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Placenta Accreta Spectrum: Conservative Management and Its Impact on Future Fertility

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Abstract

Placenta accreta spectrum is a complication of pregnancy, which poses a great risk on maternal health. Historically, hysterectomy was the modality of treatment of such condition, but an approach towards a more conservative management has been in the light recently. This includes several methods with varying rates of success and complications. Expectant management is effective in up to 78%–80% of the cases. The extirpative method is associated with a high risk of postpartum hemorrhage. The success of the one-step conservative procedure depends on the degree of placental invasion, and the triple-P procedure appears to be successful but requires and interdisciplinary approach. Adjuvant treatment options can be tailored according to individual cases, and these include methotrexate injection, uterine devascularization and hysteroscopic resection of retained placental tissues. Follow up after conservative management is crucial to detect complications early, and it can be done by ultrasound, Doppler examination, and trending β human chorionic gonadotropin levels. Conservative management of placenta accreta spectrum can preserve future fertility but should only be done in hospitals with enough experience as it carries a high risk of maternal complications. In the future, more research should be directed to achieve clear guidelines regarding this topic.

Keywords: Placenta accreta; Conservative management; Maternal morbidity; Fertility outcomes

Introduction

Placenta accreta spectrum (PAS) refers to a complex obstetrical condition characterized by abnormal placental attachment to the uterine wall.[1] It consists of three categories depending on the degree of placental invasion.[1] The condition is called accreta when the villi adhere only to the myometrium, increta when they invade the myometrium, and percreta when they invade the uterine serosa and possibly the surrounding pelvic organs and vessels.[1–3] The prevalence of this condition ranges between 0.01% and 1.1%, and this variation is due to the difference in the diagnostic criteria used in each region.[3] PAS is responsible for high rates of maternal morbidity due to its association with peripartum hysterectomy and postpartum hemorrhage requiring blood transfusion.[2,3] Many risk factors for PAS have been identified, such as advanced maternal age, smoking, uterine anomalies, prior uterine surgery, Asherman syndrome, and the use of assisted reproductive technologies.[4–7] However, placenta previa and cesarean delivery remain the strongest associated factors.[2,4] The incidence of PAS increases from 0.24% after the first cesarean delivery to 6.74% after the sixth one.[4,8] Several theories have been proposed regarding the pathophysiology of PAS, the latest of which is that it occurs due to a defect in the endometrial-myometrial interface, thus leading to abnormal decidualization and trophoblastic invasion.[1,9]

Management of PAS

Prenatal diagnosis of the condition remains key to decreasing its related morbidity and mortality, as it allows for appropriate interdisciplinary interventional planning.[10–12] Diagnosis occurs through imaging modalities such as ultrasound and magnetic resonance imaging, but the definitive diagnosis is usually through gross and pathological examination of the placenta at the time of surgery.[10,11,13] Management of this condition varies between a radical approach as in the case of cesarean hysterectomy and a conservative one.[14,15] Recently, the latter has become an approved option that can be offered to women who wish to preserve their future fertility.[16]

Conservative management of PAS

Conservative management of PAS entails four different techniques, namely the expectant method, the extirpative method, the one-step conservative surgery, and the triple-P procedure.[17]

Expectant management

This technique refers to the delivery of the fetus, without delivering the placenta, leaving it partially or completely

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adherent to the myometrium (in situ), thereby avoiding hysterectomy in 78%–80% of the cases.[13,15,18] The progressive decrease in blood supply to the uterus after delivery results in placental necrosis and detachment, followed by placental resorption and expulsion.[19] However, this method is associated with a morbidity rate of 56%–87.5%, and complications such as postpartum hemorrhage, infection, sepsis, disseminated intravascular coagulation, delayed hysterectomy, uterine arteriovenous fistula, and choriocarcinoma.[19–22]

The extirpative method

The extirpative method comprises of a forceful attempt of manual removal of the placenta so as to avoid leaving products of conception in the uterus.[17] However, this method is associated with a serious risk of postpartum hemorrhage.[17,23,24] When compared to the expectant approach, the latter was associated with less hysterectomy rates, red blood cells transfusion, and disseminated intravascular coagulation.[23] On the other hand, the removal of the placenta may have a role in decreasing the risk of postpartum infection and sepsis.[23,24]

The one-step conservative surgery

This approach is also known as resective-constructive surgery and aims at resecting the placenta along with the invaded myometrium in bloc.[24,25] The steps of this procedure include ligation of the newly formed blood vessels between the uterus and the surrounding structures, followed by a hysterotomy and removal of the placenta with the affected area until reaching healthy tissue, hemostasis and finally uterine reconstruction in two layers.[24,25] In one study of 68 patients with anterior placenta percreta, uterine conservation was achieved in a total of 50 patients.[26] Similarly, in another study the technique was successful in eight of 12 cases.[27] In a large retrospective study of 326 patients with a confirmed diagnosis of placenta accreta, conservative management was effective in uterine preservation in 228 of the patients, with percentages varying according to the degree invasion.[25] The procedure was 81.5% effective in type 1 where invasion was only into the upper posterior bladder, 47.7% in type 2 with parametrial invasion, 21.8% in type 3 with low posterior bladder involvement and 0% in type 4 with low posterior bladder involvement and accompanying fibrosis.[25]

Triple-P procedure

This uterine preserving technique is a three-step conservative surgery for women with PAS, and it requires the presence of an interventional radiologist.[28,29] It consists of perioperative location of the upper border of the placenta, pelvic devascularization by a pre-placed pelvic arterial balloon catheter in the anterior division of the internal iliac artery after delivery of the fetus in attempt to reduce the blood supply to the placenta, and in bloc resection of the placental and myometrial tissues involved.[28,29] Finally, the myometrial defect is reconstructed.[28,29] The risks of postpartum hemorrhage and hysterectomy are lower in patients who underwent the triple-P procedure (15.8% and 0%, respectively) than in those where the placenta was left in situ (54.4% and 27.3%, respectively).[30] This procedure is accompanied with a shorter duration of hospitalization postoperatively with an average of 4 days.[30–32] Some difficulties may be encountered in cases where myometrial resection is not possible as in cases where the placenta invades the cervix and the broad ligament.[33] Moreover, this technique cannot be used in case a lateral placenta infiltrates the ureters.[33] Although this is a fertility preserving surgery, questions have been raised about the risk of uterine rupture in a subsequent pregnancy.[33] Complete resorption of the placenta occurred after 8 to 10 weeks after the procedure, verified by transvaginal ultrasound.[29,32]

The Royal College of Obstetricians and Gynecologists recommends that uterine preserving surgical techniques only be used when surgeons work in an interdisciplinary approach and with appropriate experience to manage such cases.[34] In the cases where the entire placenta is left in situ, additional treatment options might be of use.[12,35] These include methotrexate (MTX) injection, uterine devascularization, and hysteroscopic resection of retained tissues.[17,18,35]

MTX injection

The use of MTX, a cytotoxic agent, has been suggested in the conservative treatment of PAS in multiple studies. MTX acts by reducing the vascularity of the placenta, thereby causing necrosis and accelerating its involution.[17,36] However, its efficacy in PAS may be limited.[37,38] This is because the activity of MTX is more pronounced against dividing cells, as seen in the early placenta, rather than in non-dividing ones, as seen in the third trimester.[37,38] There is also no consensus about the appropriate dosage or mode of administration that should be used.[15] Moreover, MTX is contraindicated in breastfeeding, and is linked to serious side effects such as nephrotoxicity and pancytopenia, which may further cause a secondary infection in the remaining placenta.[12,17,39,40] Currently, the International Federation of Gynecology and Obstetrics, the American College of Obstetricians and Gynecologists, and the Royal College of Obstetricians and Gynecologists do not recommend its use in PAS.[12,17,34]

Uterine devascularization

Uterine devascularization can be achieved through several techniques such as iliac artery embolization, bilateral uterine or hypogastric iliac ligation and balloon occlusion in an attempt to prevent secondary postpartum hemorrhage and possibly accelerate placental resolution.[15,17,18] Several case reports have been published about arterial embolization in the treatment of PAS, revealing an overall success rate of 71%–76.9% and a complication rate of 11%.[41,42] Complications included endometritis, uterine synechiae, uterine perforation, internal iliac artery perforation, and premature ovarian failure.[41] The follow-up of the patient and the resolution of the placenta increta was demonstrated by magnetic resonance imaging.[41,43] The average rate of placental resolution in patients who have undergone uterine artery embolization (22.4 weeks) is

shorter than those who did not (35.3 weeks).[20] A study assessing the role of bilateral uterine and ovarian surgical devascularization revealed effectiveness in cases of placenta accreta, rendering it a possible option in the treatment of PAS.[44] To date, no studies have been conducted to prove the superiority of one method over the other, and therefore, their use cannot be advised at present.[34,45]

Hysteroscopic resection of retained tissues

Hysteroscopy has been suggested as an adjunct method to shorten the period of placental elimination after conservative treatment in PAS, especially in women who present with pelvic pain and persistent vaginal bleeding.[46,47] It also shortens the recovery time and avoids the risk of sepsis induced by retained tissue.[47,48] The reported success rate is 92%.[47] This procedure carries a risk of uterine perforation, bleeding, and delayed endometritis, and it should only be attempted when the placenta shows no signs of vascularity on Doppler studies.[46] Ultrasound or laparoscopic guidance can also be an option to avoid serious complications.[37] The data is still limited to small case series, and in the future, more studies are needed to assess the feasibility of hysteroscopy in the conservative management of PAS.[46,47]

Follow up after conservative management

Placental reabsorption after conservative management of PAS occurs in 69%–75% of the cases, after an average of 95 to 120 days.[15,19,49] Follow up after conservative management of PAS is essential for identifying women at risk of complications and intervening early when any of these arise.[34] There is lack of consensus about a proper follow up schedule and routine, but it is suggested that clinic visits occur every 2 to 4 weeks after delivery.[49] They comprise of inquiring about vaginal bleeding, foul smelling vaginal discharge, uterine tenderness, and/or fever and performing blood tests if deemed necessary.[49] Other parameters include examination by ultrasound and Doppler and measurement of serum β human chorionic gonadotropin (β-hCG).[19,34,49]

Ultrasound and Doppler examination

In the normal postpartum period, ultrasound examination of the uterus may reveal simple fluid, blood products, and avascular echogenic material.[50] In the cases of retained products of conception, as in PAS, intrauterine echogenic material may be seen, but maybe difficult to differentiate from necrotic decidua and blood clots.[51] A thickened endometrial echo complex (8–13 mm) is the most sensitive finding (sensitivity 80%), followed by the presence of an endometrial mass (sensitivity 79%), but they both lack specificity which is reported at 20%.[50,51] The combination of color Doppler finding of hypervascularity with the above findings increases the positive predictive value to 96%.[50]

Pulsatility Index (PI)

The measurement of the PI in uterine arteries has also been proposed. During pregnancy, the vascular resistance in the uteroplacental circulation decreases, and; therefore, a persistently low PI after delivery would theoretically reflect the persistence of the placenta.[52,53] The PI on the side of the placental retention is also found to be lower than on the contralateral side.[53] The evidence regarding the efficacy of PI in the conservative management is perplexing. One study of five cases showed that the PI did not significantly change during the postpartum period.[53] Other studies showed a gradual rise in the PI of more than one, and this was reflective of success of the conservative approach.[19,54] However, currently there are not enough studies to determine a cut-off PI that is indicative of a good prognosis.[54]

β-hCG Levels

The serum levels of β-hCG reflect the number of active trophoblasts present in the uterus.[54] Therefore, in patients with retained placentas, the serum β-hCG levels tend to be higher than in the normal puerperium.[53] Following up β-hCG levels before removal of the placenta, they appear to decrease in a time-dependent manner.[53] The values drop gradually over an average of 21–35 days postpartum, reaching <5 IU, after which the levels are not reflective of the uteroplacental circulation.[54] However, several cases in the literature describe the persistence of placental tissue even in the absence of β-hCG.[35] Currently, no clear protocols exist to guide the timing or the frequency of measuring β-hCG levels postpartum in cases of PAS.

Outcomes of conservative management of PAS

Future fertility in the cases of conservative management of PAS seems to be minimally affected.

A study done in 2010, showed that following conservative treatment of 35 patients, all resumed their menstrual cycles after a median of 130 days, and 12 out of 14 patients became pregnant again.[55] Another study in the same year showed that of 27 women who intended a future pregnancy, 24 succeeded, with a subsequent pregnancy rate of 88.9%, and within a mean time to conception of 17.3 months.[56] All deliveries resulted in healthy newborns born beyond 34 weeks of gestation.[56] A commonly encountered issue among those cases is the high recurrence rate of placenta accreta which is reported to be 22.8%–28.6% in subsequent pregnancies.[56,57] This is postulated to be due to the persistence of the risk factors that have caused the condition in the first time.[57] The risk of postpartum hemorrhage in the subsequent pregnancy is also higher in these patients compared with those who did not have placenta accreta.[57] It occurs in 8.6%–19% of the cases, and is mostly related to placenta accreta and uterine atony.[56,57] Cases of spontaneous uterine rupture, uterine synechiae, and Asherman syndrome have also been reported following conservative management of PAS.[56,58,59] Similar results regarding the effect of uterine devascularization and hysteroscopic resection of retained placenta on future fertility and recurrence of the condition are present.[41,47,60] In the cases of uterine devascularization, the residual ovarian function might be in question. Studies have shown that bilateral internal iliac artery and uterine artery ligation and pelvic arterial embolization do not affect the vascular supply to the pelvis or future fertility, and this is probably due to the presence of an extensive collateral circulation.[61–64]

Conclusions

PAS is a condition of pregnancy that has been recently on the rise and is associated with severe maternal morbidity. Recently, conservative management with uterine preservation, especially for women who intend future pregnancies, has become acceptable. However, this method has been associated with maternal complications, and; therefore, it should only be an option in areas with adequate expertise and after extensive counseling of the patient. Due to the paucity of data regarding the efficacy of each method of this approach, the superiority of one to another, the optimal follow up strategy, and the future fertility outcomes, the choice of this method should be done in a case-dependent manner. Currently, all the data regarding conservative management of PAS are limited to case reports and small case series, and in the future, large trials targeting this aspect might lead to more definitive guidelines.

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Conflicts of Interest

None.

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