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Review Article

First-trimester abortion complicated with placenta accreta: A systematic review

Yeou-Lih Wang ^{a, b, c, *}, Shih-Shien Weng ^{a, b, c}, Wen-Chu Huang ^{a, b, c}^a Department of Obstetrics and Gynecology, Mackay Memorial Hospital, Taipei, Taiwan^b Mackay Medicine, Nursing and Management College, Taipei, Taiwan^c Mackay Medical College, Taipei, Taiwan

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ABSTRACT

Placenta accreta is a potentially life-threatening condition that may complicate a first-trimester abortion in rare occasions, and it can be difficult to recognize. We reviewed the literature in PubMed-indexed English journals through August 2018 for first-trimester postabortal placenta accreta, after which 19 articles and 23 case reports were included. The risk factors for the development of abnormal placentation are previous cesarean section (87%), previous history of uterine curettage (43.5%), and previous history of surgical evacuation of a retained placenta (4.3%). Ten patients (43.5%) had an advanced age (≥ 35 years). Most patients clinically presented with vaginal bleeding, ranging from intermittent or irregular bleeding, persistent bleeding, and profuse or massive bleeding. The onset of symptoms might be during the intra- or immediate postoperative period. Some patients had delayed symptoms 1 week to 2 years post-operatively. Conservative management may be attempted as the primary rescue, including uterine artery embolization (UAE), transcatheter arterial chemoembolization (TACE) with dactinomycin, and laparoscopic hysterotomy with placental tissue removal. However, most reports in the literature suggested either abdominal or laparoscopic hysterectomy as the definitive treatment for first-trimester postabortal placenta accreta. High index of clinical suspicion with anticipation of placenta accreta in early pregnancy is highly essential for timely diagnosis, providing the physician better opportunities to promptly manage this emergent condition and improve outcomes.

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Introduction

Placenta accreta may be a potentially life-threatening complication of pregnancy, characterized by complete or partial absence of the decidua basalis and imperfect development of the fibrinoid layer (Nitabuch layer). Based on the depth of placental invasion, the condition can be sub-classified into placenta accreta vera (attachment to the myometrium without invasion), placenta increta (subtotal invasion into the myometrium), and placenta percreta (total invasion into the myometrium, including perforation through the uterine serosa) [1,2]. The reported incidence of placenta accreta/increta/percreta is 1 in 2500–7000 pregnancies; however, the abnormal placental condition assumes considerable clinical significance because of morbidity and mortality from severe massive bleeding, uterine perforation, and infection [2–4].

Placenta accreta usually manifests with vaginal bleeding during difficult placental removal at delivery in the third trimester of pregnancy. However, it may also complicate first- and early second-trimester pregnancy termination, causing profuse postabortal hemorrhage [8–26]. Although the presentation of placenta accreta after a dilatation and curettage procedure is extremely rare, it is clinically significant because it can cause post-evacuation bleeding and result in difficult clinical management. Furthermore, retained placental tissue and accompanying hematoma can become entrapped in the uterine myometrium and mimic an unusual uterine mass lesion.

The diagnosis of placenta accreta in the first trimester is difficult compared with its diagnosis in the second or third trimester. Efforts to identify placenta accreta in the first trimester have yet to be standardized. Although some treatment options have been proposed, the management of placenta accreta after a first-trimester abortion is still quite challenging. We reviewed the literature and conducted an analysis to assess the risk factors, possible diagnostic modality, and efficacy and safety of management options for placenta accreta after a first-trimester abortion.

* Corresponding author. Department of Obstetrics and Gynecology, Mackay Memorial Hospital, No. 92, Section 2, Chung-Shan North Road, Taipei, 10449, Taiwan. Fax: +886 2 25433642.

E-mail address: K9850316@ms24.hinet.net (Y.-L. Wang).

Material and method

We conducted a systematic review of all articles in English on this topic published with MEDLINE search in PubMed-indexed journals through August 2018, by using the combination of keywords “first trimester abortion” and “placenta accreta” or “first trimester pregnancy” and “placenta accreta.” Inclusion criteria were articles published in English with the primary topic being first-trimester abortion complicated with placenta accreta and a clear report of the clinical presentation, management, and outcomes. Reference lists from articles identified by using a systematic search were examined to identify other potential studies. Articles not providing clear clinical presentation, management, and outcomes were excluded.

The detailed procedure for study selection and the reasons for exclusion are provided in Fig. 1. Initial decisions to include or exclude studies were focused on the study title. Subsequent decisions were then centered on the abstract and the full-body text. Two authors (Wang YL and Weng SS) were independently involved with article selection, and disagreements were resolved by a third author (Huang WC).

Results

The systemic search identified 172 publications. After removing duplicates, 132 articles were screened by title/abstract, and 39 were selected for full-text assessment. Of those, 17 were selected,

whereas 2 additional articles were selected from reference lists, resulting in the inclusion of 19 articles and 23 case reports published through August 2018. All found studies were case reports, and 17 articles included only one case, whereas the other two articles included two (Liao, 2016) and four cases (Liu, 2003). The demographic characteristics, risk factors, clinical presentations, management, and outcomes of all the patients found in the literature are listed in Table 1.

Risk factors

A high proportion of these patients had a previous history of either cesarean section, or uterine curettage, or advanced maternal age. Of the 23 patients, 20 patients (87%) reported to have post-abort placenta accreta had a previous history of cesarean section. Of these 20 patients, 12 had one previous cesarean section, 6 had two experiences of cesarean section, and 2 had three experiences of cesarean section. One patient (4.3%) had a history of surgical evacuation of retained placenta, and 10 (43.5%) patients had a history of uterine curettage. Ten patients (43.5%) had an advanced maternal age (≥ 35 years). All patients had at least one of these risk factors, whereas 10 patients (43.5%) had two risk factors, and 4 patients (17.4%) had three risk factors.

Clinical presentations and diagnosis

Twenty-two patients had clinical presentations of vaginal bleeding ranging from intermittent or irregular bleeding, persistent bleeding, and profuse or massive bleeding after surgical abortion. Of the 23 patients, 15 (65%) had massive hemorrhage during the intra- or immediate postoperative period, and one patient (Son, 2007) had acute abdominal pain and syncope. However, eight patients (35%) had delayed onset of symptoms even up to 1 week to 2 years postoperatively. Lim et al. [22] reported a 41-year-old woman (G4 P2) who presented with irregular bleeding 2 years after termination of pregnancy of 5 weeks gestation. Vaginal ultrasonography revealed a $7.8 \times 6.6 \times 4.1$ cm well-defined complex mass without vascular flow in the uterine wall. Diagnostic dilatation and curettage was performed; however, heavy uterine bleeding and shock were noted, and emergent total abdominal hysterectomy and incidental appendectomy were performed. Histopathological examination revealed retained placenta accreta without atypical trophoblastic cells.

Of the 23 patients, 10 (43.5%) had an echogenic complex mass in the uterine wall (8 cases in the lower anterior wall and the other 2 cases in the fundal area) on ultrasonography, wherein 8 of 10 cases require further magnetic resonance imaging (MRI) examination. Two patients had hysteroscopy examination, wherein one had a broad-base, intracavitary bulge (Takeda, 2010), whereas the other patient had an invaded placental tissue in the lower uterine segment (Wang, 2011). Besides, two patients had laparoscopic examination, which showed either a lower anterior wall defect (Tanyi, 2008) or bulging mass (Wang, 2011) over the lower uterine segment.

Treatment

Of the 23 patients, 8 (34.8%) underwent conservative treatment, and 7 cases (87.5%) were successful. Of these eight patients, seven (30.4%) underwent uterine artery embolization (UAE), including one patient who underwent transcatheter arterial chemoembolization with dactinomycin (Takeda, 2010). Six cases of embolization (85.7%) were successful; 1 case (Liao, 2016) of embolization failed, and the patient underwent emergent hysterectomy due to recurrent vaginal bleeding and shock after 4 months.

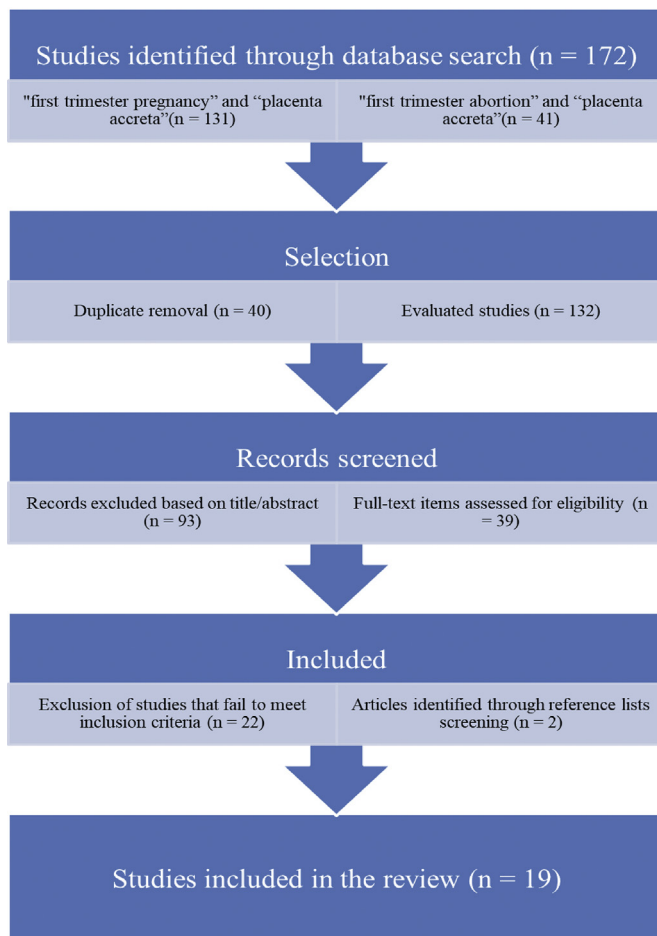


Fig. 1. Flowchart of the results of the search and the selection and inclusion of studies.

Table 1
Literature review of clinical data for patients with placenta accreta after a first-trimester abortion.

Ref	Age	Parity (cesarean deliveries)	Gestational age (weeks)	Risk factor	Abortion procedure	Signs and symptoms	Interval from abortion to symptom onset	Confirmation of diagnosis	β-hCG (mIU/mL)	Treatment
9	34	G3P3 (3)	12	Previous cesarean section	Suction D&C	Profuse bleeding	Intraoperative	Histopathology	390	Hysterectomy
8	32	G6P2	9	Surgical evacuation of retained placenta	Suction D&C	Vaginal bleeding	Intraoperative	Histopathology	Unknown	Hysterectomy
10	27	G4P2 (1)	5	Previous cesarean section	Suction D&C	Profuse hemorrhage	Immediately	Histopathology	1133	Hysterectomy
11	30	G2P1 (1)	11	Previous cesarean section	Suction D&C	Episodic heavy vaginal bleeding	17 weeks	Ultrasonography, MRI, histopathology	Described as normal	Hysterectomy
12	38	G2P1 (1)	7	Previous cesarean section	Suction D&C	Profuse bleeding	Intraoperative	Histopathology	Unknown	Hysterectomy
13	30	G2P1 (1)	8	Previous cesarean section	Suction D&C	Profuse hemorrhage	Intraoperative	Angiography	Unknown	Uterine artery embolization, D&C
13	28	G2P1 (1)	8	Previous cesarean section	Suction D&C	Profuse hemorrhage	Intraoperative	Angiography	Unknown	Uterine artery embolization
13	32	G5P1 (1)	8	Previous cesarean section, previous suction D&C	Suction D&C	Profuse hemorrhage	Intraoperative	Angiography	103,754.8	Uterine artery embolization
13	40	G6P1 (1)	8	Previous cesarean section, previous suction D&C	Suction D&C	Profuse hemorrhage	Intraoperative	Angiography, histopathology	3315.1	Uterine artery embolization then hysterectomy due to adenomyosis
14	42	G6P2 (2)	5	Previous cesarean section	Suction D&C	Vaginal bleeding and right lower quadrant pain	2 weeks	MRI, histopathology	2009.3	Hysterectomy
15	35	G5P2	Unknown	Previous suction D&C	Suction D&C	Acute abdominal pain and syncope	8 weeks	CT, histopathology	<2	Hysterectomy
16	34	G6P1 (1)	8	Previous cesarean section; previous suction D&C	Suction D&C	Persistent vaginal bleeding and a complex mass in the anterior lower uterine segment	16 weeks	Ultrasonography, MRI, CT, histopathology	3	D&C then hysterectomy
17	32	G6P3 (1)	7	Previous cesarean section, previous suction D&C	Suction D&C	Heavy vaginal bleeding	Immediately	Ultrasonography, histopathology	Unknown	Diagnostic laparoscopy then converted to laparotomy with hysterectomy
18	36	G5P3AA1 (2)	11	Previous cesarean section; previous suction D&C	Suction D&C	Profuse hemorrhage	Immediately	Histopathology	Unknown	Hysterectomy
19	39	G4P3	11	Multiparity	Suction D&C	Persistent vaginal bleeding	7 weeks	Ultrasonography, MRI	Unknown	Uterine artery embolization
20	27	G3P1 (1)	8	Previous cesarean section	Suction D&C	Increased bleeding after intermittent bleeding	8 weeks	Ultrasonography, MRI, CT angiography, hysteroscopy	80.93	Transcatheter arterial chemoembolization with dactinomycin
21	38	G3P2 (2)	12	Previous cesarean section	Suction D&C	Profuse hemorrhage; vaginal bleeding and lower abdominal pain	Intraoperative; 8 weeks	Ultrasonography, hysteroscopy, laparoscopy, histopathology	3.2	Laparoscopic hysterotomy and removed placental tissue
22	41	G4P2 (1)	5	Previous cesarean section; previous suction D&C	Suction D&C	Irregular bleeding with uterine mass	2 years	Ultrasonography, histopathology	0.27	D&C then hysterectomy due to vaginal bleeding and shock
23	41	G3P2 (2)	Unknown	Previous cesarean section	Suction D&C	Persistent vaginal bleeding for 2 months	Immediately	Ultrasonography, MRI, histopathology	130	Hysterectomy and bladder rupture
24	36	G8P2AA1 (2)	9	Previous cesarean section; previous suction D&C	Suction D&C	Profuse vaginal bleeding	Immediately	Histopathology	unknown	Hysterectomy
25	20	G2P1 (1)	7	Previous cesarean section	Suction D&C	Persistent vaginal bleeding	1 week	Ultrasonography, MRI, histopathology	Unknown	Subtotal hysterectomy
26	30	G7P3AA4 (3)	11	Previous cesarean section; previous suction D&C	Suction D&C	Vaginal bleeding during D&C	Intraoperative	Ultrasonography, MRI, histopathology	48,121	Transarterial embolization firstly, then hysterectomy due to massive vaginal bleeding and shock 4 months later (bladder injury during operation)
26	28	G8P2AA5 (2)	10	Previous cesarean section; previous suction D&C	LAVH	Vaginal bleeding and missed abortion	Intraoperative	Ultrasonography, MRI, histopathology	Unknown	LAVH (uterine rupture with bladder injury during operation)

Ref, reference; D&C, dilatation and curettage; β-hCG, β-human chorionic gonadotropin; LAVH, laparoscopic-assisted vaginal hysterectomy.

The histopathology report confirmed the diagnosis of placenta increta. One patient (Liu, 2003) of the successful embolization group had no advanced bleeding seven days after UAE (Liu, 2003). However, she underwent hysterectomy because she had completed childbearing and worried about her adenomyomas. The histopathology revealed placenta increta at the lower uterine segment. Besides, one patient (4.3%) presented placenta increta with a complex lower uterine segment mass on ultrasonography image after first-trimester abortion and relatively stable vital signs that was treated successfully with laparoscopic hysterotomy and placental tissue removal (Wang, 2011). Pathologic analysis revealed necrotic and hemorrhagic placental tissue, consistent with placenta accreta. Eighteen patients had placenta accreta that was confirmed histopathologically, including 15 patients who underwent hysterectomy, 2 patients who underwent embolization and hysterectomy (Liu, 2003 and Liao, 2016), and 1 patient who underwent laparoscopic hysterotomy and placental tissue removal (Wang, 2011). Seventeen patients had placenta accreta over lower uterine segment of uterus, which was confirmed pathologically, and the other patient (Son, 2007) had placenta accreta over the left cornual area. Three patients with histopathological confirmation of placenta accreta developed complications with bladder injury, wherein, one patient (Genc, 2014) presented with placenta percreta at the site of previous cesarean section, whereas the other two patients (Liao, 2016) had an invaded placental tissue in the lower uterine segment with dense bladder adherence.

Of the 23 patients, 15 patients (65%) who underwent hysterectomy (13 abdominal total hysterectomies, 1 abdominal subtotal hysterectomy, and 1 laparoscopy-assisted vaginal hysterectomy) as treatment for postabortal accreta. Seven patients who had massive hemorrhage intraoperatively or immediately after suction D&C underwent emergent hysterectomy. The other eight patients had delayed and relative mild to moderate symptoms. These patients had preoperative examinations, including ultrasonography, computerized tomography, or MRI. One patient (Liao, 2016) presented with placenta accreta while pregnant for more than 9 weeks and vaginal bleeding. Ultrasonography and MRI revealed suspicious placenta accreta. Laparoscopy-assisted vaginal hysterectomy was planned because she did not opt for uterine conservation. The pathology report confirmed placenta accreta with foci placenta increta.

Discussion

To the best of our knowledge, this is the first systemic review to study the clinical issues of placenta accreta after a first-trimester abortion procedure. Its incidence is extremely rare, as only 19 articles and 23 cases have been reported in literature. Most cases presented clinically with vaginal bleeding ranging from intermittent or irregular bleeding, persistent bleeding, and profuse or massive bleeding. The onset of symptoms might be during the intra- or immediate postoperative period. Some patients had delayed symptoms even up to 1 week to 2 years postoperatively. Some patients with placenta accreta after a first-trimester abortion and relatively stable vital signs underwent image modality examinations, such as ultrasonography (10 cases), MRI (8 cases), hysteroscopy (2 cases), and laparoscopy (2 cases). Conservative management may be attempted as the primary rescue, including UAE, transcatheter arterial chemoembolization (TACE) with dactinomycin, and laparoscopic hysterotomy and placental tissue removal. Definitive treatment includes either abdominal or laparoscopic hysterectomy if conservative treatment has failed.

The development of abnormal placentation has been associated with placenta previa, previous uterine curettage, scarred uteri resulting from prior cesarean section, myomectomy or cornual

resection, multiparity (≥ 6), and older maternal age [5–8]. In the present review, 20 of the 23 reported patients with postabortal placenta accreta had a history of cesarean section. One patient had a history of surgical evacuation of retained placenta, and 10 patients had a history of uterine curettage. Ten patients (43.5%) were of advanced age (≥ 35 years). Nevertheless, the precise cause of placenta accreta remains unknown.

Morbidly adherent placenta (MAP) or abnormally invasive placenta (AIP) is a histopathological term, which encompasses a spectrum of conditions characterized by an abnormal adherence of the placenta to the implantation site [6,33–35]. In clinical practice, the term placenta accreta is often used for MAP or AIP. The diagnosis of placenta accreta in the first trimester is rare and challenging compared with its diagnosis in the second or third trimester. Efforts to identify placenta accreta in the first trimester have yet to be standardized. D'Antonio et al. [36] evaluated first-trimester ultrasonography findings in pregnancies wherein MAP was confirmed surgically or histopathologically. Ultrasonography findings for first-trimester detection of MAP included placenta lacunae (46%), reduced thickness of retroplacental myometrium (67%), abnormal bladder–serosal interface (52%), and low implantation of gestational sac as assessed subjectively or measured from the inferior edge of the sac to the external cervical os (82%). Complementary MRI might be performed to evaluate the lateral extension and penetration depth of the placenta, because this modality may provide clearer results than ultrasonography in the identification of the placenta in the first trimester when the myometrium is thick. Early recognition of the condition may improve the outcome because it provides the physician the opportunity to promptly manage this emergent condition. However, the majority of patients with placenta accreta have no preceding symptoms; thus, early diagnosis must rely on a high degree of suspicion based on early recognition of the risk factors.

The definitive treatment for first-trimester postabortal placenta accreta consisted of hysterectomy [8–12,14,15,22,23,26]. However, with the advanced development of diagnostic and treatment modalities, conservative treatment can be chosen in certain instances, particularly if future childbearing or uterine preservation is desired by a patient [13,19–21]. UAE [13,19] and cytotoxic therapy with methotrexate (MTX) [27–29] have been introduced recently as conservative measures for treatment of postabortal and postpartum abnormal placentation. Uterine artery embolization is an effective intervention to achieve immediate hemostasis; however, revascularization of the retained placental tissue may cause persistent or secondary hemorrhage, resulting in treatment failure, and eventual hysterectomy [26,30–32]. Cytotoxic therapy with MTX had shown variable results in placenta accreta [27–29]. Due to an immediate hemostatic effect, MTX therapy is limited, and delayed hemorrhage may not always be prevented solely by medical treatment [28]. MTX therapy has been suggested to remain as an alternative when a patient has no active bleeding from retained placental tissue [29]. Takeda et al. [20] reported a case of placenta increta after first-trimester abortion that was treated successfully by using TACE with dactinomycin. This might be an effective, minimally invasive treatment for post-abortion retained placenta increta with hemorrhage in a woman desiring fertility preservation. Wang et al. [21] reported a case of placenta increta after a first-trimester abortion that was treated successfully using laparoscopic hysterotomy and placental tissue removal. We believe it may be safe to attempt to treat such a patient with stable vital signs and placenta increta, using laparoscopy, knowing that if intractable bleeding occurred, we could immediately perform a laparoscopically assisted vaginal hysterectomy. Conversion to open laparotomy would be the procedure of last resort. Two patients underwent hysteroscopy that revealed placenta accreta in this study. However,

operative hysteroscopy surgery for management of post-abortion placenta accreta was lacking. Perhaps, with the development of newer modalities in hysteroscopy technology, conservative surgery via hysteroscopy can be chosen in certain instances in the future.

Several limitations of the present study should be acknowledged. First, this research had a retrospective design, and some data may not have been validated as well as the data in planned prospective studies. Second, the data of the outpatients who have never been hospitalized might have been more difficult to collect than those of the in-patients. Prospective studies are desirable to examine the effects of surgery or medical therapy. However, considering the rarity of this disease, it may be difficult to execute a prospective study. Although similar works could hardly be found in literature, it could mainly be because of the lack of good-quality evidence to be used.

Conclusion

Placenta accreta is a potentially life-threatening condition that may complicate first-trimester abortion on rare occasions and is difficult to be recognized preoperatively. A high index of clinical suspicion based on early recognition of the risk factors and anticipation of placenta accreta is highly essential in early pregnancy. Conservative options may be attempted as the primary rescue, including UAE, TACE with dactinomycin, and laparoscopic hysterotomy and placental tissue removal. However, because of the uncertain success rate of conservative management, most reports in the literature suggest either abdominal or laparoscopic hysterectomy as the definitive treatment for first-trimester postabortal placenta accreta.

Disclosures

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Conflict of interest

The authors declare that they have no financial and non-financial conflict of interest.

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