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Value of pelvic embolization in the management of severe postpartum hemorrhage due to placenta accreta, increta or percreta

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ABSTRACT

Objectives: To evaluate the role, efficacy and safety of pelvic embolization in the management of severe postpartum hemorrhage in women with placenta accreta, increta or percreta.
Methods: The clinical files and angiographic examinations of 12 consecutive women with placenta accreta ($n=4$), increta ($n=2$) or percreta ($n=6$) who were treated with pelvic embolization because of severe primary ($n=10$) or secondary ($n=2$) postpartum hemorrhage were reviewed. Before embolization, four women had complete placental conservation, four had partial placental conservation, three had an extirpative approach and one had hysterectomy after failed partial conservative approach.
Results: In 10 women, pelvic embolization was successful and stopped the bleeding, after one ($n=7$) or two sessions ($n=3$). Emergency hysterectomy was needed in two women with persistent bleeding after embolization, both with placenta percreta and bladder involvement first treated by extirpation. One case of regressive hematoma at the puncture site was the single complication of embolization.
Conclusions: In women with severe postpartum hemorrhage due to placenta accreta, increta or percreta, pelvic embolization is effective for stopping the bleeding in most cases, thus allowing uterine conservation and future fertility. Further studies, however, should be done to evaluate the potential of pelvic embolization in women with placenta percreta with bladder involvement.

1. Introduction

Placenta accreta, increta and placenta percreta are relatively uncommon placentation abnormalities, which correspond to invasion of the myometrium by the fetal trophoblast [1]. Placenta accreta is the least invasive form, whereas placenta percreta corresponds to a full penetration of the trophoblast through the uterus that reaches the serosal surface and potentially invades the bladder, rectal wall, and pelvic vessels [1–3]. These three conditions are potentially life-threatening disorders and are responsible for increased maternal morbidity and mortality rates [4]. The main reason is that placenta accreta, increta and percreta are associated with an increased risk of severe postpartum hemorrhage.

In order to minimize blood loss after delivery and to preserve the uterus in women with placenta accreta, increta or percreta, several strategies have been tested. In this regard, several case reports have suggested the use of uterine packing, prostaglandin administration, argon beam coagulation, methotrexate injection or direct aortic compression [5–7]. Besides these options, which remain anecdotal, three main strategies have been further developed. One of these, which has been the favored one for long and recommended by the American College of Obstetricians and Gynecologists, is based on an extirpative approach, consisting in manual removal of the placenta [8]. However, this strategy may result in severe hemorrhage that may require emergency hysterectomy [4]. In addition, extirpative management results in a substantial increase in morbidity due to subsequent endometritis, ureteral and bladder damage and fistula formation [4]. The other two strategies are based on a conservative management of the placenta, which remains in place within the uterus. One of these two is the so-called “cesarean hysterectomy” during which the abnormal placenta is removed along with the uterus. By contrast, the other one consists in a full conservative management of both the uterus and the abnormal placenta, which is left inside the uterus at the time of delivery [8–10], This full conservative approach has gained wide acceptance in Europe

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Table 1
Obstetrical data before embolization in twelve women presenting with severe postpartum hemorrhage due to placenta accreta, increta or percreta.

Patient no.	Age (years)	Parity	Gravidity	Mode of delivery	Placentation	Approach
1	42	P2	G3	Cesarean section	Accreta	Partial conservative
2	41	P4	G7	Cesarean section	Accreta	Partial conservative
3	38	P2	G2	Cesarean section	Accreta	Full conservative
4	39	P2	G3	Spontaneous vaginal	Accreta	Extirpative
5	25	P1	G1	Cesarean section	Increta	Partial conservative
6	32	P2	G2	Cesarean section	Increta	Extirpative
7	36	P1	G2	Cesarean section	Percreta	Full conservative
8	34	P3	G7	Cesarean section	Percreta	Extirpative
9	37	P2	G3	Cesarean section	Percreta	Partial conservative and hysterectomy
10	42	P3	G3	Cesarean section	Percreta	Full conservative
11	43	P2	G6	Cesarean section	Percreta	Partial conservative
12	43	P3	G6	Cesarean section	Percreta	Full conservative

because it may result in a lower incidence of hysterectomy and primary postpartum hemorrhage [8]. However, whatever the chosen option, both strategies are associated with a higher risk of uterine bleeding by comparison with a delivery with normal placental adhesion [11,12] so that pelvic embolization may be still required in a number of cases [13].

Pelvic embolization has a well-established efficacy for the treatment of multiple causes of postpartum hemorrhage [14–18]. In addition, researchers have reported return to normal menses and multiple cases of pregnancy after pelvic embolization, whereas hysterectomy definitively eliminates future fertility [19–21]. Moreover, there were some reports that described the successful use of pelvic embolization in cases of postpartum bleeding in women with placenta accreta or percreta [13,22–24]. However, studies that specifically addressed this topic are scarce [25–27], so that the capabilities of pelvic embolization in the management of severe postpartum hemorrhage in women with placenta accreta, increta or percreta have not been fully elucidated so far.

Accordingly, we report our experience involving 12 consecutive women with severe postpartum hemorrhage due to placenta accreta, increta or percreta who were treated with pelvic embolization. The goals of this retrospective study were to evaluate the potential role and efficacy pelvic embolization in the management of severe postpartum hemorrhage in women with placenta accreta, increta or percreta and to identify, if any, the complications of this procedure in this specific population.

2. Materials and methods

2.1. Patients

From March 2007 through January 2009, the database of our Institution was retrospectively queried to identify cases of women with placenta accreta, increta or percreta. A total of 27 women were identified. Of these, 12 were treated by percutaneous transcatheter pelvic arterial embolization after delivery because of severe postpartum hemorrhage. The remaining 15 women were excluded because they did not experience severe bleeding during delivery and therefore, did not require pelvic embolization. Thus, the final study population comprised 12 consecutive women with a mean age of 37.7 years (range: 25–43 years). All but one woman were referred from outside institutions. All pelvic embolization procedures were performed in accordance with the guidelines of our institutional review board and informed consent was obtained from all patients.

2.2. Presentation at admission

All women initially presented with severe postpartum hemorrhage with external bleeding and severe hemodynamic consequences requiring immediate correction of the hemodynamic parameters by blood transfusion and administration of crystalloid or colloid substances. Two women were primiparous, 10 were multiparous and none of the women had history of severe postpartum hemorrhage. Seven women were Caucasian, three were African, one was Afro-Caribbean and one was Arabic. All women had a history of uterine scar due to prior cesarean section ($n = 9$), hysteroscopy with biopsies ($n = 2$) or dilation and curettage after surgical abortion ($n = 1$).

Eleven women had cesarean deliveries and one had spontaneous vaginal delivery. Among the five women with abnormal placentation diagnosed antenatally (placenta accreta, $n = 2$; placenta percreta, $n = 3$) based on typical ultrasonographic and color Doppler findings, four had initially a full conservation and one had a partial conservation of the placenta. Among the seven women with an abnormal placentation diagnosed during delivery (placenta accreta, $n = 2$; placenta increta, $n = 2$; placenta percreta, $n = 3$), three had initially an extirpative approach and four had a partial conservation of the placenta. One of these latter seven women, with placenta percreta had hysterectomy with partial bladder resection at her referring institution because of life-threatening bleeding after failed surgical attempts for uterine conservation. The mean term was 34.4 weeks (range: 26–39 weeks). No cases of multiple pregnancies were present. Ten women had primary postpartum hemorrhage and two had secondary (or delayed) postpartum hemorrhage. Secondary postpartum hemorrhage occurred 5 weeks after cesarean section in one woman with placenta accreta treated extirpatively with remaining placental portions and 10 weeks after cesarean section in another woman with placenta percreta and bladder invasion treated conservatively. These two women had their uterus in place when embolization was performed.

Before embolization, all women had an estimated blood loss of more than 1 L and had already received fresh blood transfusion, intravenous administration of crystalloid or colloid substance and intravenous injection of 20 units of oxytocin (Syntocinon®; Sandoz, Rueil-Malmaison, France) in association with 500 μg ($n = 1$) or 1000 μg ($n = 11$) of prostaglandin-E2 analogue (Nalador®; Schering, Lys-Lez-Lannoy, France). Hypovolemic shock, as defined by a systolic blood pressure less than 90 mmHg, was present in six women. For the 11 women referred from outside institutions, the mean time between delivery and arrival at our institution was 7 h 10 min (range: 3–8 h, 45 min). Obstetrical data of the 12 women are reported in Table 1. Before embolization, abdominal and pelvic ultrasonographic examination showed peritoneal hemorrhage in the woman with prior hysterectomy. For the other 11 women, abdominal and pelvic ultrasonographic examination showed a complete placenta left in place ($n = 4$), remaining portions of placenta ($n = 5$) or absence of placental remains ($n = 2$), intra-uterine blood clots ($n = 11$) in association with a poorly retracted uterine body ($n = 6$), with ($n = 3$) or without peritoneal hemorrhage ($n = 8$). Clinical examination revealed absence of cervicovaginal abnormalities in all women.