



Review Article

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## ***Evaluation of Recent Updates Regarding Adherent Placenta, Diagnosis and Management: Literature Review***

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### **ABSTRACT**

**Background:** The adherent placenta is a range of pathologic adherence of the placenta, including placenta increta, placenta percreta, and placenta accreta. Villous invasion depth determines the severity of the complications, and the villi sometimes invade the surrounding pelvic organs. Therefore, any surgical procedure becomes technically difficult, especially with excessive neovascularity. **Objective:** The prenatal diagnosis of the adherent placenta has become essential to its management and outcome. In this article, we aimed to review the published literature that discussed adherent placenta diagnosis and management. **Method:** A comprehensive search was done using biomedical databases including Medline, and PubMed to study the role of Adherent Placenta. Keywords used in our search through the databases were "Adherent Placenta", "Placenta Increta, Placenta Percreta, and Placenta Accreta", and "Pathophysiology and Management". **Conclusion:** The mainstay imaging technique in cases of placenta accreta is ultrasound. Pelvic ultrasound is highly reliable to diagnose or exclude the presence of placental adhesive disorders. However, when the ultrasound results are not conclusive, MRI is recommended, because it has a higher potential benefit. In general, the recommended management of an adherent placenta is planned cesarean hysterectomy with a hysterotomy that avoids the placenta. Appropriate counseling can be conducted to consider alternative management strategies. A center with a multidisciplinary team experienced in the care of the condition should conduct the delivery in order to optimize the response to every peri and intraoperative complication.

**Key words:** Adherent Placenta, Diagnosis, Management.

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### **INTRODUCTION**

The placenta is the functional center of the maternal-fetal system which is responsible for respiration, secretion, endocrine and immunological function of the fetus [1]. Morbidly adherent placenta, also known as, placenta

accreta spectrum is defined as the range of pathologic adherence of the placenta, including placenta increta, placenta percreta, and placenta accreta [2]. Irving and Hertig published the first case series of placenta accreta in 1937 [3]. They defined PA clinically as “the abnormal adherence of the afterbirth in whole or in parts to the underlying uterine wall.” The histologic description was “the complete or partial absence of the decidua basalis” [2]. In the 1960s, pathologists separated placenta accreta into three categories: placenta accreta when the villi simply adhere to the myometrium, placenta increta when the villi invade the myometrium, and placenta percreta where the villi invade the full thickness of the myometrium [4, 5]. The depth of villous invasion determines the severity of the complications.

The villi, in cases of adherent placenta especially placenta percreta, sometimes invade the surrounding pelvic organs. Therefore, any surgical procedure becomes technically difficult, especially with excessive neovascularity. Thus, the prenatal diagnosis of an adherent placenta has become essential to its management and outcome [2]. In this article, we aimed to review the recent literature that discussed adherent placenta diagnosis and management.

## METHODOLOGY

### Sample

We performed a comprehensive search using biomedical databases including Medline, and PubMed, for studies concerned with the evaluation of Adherent Placenta published in the English language. Keywords used in our search through the databases were “Adherent Placenta Pathophysiology”, “Adherent Placenta Management”, and “Adherent Placenta Evaluation”. More relevant articles were recruited from reference lists scanning of each included study.

### Analysis

No software was used, and the data were extracted based on the specific form containing the title of the study, the name of the author, objective, summary, results, and outcomes.

## DISCUSSION:

In the past, localized uterine injuries that resulted from previous cesarean sections were thought to be the only pathology behind the occurrence of PAS, and these subsequent injuries will lead to defective scarring or decasualization, which causes abnormal placental adherence in the later pregnancies. After that, it has been found that even small disruptions to the lining of the uterus can lead to subsequent placenta accreta [2, 6]. Any myometrial tissue damage, whether surgical, instrumental or physical, followed by a secondary collagen repair, is closely related to the subsequent appearance of placenta accreta, for example, uterine dilation and curettage, hysteroscopic surgery, endometrial ablation, uterine artery embolization and myomectomy [7-11].

The most common component of the adherent placenta is placenta accreta with a percentage of 75% of cases. In mild cases of placenta accreta spectrum, manual removal of the retained placenta can be enough. However, the severity of the cases can be affected by several factors, such as changes in maternal vascular malperfusion, chronic nasal inflammation, and subchorionic or intervillous and retromembranous hemorrhage [6, 12].

### Diagnosis:

By histopathologic examinations, the diagnosis of a placenta accreta can be made. The diagnostic features are an absence of decidua and if chorionic villi are seen adjacently to myometrial fibers directly. These features cannot be seen macroscopically, but the presence of placental basal plate myometrial fibers can be confirmed by microscopic examination. However, there is a possibility that basal plate myometrial fibers can be present in normal pregnancies but it can be an indication of an increase in the risk of the adherent placenta in future pregnancies [6, 13]. Nevertheless, most case reports and cohort studies demonstrated that the diagnosis of an adherent placenta is done via transabdominal ultrasound images. The adherent placenta is mostly diagnosed in the late second and early third trimesters. Standardized descriptions of ultrasound signs have been proposed by the European Working Group on Abnormally Invasive Placenta to be used for the prenatal diagnosis of placenta accreta spectrum [14]. Jauniaux et al. [2] in their paper summarized these important imaging features.

The first sign of an adherent placenta is clear zone loss when the normal hypoechoic retroplacental zone in the myometrium under the placental bed is not present on ultrasound. The abnormal extension of the placental villi via the decidua basalis into the myometrium is represented by this sign. However, multiple papers criticized the

accuracy of this sign due to its variation in appearance with the advancement of the gestation [15, 16]. It also may change with the location of the placenta inside the uterine cavity.

In addition, one of the used prenatal diagnostic signs for the placenta accreta spectrum is myometrial thinning. This sign is considered positive when the myometrium is <1 mm or when the sonographer cannot detect the myometrium [17]. This sign should be present when the placenta results in a major scar defect underneath. Then, the myometrium will become thinner than normal or completely replaced by scar tissue. Thus, the myometrium will become thinner with advancing gestation independently of any abnormal villous invasion. Nevertheless, a systematic review of Jauniaux et al. [18] demonstrated that half of the included cohort studies reported this sign [18]. The disadvantage of this sign is the high possibility of false-positive diagnoses as an abnormal invasion which are given to normal myometrial thinning. With the advancement of the gestation, myometrial thinning may get so extreme due to the further stretching of the uterus leading to incorrect diagnosis [2, 18]. Moreover, the clear zone sign and myometrial thickness can be affected by the direct pressure of ultrasound probes and the fullness of the maternal bladder. Therefore, the sonographer must take care of these signs.

Placental lacunae are the most commonly used ultrasound sign in prenatal adherent placenta diagnosis. Around 80% of the authors reported placental lacunae antenatally in adherent placenta cases. Placental lacunae are multiple, irregular, large spaces in the placenta. The placenta in the ultrasound appears with a “moth-eaten” appearance in placenta accreta cases [18]. “Placental lakes” and “Swiss cheese” are also terms used to describe these lacunar placental spaces in other papers [19, 20]. These lakes can be seen in normal pregnancy especially after the end of the first trimester. The differentiation between abnormal invasion lacunae and normal placental lakes is not easy. However, multiple factors can help to differentiate such as number, shape, location, and velocity of the blood flow inside the space. Placental lakes arise because of the high velocity of maternal blood flow to the lobules. This increased flow will distort the anatomy of the interlobular septa resulting in numerous, large and irregular in size lacunae. On the other hand, normal placentation mostly will have normal velocity and less vascularity leading to fewer lakes and normal thickness of the underlying myometrium [21].

In cases of villous invasion into the muscle of the posterior wall of the bladder, an ultrasound artifact will be seen arising as a hyperechoic line between uterine serosa and bladder lumen. This is due to the massive neovascularity found within the peritoneal fold in this area. This sign is called “bladder wall interruption.”

Sometimes, villous invasion causes ballooning of the uterus. This results from the deep invasion of the myometrium impairing the integrity of the surrounding uterine muscles. This bulge will press the surrounding structures. This sign is called, “placental bulge” and it is also seen and described in laparotomy as a “snowman” sign [22].

In placenta percreta, the placental tissue invades through the uterus and may reach the bladder. The hypervascularity developed in this tissue will help in creating an independent focal mass called “exophytic mass.” It usually contains persistent and significant blood flow because of the excessive dilatation of the uteroplacental circulation beyond the spiral arteries. Similar to lacunae, placental bed, and myometrial thickness, vasculature characteristics under and around the accreta area will change with advancing gestation. Exophytic mass is a prominent feature of adherent placenta on prenatal ultrasound. In 33% of the cases of invasive placentation, bladder wall interruption, bladder bulge, and exophytic mass were reported [18].

Placenta accreta, increta, and percreta differ from each other histopathologically. However, from the clinical–surgical perspective, the same patient can have different degrees of invasion at the same time [7]. There is a mismatch between histology and surgical finding. Therefore, it is preferred that the placenta accreta should be defined according to its clinical–surgical characteristics [23].

As mentioned earlier, the mainstay imaging technique in cases of placenta accreta is ultrasound [24]. Lax et al. [25] found that pelvic ultrasound is highly reliable to diagnose or exclude the presence of placental adhesive disorders. However, when ultrasound results are not conclusive, MRI is recommended because it has the potential benefit in which it provides greater soft-tissue contrast as well as a larger field of view in comparison to sonography [24]. Regarding topographic evaluation and staging of adhesive disorders, MRI is considered an excellent tool. For the detection of placenta accrete, Warshak et al. [26] described a sensitivity of 77% and specificity of 96% for the ultrasound. On the other hand, the sensitivity of MRI has been published as 88% with a specificity of 100%

**Complications:**

Placenta accreta can be associated with devastating morbidity because of recurrent antepartum hemorrhage and hospitalization [27]. It can be complicated by massive postpartum hemorrhage, disseminated intravascular coagulopathy, cesarean hysterectomy, surgical injury to the ureter, bladder, and other viscera, adult respiratory distress syndrome, blood transfusion-associated complications, renal failure, septicemia and even maternal death [28]. This condition is also associated with an increased incidence of pre-term birth and perinatal mortality and morbidity [29].

**Management:**

Adherent placenta management in the literature involves three varieties including accreta, increta, and percreta. Thus, it is difficult to discuss and evaluate each condition adequately. However, the difficulty in managing adherent placenta increases along with the severity [30]. The most serious condition is placenta percreta. Thus, it is associated with a significantly higher maternal morbidity than are the other varieties [31]. The management in placenta percreta is also more challenging than in the other conditions before and at the delivery [32].

**• Conservative Approach:**

In general, the recommended management of an adherent placenta is planned cesarean hysterectomy with a hysterotomy that avoids the placenta. Thus, there will not be any prospect of future fertility. In order to preserve fertility, avoiding hysterectomy and conserving the uterus can be considered. If appropriate facilities for radiological intervention are available, conservative options should be offered. Extensive counseling is necessary before the approach to clarify the unpredictability of the outcomes. The outcomes involve serious complications such as death [24].

A conservative approach is done after the cesarean section by leaving the placenta in situ and waiting for its later reabsorption or expulsion [33]. After delivering the baby and closing the uterus, the placenta is left inside. There are other methods of conservative approach that can be added to leaving the placenta in situ such as internal iliac vessel embolization and combined B-Lynch suture with Bakri balloon uterine compression [27, 33, 34]. In addition, conservative therapy includes medical intervention that might be used with or without plans for surgical intervention in mind, for example, methotrexate [35]. Methotrexate results from the antimetabolic effect on trophoblast cells, which hasten the involution of the placenta [36].

There are also other medications, such as, uterotonics like mifepristone and misoprostol that can be used to encourage uterine contraction and expulsion of the placenta [24]. However, their use is controversial. There are some potential complications of conservative options such as uterine necrosis, uterine lacerations, or endomyometritis. Medical therapy has a failure rate of 20% with the antecedent risk of cesarean hysterectomy from unpredictable massive postpartum hemorrhage and its associated complications [37].

The success and failure of conservative management vary by protocol, institution, and study [35]. The failure of the conservative approach will be accompanied by consequences such as the need for reoperation, ICU admission, sepsis, shock, and necrosis of the uterus or surrounding tissues [35, 38, 39]. Other risks of conservative therapy include delayed hemorrhage, multiple transfusions, thrombus formation, limb ischemia, vessel injury, and subsequent abnormal uterine bleeding [40].

Approximately two-thirds of the patients who had the placenta left in situ suffered at least one late postoperative complication. On the other hand, of the women with local resection or initial management by hysterectomy, only 12% suffered postoperative complications. Therefore, deciding which approach will be done should depend on the availability of the expertise in each center. The interventional radiological department is not available in each center and such surgeries need a significant experience because the placenta percreta site can bleed heavily [30]. The excess morbidity in cases where the placenta was left in situ occurred mainly after 24 hours. Therefore, it is recommended that the obstetricians who accidentally find a placenta percreta or who are not prepared for a primary repair consider leaving the placenta in situ for subsequent referral of the patient to a tertiary center within 24 hours for a secondary local resection and repair. The necessary expert knowledge and experience must be available at the tertiary center [30].

**• Surgical Approach:**

Silver et al. [41] Summarized the recommendations of the Society for Maternal-Fetal Medicine and the American College of Obstetricians and Gynecologists regarding adherent placenta treatment [42, 43]. They stated that

delivery should occur in a center with a multidisciplinary team experienced in the care of the condition and a blood bank with the capacity for massive transfusion. Outcomes are improved with scheduled delivery before the onset of labor or bleeding. In most cases, planned preterm delivery at 34 weeks of gestation appears to best balance maternal and neonatal risks.

The generally recommended management of placenta accreta spectrum is planned cesarean hysterectomy with a hysterotomy that avoids the placenta, which is left in situ. Multiple studies evaluated the surgical approach and the accompanied options. Eller et al. [44] evaluated the outcomes of a cesarean hysterectomy without attempted placental removal. They found a significant decrease in morbidity compared to patients with placental removal. Moreover, the pre or peri-operative use of ureteral stents decreased the risk of ureteral injury and significantly reduced the rate of postoperative morbidity. They also found that hypogastric artery ligation help in decreasing the mean blood loss or the need for a large volume of blood transfusions. They concluded that scheduled cesarean hysterectomy with preoperative ureteral stent placement and avoiding placental removal was the optimal management strategy for prenatally diagnosed placenta accrete [10, 44].

Angstmann et al. [45] in their paper compared hysterectomies with staged embolization and routine cesarean hysterectomy. They found that preoperative use of interventional radiological embolization followed by a hysterectomy resulted in significant reductions in blood loss, need for transfusion and units of blood transfused. Even in an optimized situation with an experienced and multidisciplinary team, there is a risk of significant complications after delivery [35]. The most common complication of placenta accreta is hemorrhage. Massive persistent hemorrhage can lead to DIC, hypovolemic shock, and multiorgan dysfunction or failure. Other common complications are cystotomy, ureteral damage, and bowel injury. Serious complications like that may lead the patient to be admitted to the ICU. ICU admission adds more burden by increasing the risk of infection from pneumonia and invasive catheters. Major complicated surgeries, especially with the postpartum status, increase the risk of venous thromboembolism [46].

The rates of morbidity, complications, and mortality are influenced by the type of accreta spectrum disorder present [47]. Percretas are associated with a higher incidence of morbidity and mortality due to their higher extensive invasion through the uterus and into surrounding tissues. The expertise of the delivery center also affects patient outcomes [47]. Perinatal mortality has been quoted as high as 25% [48]. Preterm birth is the major factor responsible for fetal or neonatal morbidity and mortality. Moreover, maternal hemorrhage can also result in fetal compromise from compromised uteroplacental oxygenation with resultant fetal hypoxemia and acidosis [49].

## CONCLUSION :

The mainstay imaging technique in cases of placenta accreta is ultrasound. Pelvic ultrasound is highly reliable to diagnose or exclude the presence of placental adhesive disorders. However, when the ultrasound results are not conclusive, MRI is recommended, because it has a higher potential benefit. In general, the recommended management of adherent placenta is planned cesarean hysterectomy with a hysterotomy that avoids the placenta. Appropriate counseling can be conducted to consider alternative management strategies. A center with a multidisciplinary team experienced in the care of the condition should conduct the delivery in order to optimize the response against every peri- and intraoperative complication.

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