomy later due to excessive bleeding. The uterus was conserved in 26.8% of women.[17] In our study, uterine conservation was possible in 3 (12%) of 25 women all of whom were diagnosed as placenta accreta intraoperatively.

Different techniques have been described to minimize blood loss during caesarean section and/or hysterectomy for invasive placenta. Saha *et al*.[18] did a prospective study on 12 women who underwent caesarean hysterectomy by a technique likely to result in lesser blood loss. Dissection of bladder flap was done prior to uterine incision and delivery of the baby. Blood vessels crossing between the uterus and bladder during dissection

were ligated and divided. Time interval from induction of anaesthesia to delivery of the baby ranged from 40 to 79 minutes, no woman had bladder or ureteric injury. The average blood loss was 1.46 L and the mean number of blood transfusions was 2.1 units with none requiring admission to ICU.[18]

A 9-year retrospective study included 14 women, 12 of whom underwent uterine artery embolization (UAE) immediately after caesarean section. UAE was done prophylactically in 7 cases while 5 cases had PPH, which was managed by UAE. UAE was successful in 3 women while 2 required a hysterectomy due to failed UAE. One woman had uterine necrosis at 6 weeks after UAE and required a hysterectomy. The authors concluded that conducting the surgical procedure in the cardiac catheterization laboratory has the advantages of reduced stress and risks associated with transfer of women with potentially unstable vitals to another area.[19] There are three case reports of delivery of the baby by the transfundal incision in morbidly adherent placenta and all reported lesser blood loss and easier surgery with this technique.[20,21] This technique helps to decrease an inadvertent incision into the placenta, which can lead to torrential maternal and foetal bleeding. Prophylactic common iliac artery balloon occlusion was also done with transfundal uterine incision in 1 woman.[21] We used the transfundal incision for delivery of the baby in all the patients. Maximum bleeding was noted during the bladder dissection in 18 of 25 patients (72%) and from the placental site in the remaining. Even with an anterior placentation, placenta was avoided by the transfundal incision and all the women had minimal bleeding during uterine incision for delivery of the baby.

A 15-year review of peripartum hysterectomy reported that the procedure was associated with a maternal mortality rate of 12.5% and urinary tract injury rate of 7.5%.[22] There was no maternal mortality in our study and urinary tract injury occurred in 3 of the 25 women in whom placenta was invading the bladder. Successful repair of the bladder rent was done in all 3 patients with no residual complications.

Conclusion

Transfundal incision for delivery of the baby in PAS disorders avoids the placenta, which in turn may be associated with lesser blood loss. Another benefit is lower risk of injury to the bladder by extension of the incision, which can happen with a vertical classical incision. In situations where immediate delivery of the baby is indicated, transfundal incision may be beneficial as this area is usually free of adhesions and the baby can be delivered immediately after the peritoneal cavity is entered.

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