

Management of morbidly adherent placenta

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Abstract

Morbidly adherent placenta is a rare complication of human placentation that may threaten maternal life due to massive haemorrhage. Its incidence is increasing due to the rising caesarean section rates worldwide. A high degree of clinical suspicion coupled with ultrasonography, magnetic resonance imaging, and cystoscopy helps in antenatal diagnosis. Elective caesarean hysterectomy with a multidisciplinary approach is the conventional treatment for confirmed cases of morbidly adherent placenta. However more conservative fertility saving approaches are also used successfully.

Introduction

Morbidly adherent placenta (MAP) occurs when there is a defect in the decidua basalis, resulting in an abnormal invasion of the placenta into the substance of the uterus. As a result, there is no clear plane of cleavage between the placenta and the underlying uterus. Depending on the extent of adherence and invasion of the placenta the condition is classified as placenta accreta (reaching the myometrium), placenta increta (into the myometrium) and placenta percreta (right through the myometrium to breach the serosa or beyond)¹. In the literature the term "placenta accreta" is often used interchangeably as a general term to describe all three conditions. Morbidly adherent placenta is thought to be due to an absence or deficiency of Nitabush's layer or the spongiosus layer of the decidua. Benirschke et al suggested this to happen as a consequence of failure of reconstitution of the decidua basalis after repair of caesarean incision, thus resulting in absence of intervening decidual tissue between the invading trophoblast and the myometrium². It has been proposed that the abnormality of the placental uterine interface leads to leakage of fetal alpha-fetoproteins into the maternal circulation resulting in elevated levels of maternal serum alpha-fetoproteins^{3,4}.

The incidence of MAP has increased 10-fold in the past 50 years and now occurs with a frequency of 1 per 2500 deliveries⁵. The incidence varies from 1:540 in Thailand to 1:93,000 in the United States. The high incidence reported in Thailand may be related to the increase prevalence of trophoblastic disease in Asia⁶. It has been suggested that the rarest form, placenta percreta, represent 5-7% of all abnormal placentations⁷. About 75% of placenta percreta are associated with placenta praevia. Approximately 25% of women with placenta praevia and one previous caesarean delivery have a MAP, whereas almost 50% with placenta praevia and two prior caesarean deliveries have a MAP⁸.

Morbidly adherent placenta may lead to massive obstetric haemorrhage resulting in complications such as disseminated intravascular coagulopathy, need for hysterectomy, surgical injury to urinary tract and other viscera, adult respiratory distress syndrome, renal failure and even death^{9,10}. Placenta percreta is associated with a maternal mortality as high as 10% and significant maternal morbidity¹¹. Most cases of MAP are detected at the time of caesarean section. Other presentations are acute abdomen and shock from ruptured uterus, antepartum haemorrhage, haematuria if the bladder is involved and as a complication of the third stage of labour¹². Presentation in second-trimester is rare. Most case reports indicate that the mid-trimester presentation of MAP could be in the form of uncontrollable vaginal bleeding or uterine rupture, causing intraperitoneal bleeding. Some are detected only following second trimester miscarriage or evacuation of retained products of conception¹³.

Involvement of the urinary bladder is associated with higher morbidity such as massive haemorrhage and bladder resection. Even though there is bladder invasion the most common presenting symptoms are premature onset of labour and vaginal bleeding. Gross haematuria is rare even when the bladder is invaded and, in one series, occurred only in six out of 27 cases of placenta percreta with bladder involvement¹⁴.

Diagnosis

Antenatal diagnosis is the single most important factor in improving the outcome in MAP. It should be suspected in women with placenta praevia who have

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undergone caesarean section or other uterine surgery in the past. A high degree of clinical suspicion is of utmost importance when the placenta is located underneath a previous uterine scar.

Ultrasonography: This is the first-line investigation for suspected placental invasion of the myometrium. The two mostly used diagnostic criteria are presence of irregular lacunae within the placenta and the loss of retroplacental clear space. Irregularly shaped placental lacunae within the placenta and turbulent flow through these lacunae during Doppler flow studies have a diagnostic sensitivity of 79% at 15 to 20 weeks of gestation, and 93% after 20 weeks^{10,11}. The positive predictive value is up to 92%. These lacunae may give the placenta a "moth-eaten" or "swiss cheese" appearance. The risk of MAP increases with the rise in the number of lacunae¹². The second diagnostic feature is loss of retroplacental "clear space" (Figure 1).

This feature has a sensitivity of 57% and false positive rate of 48.4%¹⁵.

Other less-sensitive criteria include thinning or absence of the myometrium overlying the placenta, increased vascularity of the uterine serosa-bladder interface, and protrusion of the placenta into the bladder (Figure 1). The presence of at least two of these features has a positive predictive value of 86%.

Doppler study findings are not diagnostic. There is usually an increase in vascularisation of the placental-myometrial interface in MAP; the absence of this feature has a 95% negative predictive value. The false-positive and false-negative rates range from 2 to 25% using a trans-abdominal ultrasound approach. A trans-vaginal approach is usually superior, as it enables avoidance of the fetal head and higher resolution images^{13,14,15}.

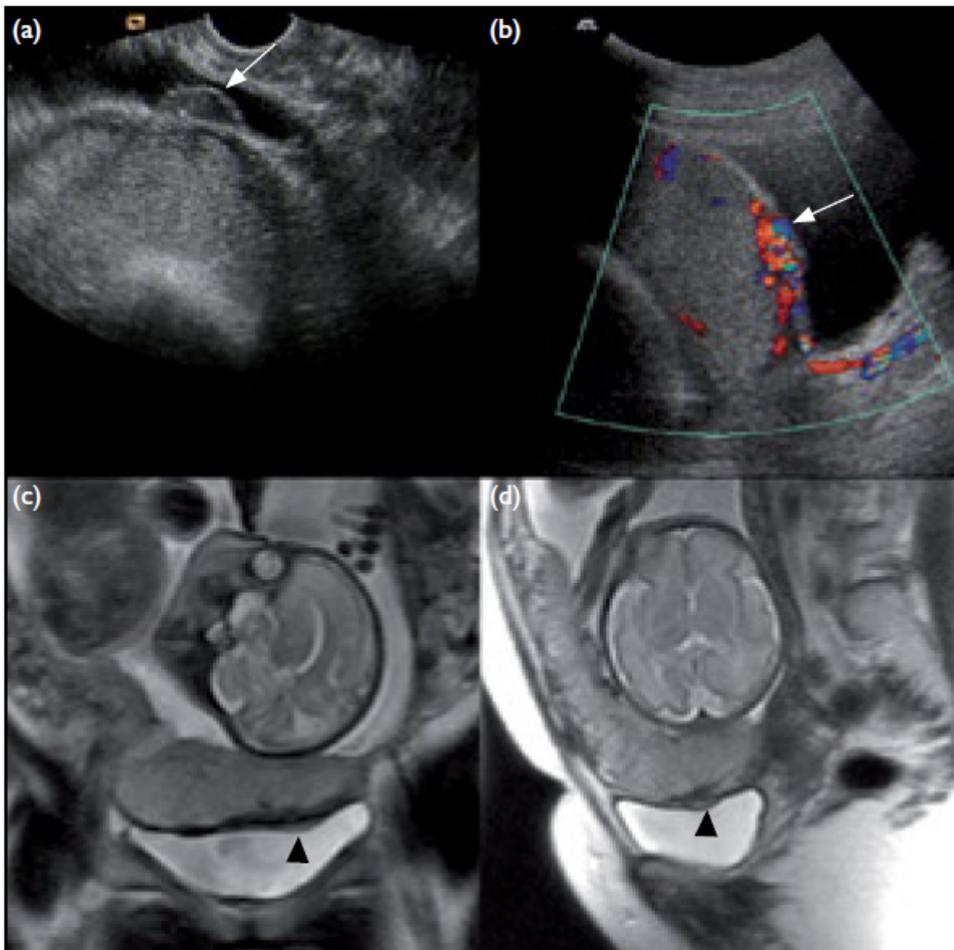


Figure 1. Placenta praevia with morbidly adherent placenta: (a,b) Transvaginal sonographic images revealing no myometrial tissue between the lower uterine wall and the bladder. There is also an abnormal vessel running within the bladder wall (white arrows). Corresponding (c) coronal and (d) sagittal magnetic resonance images indicate a bulge at the bladder wall (black arrowheads).

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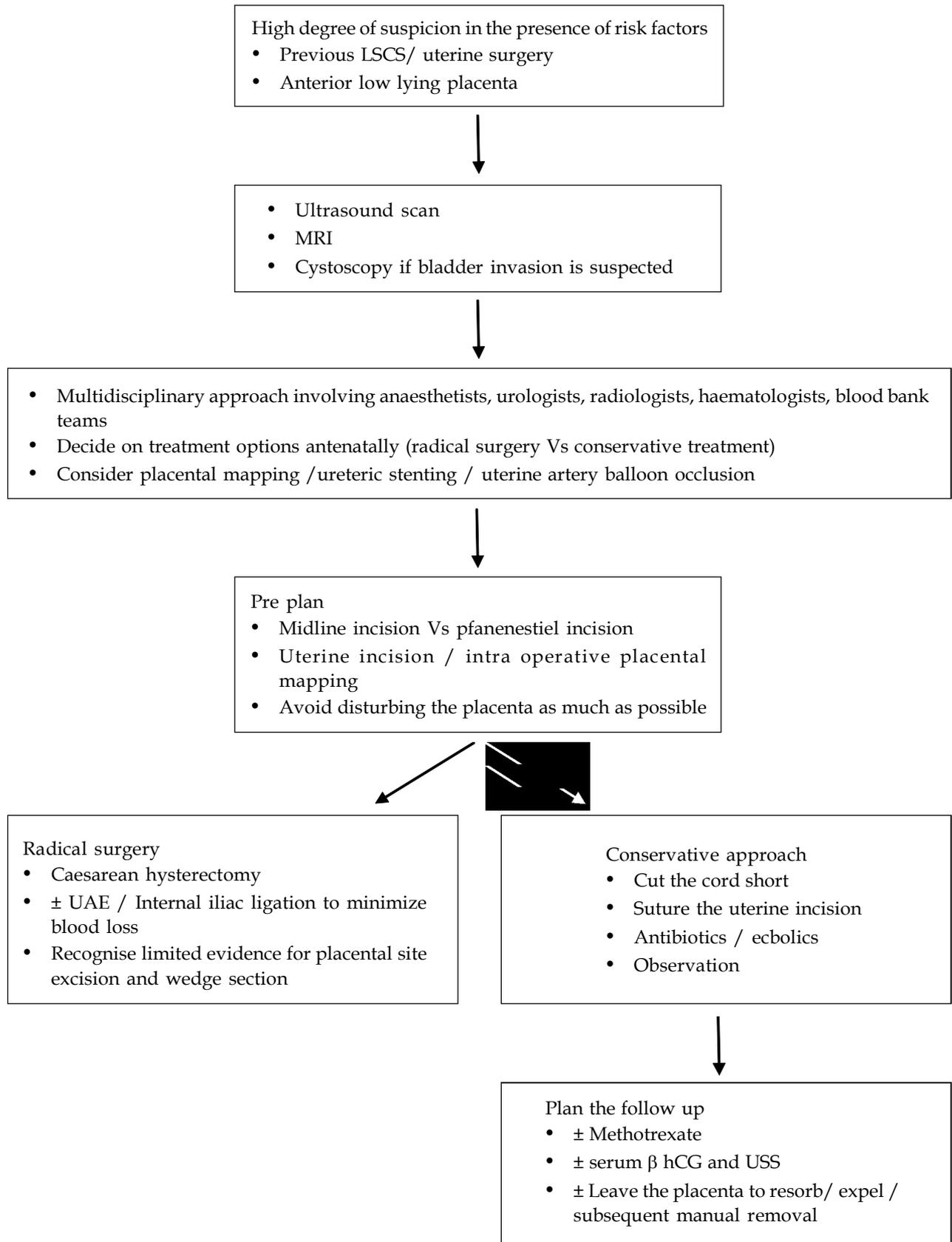


Figure 2. Management of morbidly adherent placenta.

Magnetic resonance imaging: This has been effectively used for the investigation of placental invasion. Although most studies have shown reasonable diagnostic accuracy it appears that MRI is no more sensitive than USS^{15,16}. However, MRI achieves better images than ultrasonography in posteriorly sited MAP and in patients with prior myomectomy, because the ultrasound beam is impeded by the fetal head in the former and by the scar tissue in the latter¹⁸.

There are three significant MRI features for the detection of MAP. These are: abnormal uterine bulging of the normal pear-shaped gravid uterus, heterogeneity of the signal intensity of the placenta on T2-weighted images, and the presence of T2-weighted dark linear bands in intraplacental signal intensity, extending from the basilar plate to the placental surface¹⁹. Other diagnostic features include: (1) loss of myometrial contour in the lower uterine segment and obliteration of the lower uterine segment²⁰, (2) thinning or irregularity of the myometrium, transmural extension of signal abnormality through the myometrium, irregularity or disruption of the normal bladder wall architecture and invasion of local structures²¹, (3) attenuation and non-visualisation of the uterine wall, interruption of the uterine wall, interruption of the tissue plane between the myometrium and bladder wall by irregular masses and over invasion of the myometrium by the placenta²² (Figure 1).

Cystoscopy: In cases of placenta percreta where involvement of the bladder is suspected, cystoscopy is useful but biopsy should be avoided as it may precipitate severe haemorrhage. Placing ureteral stents during cystoscopy helps in intra-operative identification of the ureters¹⁴.

Treatment of morbidly adherent placenta

A multidisciplinary approach is relevant in managing these patients in order to reduce morbidity and mortality associated with MAP. Particular consideration should be given to anticipation and management of massive haemorrhage, including availability of packed cells, platelets, fresh frozen plasma, cryoprecipitate, and activated factor VII. Interventional radiology and cell saver technology are useful. Antenatal diagnosis enables one to leave the placenta undisturbed, either during caesarean hysterectomy or in managing the MAP conservatively. An algorithm for the management of MAP is shown in Figure 2.

Uterine incisions: It is best to avoid cutting through a MAP because of the possibility of massive haemorrhage. Various modifications of the uterine incision to avoid the placenta have been reported. Classical incision, high transverse incision, fundal incision, fundal transverse incision have all been used

to deliver the fetus^{23,24}. If hysterectomy is not planned, the risk of uterine rupture in a future pregnancy should be considered and explained to the patient in cases where non-lower segment incision is planned. Pre-operative and/or intra-operative ultrasound mapping, to delineate the area of the uterus overlying the placenta prior to the uterine incision is useful^{25,26}.

Hysterectomy: Traditional management of MAP is caesarean hysterectomy, which is a daunting task, fraught with technical difficulties and results in post operative complications and loss of fertility. However, prompt hysterectomy has led to a reduction of maternal mortality to less than 2%¹². Over the last decade, management of MAP has changed from the old obstetric dictum of never leaving any part of the placenta in utero, to a more conservative approach.

It is imperative to perform surgery under elective controlled conditions, rather than as an emergency without adequate preparations. The ideal abdominal incision is debatable. A midline incision will facilitate better exposure, especially if placenta percreta is suspected. Leaving the placenta undisturbed until completion of the hysterectomy would prevent unnecessary haemorrhage. In cases where MAP is associated with placenta previa, total hysterectomy is preferred to a subtotal hysterectomy²⁷.

Devascularising the pelvis: Balloon Catheter Occlusion of the pelvic vessels or Selective Arterial Embolisation decreases blood flow to the uterus and makes it possible to perform surgery under easier and more controlled circumstances²⁸. Two different approaches have been described. In one approach occlusive balloon catheters are placed preoperatively in the internal iliac arteries. These are inflated after the delivery of the baby, and deflated after completing the hysterectomy. In the other approach catheters are placed preoperatively in the internal iliac arteries and embolisation of the uterine vessels are performed after delivery of the fetus but before the hysterectomy. Alvarez et al found that elective embolisation resulted in improved outcome compared with emergency embolisation for massive postpartum haemorrhage^{29,30}. Bilateral internal iliac artery ligation is performed prior to peripartum hysterectomy in an attempt to reduce operative blood loss. This is of particular importance in situations where interventional radiology is not available.

Other surgical options: Few other surgical strategies have been described to achieve haemostasis in cases of MAP, avoiding a hysterectomy. It is possible to "excise the placental site". This is done by inverting the uterus in order to provide good access to the placental site³¹. If the area of placental attachment is focal and the majority of the placenta has been removed, then a "wedge resection" of the area can be performed⁶.

Conservative approach: In this approach, once the baby is delivered the placenta is left undisturbed. The cord is cut short and the uterine incision is closed. The woman is monitored closely for bleeding and sepsis.

Methotrexate: The conservative approach of managing MAP was first described by Arulkumaran et al in 1986³². They reported administration 50 mg of methotrexate as an intravenous infusion on alternate days and the placental mass was expelled on 11th postnatal day. Subsequently similar cases have been reported. There is no consensus about the best method of administration of methotrexate and it has been used intravenously, intramuscularly³¹, orally³³ and in combination with an initial intra-umbilical injection³⁴.

Methotrexate, a folate antagonist, acts primarily against rapidly dividing cells, and therefore is effective against dividing trophoblast. Opponents argue that after delivery of the fetus the placenta is no longer dividing and methotrexate is of no value. In fact there are case reports where methotrexate has failed, and conservative management has been successful without methotrexate²⁷.

Use of serum β human chorionic gonadotropin and ultrasonography in monitoring: When the placenta is left in situ the woman requires follow up to ascertain resolution of placental tissue as there is a risk of infection and haemorrhage. Clinical condition of the patient, serial USS and β hCG are used in this regard. Serum β hCG levels are performed on a weekly basis, until it becomes undetectable³⁵. However, low levels of β hCG does not mean that haemorrhage will not occur, and it has been omitted with no apparent deleterious effects in a number of cases^{36,37}. Some authors have used regular quantification of β hCG to determine when to discontinue the administration of methotrexate, which itself is a controversial issue³⁸.

USS with colour Doppler has been used to monitor the placental involution. It makes sense to believe that reducing placental volume means placental involution. But it is questionable whether ultrasonographic assessment of placental involution adds further to clinical assessment in monitoring.

Subsequent management of the placenta: The placenta is left to resorb or expel spontaneously. If significant bleeding develops a manual removal is attempted³⁸. It should be noted that interval removal of the placenta can be associated with heavy bleeding. Many reports do not describe any attempts at removal of the placenta. Chan et al reported a case where a MAP was managed conservatively where the placenta was trimmed stage wise as it protruded through the introitus, without attempting to remove manually¹⁸.

Most authors report prolonged use of antibiotics (10 - 14 days) while the resolution process is being

monitored, though there is little evidence to support the superiority of this practice over the single-dose prophylaxis commonly used in other elective or emergency caesarean deliveries¹⁸.

Involvement of the bladder: Washecka et al carried out a meta-analysis of 54 reported cases of placenta percreta³⁹. They noted that 31% of cases presented with haematuria. In 33% of cases the diagnosis was made with prenatal USS or MRI. Subsequently Hudon et al explained urological sequelae in women with placenta percreta. They reported lacerations of the bladder (26%), urinary fistula (13%), gross haematuria (9%), ureteric transection (6%), and reduced bladder capacity (4%). Partial cystectomy was needed in 44% of cases⁹.

Management of patients with bladder involvement requires careful pre-operative planning and involvement of the urologist. Preoperative ureteric stenting aids in identifying the ureters, which will help reduce ureteric injuries. Care must be taken during surgery not to attempt to dissect the bladder off the lower uterine segment which results in torrential bleeding. Anterior bladder wall incision is particularly helpful in defining dissection planes and the location of the ureters^{14,40}. With the serious morbidities described above it seems sensible to attempt conservative management in placenta percreta.

Conclusion

Even today, the ground reality is that a majority of morbidly adherent placentae are diagnosed during the third stage of labour or during caesarean section and which results in adverse consequences including exanguinating haemorrhage. A high degree of clinical suspicion coupled with imaging and other relevant investigations like cystoscopy is important in arriving at an antenatal diagnosis of morbidly adherent placenta. Expertise of a multidisciplinary team is useful in the management of this challenging condition. Although caesarean hysterectomy was the cornerstone in the management in the past, antenatal diagnosis permits effective and safe conservative approaches today. The use of methotrexate, monitoring with serum β hCG and follow up with USS is backed only by conflicting evidence.

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