

Morbidly Adherent Placenta: A Critical Review

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Abstract

Objective To evaluate the demographic profile, high risk factors, fetomaternal outcome and management options in morbidly adherent placenta (MAP).

Study Design Retrospective analysis.

Methodology Review of 20 case records of women with MAP during year 2001–2006.

Results The mean age and parity of the women was 27.7 ± 4.2 years and 2.5 respectively. 70 % women had previous uterine scar, and similar number had placenta previa. 60 % women presented with antepartum hemorrhage and 20 % with retained placenta. 85 % women underwent hysterectomy with 5 % requiring internal iliac artery ligation, another 5 % partial cystectomy and 15 %

bladder repair. Blood loss was between one and nine litres requiring an average of six units whole blood and 4 units FFP. There were six (30 %) maternal deaths. 55 % of the newborns were preterm and the perinatal mortality was 33.3 %.

Conclusion Cesarean section and placenta previa are significant risk factors. MAP is associated with high fetomaternal morbidity and mortality.

Keywords Morbidly adherent placenta · Placenta accreta · Placenta increta · Placenta percreta · Internal iliac artery ligation

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Introduction

The incidence of placenta accreta has increased dramatically over the last three decades, in concert with the increase in caesarean delivery rate. At present, the incidence of placenta accreta is 1 per 2,500 deliveries and it occurs when there is a defect in decidua basalis, resulting in abnormally invasive placentation of the placenta [1]. Prior uterine surgery, myomectomy and curettage, in addition to caesarean section have all been associated with abnormal placentation, but more ominously, placenta previa has been associated with a high rate of placenta accreta [2].

The maternal mortality risk may reach 7 % and the extensive surgery related morbidities include massive

transfusions, infections, urologic injuries and fistula formation [3]. Optimal management of women with placenta accreta involves early recognition of high risk women based on clinical risk factors, accurate preoperative diagnosis, detailed maternal counselling and meticulous planning at the time of delivery.

The purpose of this study is to evaluate the demographic profile, high risk factors, maternofetal outcome and management options in women of morbidly adherent placenta (MAP) at our centre.

Materials and Methods

We performed a retrospective analysis of women of MAP from October 2001 through September 2006 in our institution, which is a tertiary hospital.

MAP was defined clinically or histopathologically by one of the following:

- Heavy bleeding from implantation site after forced/piecemeal removal of placenta at caesarean section
- Manual removal of placenta (MRP) partially or totally impossible; no cleavage plane between placenta and uterus
- Histopathological confirmation on a hysterectomy specimen

The medical records of all the women who were diagnosed to have MAP were reviewed. Demographic data including age, parity, gestational age and previous caesarean delivery or other uterine surgery, details of medical and obstetric history and information on the intraoperative and postoperative events were recorded. In particular, from the surgery report we obtained data on placental location, estimated blood loss, blood transfusion, presence of placenta accreta, procedures needed to control bleeding. Neonatal outcomes were reviewed for birth weights, nursery admission, nursery stay and perinatal mortality. The term placenta accreta has been used where placenta was attached directly to the uterine wall with no myometrial invasion, placenta increta is used where placenta was seen invading the myometrium and percreta specifies placental invasion up to or beyond uterine serosa.

Results

Twenty women met the diagnostic criteria of MAP and the total number of deliveries during the study period was 53,994 making the incidence of MAP, 0.04 % (1 per 2,699 deliveries) over the 5 year study period. The incidence of MAP increased from 0.01 % in the year 2001 to 0.05 % in 2006 (Fig. 1). 50 % of the women of adherent placenta

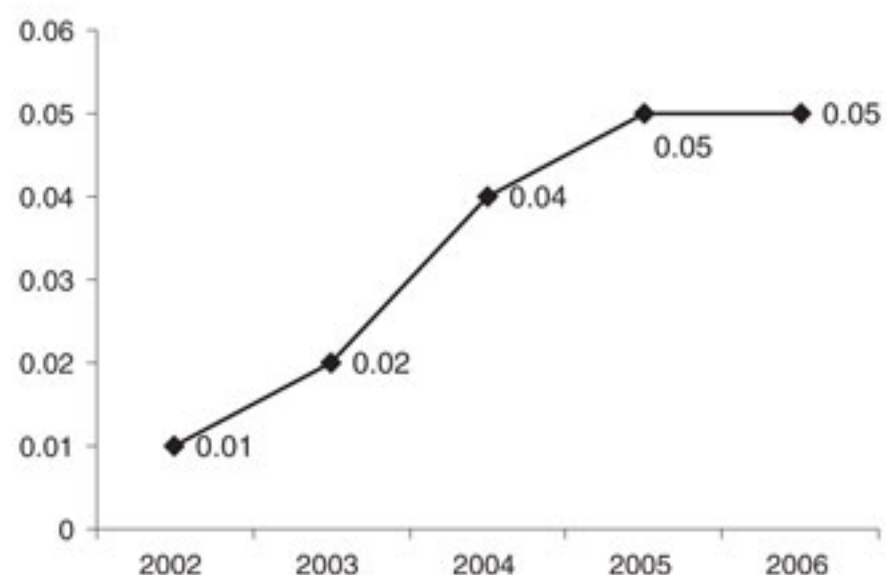


Fig. 1 Yearly incidence of morbidly adherent placenta per 100 deliveries (2002–2006)

Table 1 Demographic characteristics ($n = 20$)

Mean age (year)	27.7 ± 4.2
≥ 35 years	15.0 %
Mean parity	2.5 ± 0.9
Grand multiparity	0.0
Booked women	20.0 %
Previous CS	65.0 %
Previous 2 CS	5.0 %
Previous CS + h/o curettage	20.0 %
Only curettage	0.0 %
Placenta previa	70.0 %
No risk factors	10.0 %

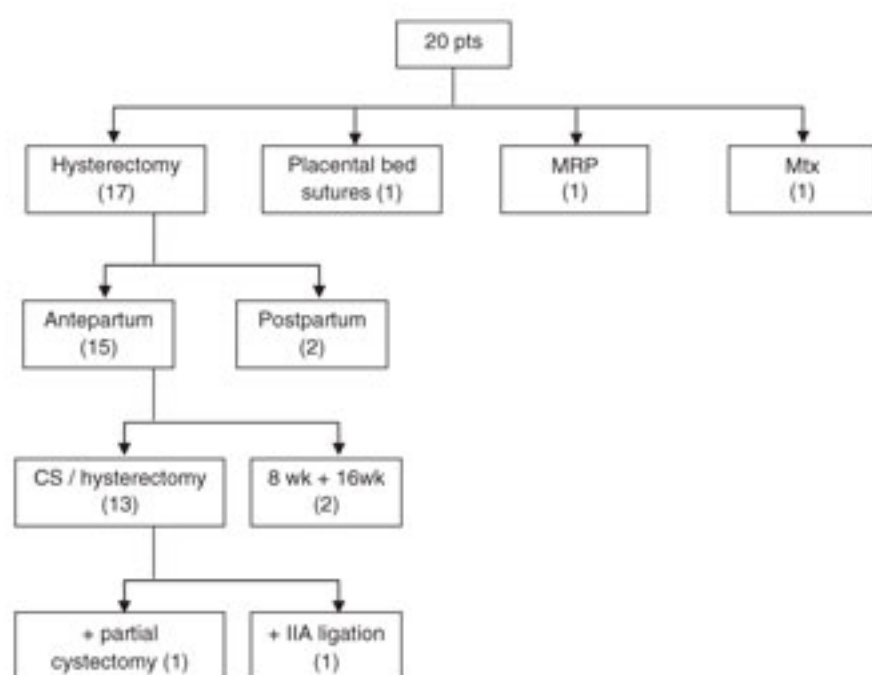
were accreta, 30 % women were increta while percreta accounted for 20 % of the women.

The mean age of the women was 27.7 ± 4.2 years with three women (15 %) having age more than 35 years. The mean parity was 2.5 ± 0.9 . One woman was primigravida, while none of the women was grandmultiparous. Only 20 % of the women were booked with our institution. Fourteen (70 %) women had previous caesarean section scar, four (20 %) women had undergone prior curettage, but they all had history of caesarean section also. Placenta previa was associated in 14 (70 %) women. Two (10 %) women had no known risk factors (Table 1).

Sixteen of the 20 women (80 %) presented antenatally, four women (20 %) presented postdelivery with retained placenta. Twelve women (60 %) presented with antepartum hemorrhage, two women (10 %) had asymptomatic placenta previa at term. One woman (5 %) presented with shock at 8 weeks gestation. She was taken up for laparotomy for suspected ruptured ectopic pregnancy, but peroperatively, placental tissue was seen invading the serosa involving the previous scar of caesarean section and histopathology of the hysterectomy specimen confirmed placenta increta. One woman (5 %) presented with massive hemorrhage at 16 weeks (Table 2).

Table 2 Woman profile

Presentation	Gestational age	Number (n)
Placenta previa	28 weeks-term	14 (70 %)
Symptomatic	–	12 (60 %)
Asymptomatic	–	2 (10 %)
Shock (? ectopic)	8 weeks	1 (5 %)
Threatened abortion	16 weeks	1 (5 %)
Retained placenta	Post delivery	4 (20 %)

**Fig. 2** Flow chart depicting therapeutic interventions

A provisional diagnosis of placenta accreta was made preoperatively on ultrasonography (USG) in seven women (35 %), with confirmation by MRI in one woman; rest all had a peroperative diagnosis. Only three women were taken up for surgery electively, all others were operated on an emergency basis.

Figure 2 summarises the therapeutic modalities which the women underwent. Seventeen of the 20 women (85 %) underwent hysterectomy, with additional bilateral internal iliac artery (IIA) ligation in one woman in view of uncontrolled bleeding despite hysterectomy and another woman required partial cystectomy due to bladder involvement. Classical cesarean section followed by total abdominal hysterectomy with placenta in situ was done in one woman (5 %) who had a preoperative diagnosis of placenta accreta (Fig. 3). Medical management with methotrexate was given to one woman (5 %), who presented post delivery day 21 with bleeding pervaginum. USG with Doppler showed retention of complete placenta with evidence of placenta increta. She was given Inj. Methotrexate 1 mg/kg intramuscularly and was closely followed up with serial sonography and β -hCG. Two more doses of Inj. Methotrexate had to be repeated at weekly intervals in view of persistently increased vascularity on Doppler. Prophylactic antibiotics were given. The woman

**Fig. 3** Specimen of the woman who underwent classical caesarean hysterectomy. Dotted arrow showing the uterine incision in the upper segment and solid arrow showing placenta invading through the entire uterine wall visible through the serosa

was discharged after 3 weeks with the residual placenta still in situ. Serial ultrasound scan showed progressive degeneration of placenta and the woman continued to pass small pieces of placental tissue and blood for few weeks. Three months later she resumed normal menses and vaginal USG showed an empty uterine cavity.

Massive blood loss was the prominent feature in all the women with a mean blood loss of 2.7 l. An average of 6 units of whole blood (range 2–9) and four units of fresh frozen plasma (FFP) (range 2–021) were transfused. Bladder was injured during dissection in three women (15 %) and partial cystectomy was done in one woman (5 %) due to bladder involvement by percreta. 50 % of the women had to be shifted to ICU with an average stay of 2.6 days. The maternal death rate is 30 % in our study (Table 3).

Detailed analysis of the maternal mortality data highlights that 83 % of these had presented in an exsanguinated state with an Hb of ≤ 5 g% associated with DIC and were operated during emergency hours requiring massive blood transfusion. An average of nine units of whole blood and seven units of FFPs were transfused to these women. Only one woman was operated electively with an ultrasound showing central placenta previa with doubtful placental-myometrial interface. Elective LSCS was planned at 37 weeks, during the surgery she developed torrential

hemorrhage, went into DIC and despite hysterectomy and massive blood transfusion could not be saved (Table 4).

Table 5 describes the neonatal outcome. The principal newborn complication was prematurity and the average gestational age in our study was 35.2 weeks. 55 % of the newborns were preterm with an average birth weight of 2.25 kg. The perinatal mortality was 33.3 %.

Discussion

The overall incidence of placenta accreta over the 5 year study period is 0.04 % i.e. 1 in 2,699 deliveries showing an increasing trend. The incidence of placenta accreta in the literature varies between 0.001 and 0.9 % of deliveries; a rate that depends on the definition adopted for accreta (clinical or histopathological diagnosis) and the population studied, and has increased dramatically over the last three decades parallel to the increase in cesarean delivery rate [4]. Collectively termed 'Placenta accreta', three variants of the condition are recognised. Accreta is the most

common form accounting for approximately 75–78 % of the women, increta accounts for about 17 % of the women, while percreta comprises about 5–7 % of all women [5].

Placenta previa and previous caesarean section are the two most significant risk factors in our study each associated with 70 % of the women. Literature also refers these as the most important risk factors. Miller et al. reported a risk of 14 % in women of placenta previa with previous caesarean section, the risk increasing with the number of previous caesarean sections [6, 7]. History of curettage and grand multiparity are also quoted in literature as other important risk factors [8, 9].

The earliest gestation at which placenta accreta was encountered in our study is 8 weeks which was a caesarean scar pregnancy. There are reports of women when woman was taken up for dilatation and curettage, developed torrential hemorrhage necessitating hysterectomy and pathologic examination later revealed MAP [10]. According to literature the earliest gestation at which placenta accreta has been diagnosed by ultrasound is 9 weeks in a case of scar pregnancy. The woman continued pregnancy and underwent emergency cesarean hysterectomy at 37 weeks because of placenta increta [11].

Currently the management options for MAP include conservative and extirpative approaches [12]. The conservative strategy entails leaving the placenta in situ which may be followed by medical management with methotrexate, uterine artery embolization, internal iliac artery

Table 3 Maternal outcome

Operative morbidity	
Average blood loss	2.7 l (1–9)
Average transfusion	
Blood	6 units (2–19)
FFP	4 units (2–21)
Bladder injury	3 (15 %)
Partial cystectomy	1 (5 %)
ICU transfer	50.0 %
Average ICU stay	2.6 days (2 h–13 days)
Maternal death	30.0 %

Table 5 Neonatal outcome ($n = 18$)

Gestational age (weeks)	35.2 ± 2.7
Preterm	55.5 %
Mean birth weight (kg)	2.2 ± 0.6
Perinatal mortality	33.3 %

Table 4 Maternal mortality data

POG (weeks)	Preop Hb (g%)	Preop diagnosis	Elective/emergency	Surgery	Blood loss (l)	Postop complications	BT	ICU stay
34	3	–	Emergency	CS hysterectomy	2	–	5 WB	5 h
Post-partum	3	–	Emergency	MRP f/b hysterectomy	2.7	DIC	9 WB 12 FFP	9 h
31	2.5	–	Emergency	CS hysterectomy	3.5	DIC + sepsis	7 WB	2 days
37	9	+	Elective	CS hysterectomy	5.5	DIC	6 WB 5 FFP	1 h
32	5	–	Emergency	CS hysterectomy with partial cystectomy	4.5	DIC	19 WB 21 FFP	12 days
37	2.3	–	Emergency	CS hysterectomy	2	DIC	8 WB 4 FFP	6 h

POG period of gestation, CS cesarean section, MRP manual removal of placenta, DIC disseminated intravascular coagulopathy, BT blood transfusion, WB whole blood, FFP fresh frozen plasma

ligation/embolization, dilatation and curettage or hysteroscopic loop resection [13, 14]. However, risk of sepsis and delayed hemorrhage is also incurred. The extirpative approach consists of immediate cesarean hysterectomy, avoiding placental removal during operation. Nonetheless extirpative management is associated with significant risk of catastrophic bleeding from abundant neovascularization and rich collaterals beyond the efficacy of hemostasis available using current surgical techniques.

Medical management with methotrexate was given to one post-partum woman in the present study. Methotrexate, a folate antagonist, acts primarily against rapidly dividing cells and therefore is effective against proliferating trophoblasts. However, more recently, others have argued that, after delivery of the fetus, the placenta is no longer dividing and therefore, methotrexate is of no value. Methotrexate has been used in varying doses and routes, however, there are no randomized trials and no standard protocol regarding its dosage [15].

The woman morbidity in our study is primarily related to extensive surgery and includes massive blood transfusion, infections and urologic injury. Women with MAP had a high incidence of bleeding complications with an average blood loss of 2.7 l and as high as 19 U of blood and 21 U of FFPs were transfused.

Maternal mortality in our study is 30 %, which is quite high as compared to the rate of 7–10 % as quoted in literature. This may be because most of the women in our study were unbooked and had presented to us in a very poor general condition, there were no previous scans done and they had to be opened up on an emergency basis and the diagnosis of adherent placenta was made only peroperatively. Out of seven women in whom preoperative diagnosis could be made, one woman (14.2 %) expired whereas amongst 13 women in whom it was not suspected, five (38.4 %) women died (Fig. 4). This is a significant

finding emphasising the role of high index of suspicion in women with known risk factors and a meticulous USG examination for accurate preoperative diagnosis. The mortality of the woman with a preoperative diagnosis of MAP was preventable and classical caesarean section without separating the placenta could have saved the woman.

To conclude, incidence of placenta accreta is increasing and previous caesarean section and placenta previa are important risk factors, so there is a need to keep the primary caesarean section rates down. Early preoperative diagnosis in the suspected women is the key to save the woman's life. Adherent placenta should be suspected even in first trimester in women with known high risk factors who are undergoing MTP or suction evacuation.

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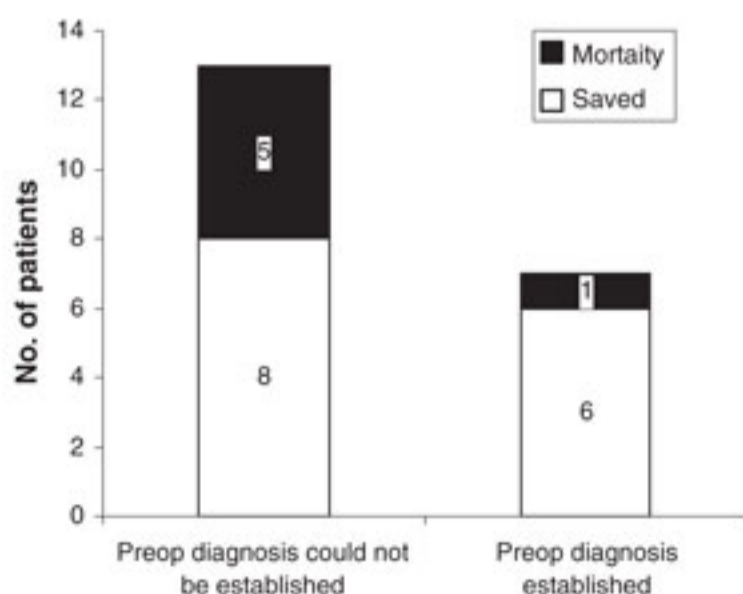


Fig. 4 Distribution of mortality in relation to preoperative diagnosis