

Case Report

## Double-balloon cervical ripening catheter works well as an intrauterine balloon tamponade in post-abortion massive hemorrhage<sup>☆</sup>

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### Abstract

**Objective:** Clinical experience in the management of post-abortion hemorrhage is limited.

**Case Reports:** Two women with severe post-abortion hemorrhage were reported. One case occurred after methotrexate treatment of Cesarean scar pregnancy and the other occurred after abortion surgery. Both patients were successfully treated with a double-balloon cervical ripening catheter inducing intrauterine balloon tamponade.

**Conclusion:** Use of a double-balloon cervical ripening catheter either before or after systemic methotrexate treatment is one of the choices in the management of severe post-abortion hemorrhage and can prevent the use of more invasive and/or destructive procedures.

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**Keywords:** double-balloon cervical ripening catheter; methotrexate; post-abortion hemorrhage

### Introduction

Abnormal early pregnancies have often been terminated by abortion, either spontaneously or with medical assistance [1–5]. Although the majority of them are uneventful [2], some may be complicated by a life-threatening situation, especially

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the occurrence of massive post-abortion hemorrhage (PAH) [4, 6]. Clinical experience in the management of PAH is limited, but the strategy used is often similar to the stepwise approach used in the management of postpartum hemorrhage (PPH), beginning with physiological attempts (massage and compression), then medication, and finally more invasive surgical interventions or radiologically invasive interventions (uterine artery embolization), such as defect repair, excision, pelvic vessel ligation, hysterotomy, or even hysterectomy [7, 8].

Many different tools are used to finish the compression-inducing intrauterine tamponade, including a gauze pack, Foley catheter and balloon catheter [9, 10]. Herein, we report two women with massive PAH, who were treated with

a double-balloon cervical ripening catheter inducing intrauterine balloon tamponade. One was after and the other before systemic methotrexate therapy.

### Case reports

The first case was an incomplete spontaneous abortion of a Cesarean section scar pregnancy after systemic methotrexate therapy. This 35-year-old woman, gravida 2, para 1, had a history of Cesarean section once and an appendectomy. She had vaginal bleeding and intermittent abdominal pain. Serum  $\beta$ -human chorionic gonadotropin ( $\beta$ -hCG) = 2478 mIU/L and transvaginal ultrasound led to a suspicion of Cesarean section scar ectopic pregnancy. She was treated with a single dose of methotrexate therapy (1 mg/kg systemically) on Day 1. The serial serum  $\beta$ -hCG levels = 944 mIU/L on Day 4 and 454 mIU/L on Day 9. However, heavy vaginal bleeding occurred suddenly on Day 10. The patient underwent insertion of a double-balloon cervical ripening catheter (Fig. 1) to induce intrauterine balloon tamponade for bleeding control, and the serum  $\beta$ -hCG level declined continuously to 58.24 mIU/L on Day 12. This double-balloon cervical ripening catheter was removed uneventfully on Day 13. The serum  $\beta$ -hCG level was <10 mIU/L on Day 16, and repeat transvaginal ultrasound confirmed complete resolution of the abortion.

The second case was a delayed surgical post-abortion hemorrhage. The 31-year-old woman, gravida 2, para 1, had a history of Cesarean section 4 years previous to this occurrence. At that time, the woman was diagnosed as having secondary infertility because of bilateral tubal occlusion. She then underwent successful *in vitro* fertilization and embryo transfer. At the gestational age of 7 weeks, transvaginal ultrasound revealed a sac at the low segment of the uterus, accompanied by a  $5.4 \times 2.1$  cm hypoechoic mass in the fundal area of the uterus, suspected of being a hematoma. The patient was treated with daily 50 mg progesterone intramuscularly for luteal support. However, low abdominal pain with vaginal spotting persisted. After 1 week of support treatment, there

was still an absence of the fetal pole in the intrauterine gestational sac. She underwent abortion surgery smoothly on the next day, with an estimated blood loss = 50 mL. Two weeks after abortion surgery, abdominal pain and vaginal bleeding recurred. Transvaginal ultrasound showed a hetero-echoic mass, with a strong signal of blood flow throughout the uterus (Fig. 2). The serum  $\beta$ -hCG level was 3811 mIU/L. Abdomen magnetic resonance imaging showed a 3.6 cm lobulated lesion located on the lower segment of the uterus, supporting the diagnosis of placenta increta, or persistent Cesarean section scar ectopic pregnancy (Fig. 3).

Medical treatment with three doses of methotrexate (1 mg/kg systemically, Days 1, 3, and 5) and leucovorin (0.1 mg/kg, systemically, Days 2, 4, and 6) was given. On Day 8, transabdominal ultrasound showed a significantly decreased blood flow in the uterine myometrium after methotrexate treatment (Fig. 4). Therefore, hysteroscopic removal of the placenta via bipolar electro-cauterization was performed on Day 8. Because of persistent vaginal bleeding, a double-balloon cervical ripening catheter was used immediately, to induce intrauterine balloon tamponade after surgery; this was confirmed by transvaginal ultrasound (Fig. 5). This double-balloon cervical ripening catheter was maintained for 1 week and removed smoothly on Day 15 without residual placental tissue within the uterine cavity (Fig. 6).

### Discussion

The causes of PAH are not well established, but possible causes might be similar to those of PPH, including uterine atony, abnormal placentation, and lacerated genital tracts [11]. Among these causes, abnormal placentation has contributed to PPH more frequently in recent decades [12], which might be also the main cause contributing to PAH. In the management of abnormal placentation, many strategies could be used, including decreasing blood supply, increasing uterine contraction, compressing abnormal placentation, and prescribing some medications, and finally surgical intervention, such as Hayman uterine



Fig. 1. The double-balloon cervical ripening catheter contains silicone material, which can be inflated with 80 mL of fluid.

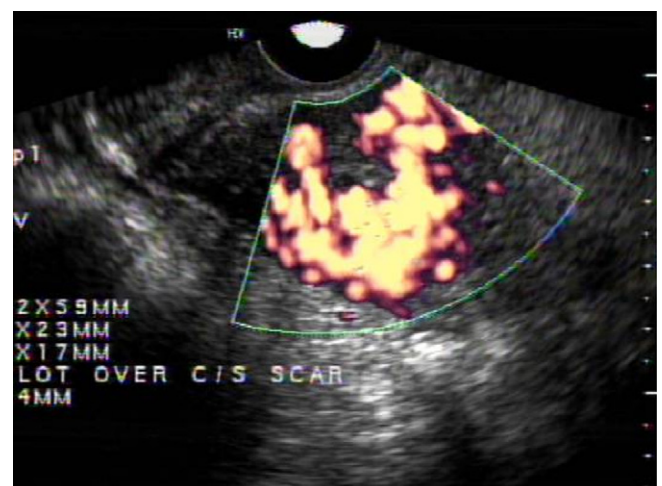


Fig. 2. Transabdominal ultrasound reveals a strong signal of blood flow in the uterine myometrium, suggesting the possibility of placenta increta.



Fig. 3. Abdominal magnetic resonance imaging shows a lobulated lesion about 3.6 cm in diameter with heterogenous mixed hyperintense T2 and T1-signals invading the lower segment of the uterine myometrium. The differential diagnosis includes placenta increta and ectopic Cesarean scar pregnancy.

compression stitch, hysterectomy and others [13]. Among the agents used for medical treatment, methotrexate is the most popular, although etoposide was sometimes used for the same purpose [14]. Methotrexate not only directly inhibits cell proliferation by blocking DNA or RNA synthesis, but also reduces the vascularity of the placenta, leading to placental necrosis and rapid involution of the placenta [15]. One of our two cases was treated with methotrexate initially for Cesarean scar ectopic pregnancy, and the other underwent rescue therapy with methotrexate for post-abortion persistent Cesarean scar ectopic pregnancy or placenta increta. Both patients responded well to methotrexate treatment, based on the serial serum levels of  $\beta$ -hCG.

However, both patients were had complications of massive PAH. In this situation, a stepwise approach can be initiated, including: compression methods, such as rolling gauze,



Fig. 5. Transabdominal ultrasound shows the location of the double-balloon cervical ripening catheter within the uterine cavity.

balloon tamponade to compress the bleeding site, often abnormal placental site or uterine cavity, uterine artery embolization [16], or its similar surgical approach, iliac artery or uterine artery ligation [17], or a more destructive surgical approach [18]. In both cases, a double-balloon cervical ripening catheter was used as a tool to produce a compressive effect on bleeding sites. This double-balloon cervical ripening catheter was urgently applied under ultrasound guidance, to form an intrauterine balloon tamponade; using this method, the heavy massive PAH was successfully managed.

This strategy is not new, since it has been successful in the management of various kinds of abnormal placentation, including PPH and our reported PAH. There are a number of different balloon catheters which can be used, including the Bakri balloon, Sengstaken–Blakemore tube, Rusch balloon, condom catheters and Foley catheters [19]. However, the cervical ripening balloon catheter was originally designed for the induction of labor. There are two types of cervical ripening balloon catheters, the single-balloon and double-balloon [20].

Of course, if the compression methods, such as our presenting method, the use of a double-balloon cervical ripening catheter, cannot reach the goal which is to stop bleeding, the

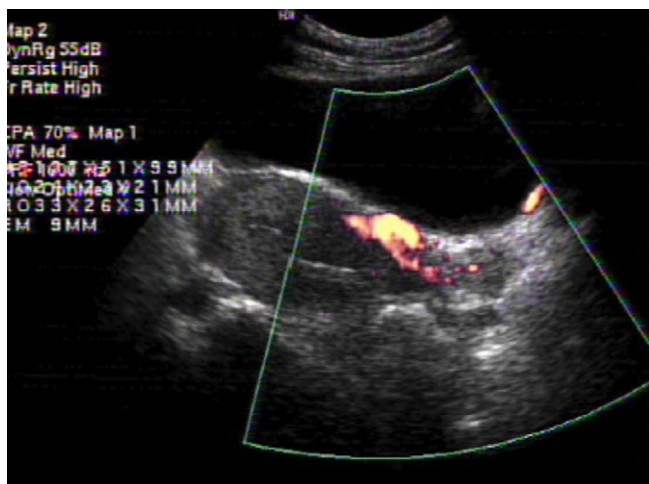


Fig. 4. Transvaginal ultrasound reveals a significantly decreased blood flow in the uterine myometrium.

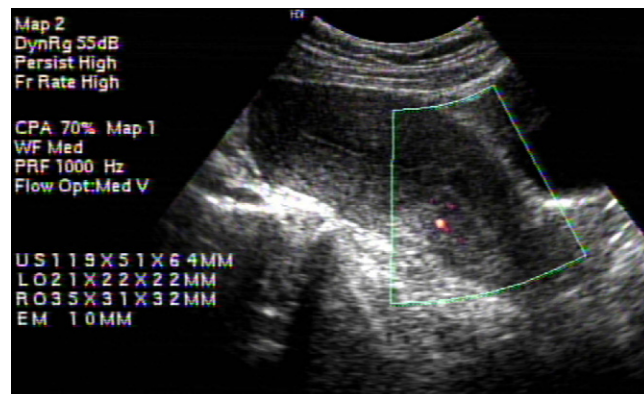


Fig. 6. Transvaginal ultrasound reveals no residual material within the uterine cavity.

stepwise approach should be continued, including blockage of uterine feeding vessels, surgical removal, suture and repair, and other more destructive methods. Based on this report, we believed that the use of this double-balloon cervical ripening catheter for inducing intrauterine tamponade to control massive PAH can be used in the earlier step in this stepwise approach strategy, since it is a valid method.

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