Puerperal Pelvic Hematoma Successfully Treated by Primary Transcatheter Arterial Embolization

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The incidence of puerperal hematomas ranges from 1 in 300 to 1 in 1,000 deliveries [1]. Episiotomy is the most common risk factor for puerperal hematomas. Other risk factors include operative vaginal deliveries, extensive birth tract lacerations, primiparity, a prolonged second stage, and coagulopathy [2]. Puerperal hematomas may be classified as vulvar, vulvovaginal or retroperitoneal. When the torn vessel lies above the pelvic diaphragm, the hematoma that develops can cause massive retroperitoneal bleeding and can be fatal without emergent treatment.

Transcatheter arterial uterine artery embolization was first reported as a treatment for postpartum hemorrhage in 1979 [3]. This interventional radiologic procedure has been used in previous decades for the control of obstetric hemorrhage caused by uterine atony, birth tract injuries and placenta accrete when first-line treatment fails. A relatively high success rate with few complications has been reported, and fertility seems to be preserved [4]. Here, we report a case of life-threatening puerperal hematoma treated primarily and successfully by transcatheter arterial uterine artery embolization.

A 29-year-old, gravida 2, para 1, woman at term gestation visited our delivery unit because of spontaneous active labor with 3-cm cervical dilatation at arrival. Her obstetric history included one uneventful term vaginal delivery. The course of this pregnancy was uncomplicated. She had no coagulopathy or previous surgery. The cervix proceeded to full dilation in 4 hours. She spontaneously delivered a live male infant weighing 3,400 g following midline episiotomy and second-degree perineal laceration. The placenta was delivered smoothly, and the perineal wound was repaired by layers. There was good uterine contraction, and only a small amount of lochia was noted. Two hours after the delivery, the patient complained of aggravating pelvic pain and cold sweating. Her pulse rate rose to 110–120 beats/minute, and her blood pressure dropped to 90/50 mmHg. A tense, large hematoma at the right upper vaginal wall was found via pelvic examination. A right lower abdominal tender mass was also palpable, which pushed the uterine fundus upwards and left. Aggressive fluid supplementation was given owing to suspected vaginal hematoma extending to the right retroperitoneal pelvis with hypovolemia. After consulting the radiologist, emergent angiography was carried out.

Pelvic angiography via right femoral arterial puncture was performed uneventfully. Preliminary bilateral internal iliac arteriography showed contrast extravasation at the right vaginal artery territory (Figure 1A). The catheter was advanced into the right vaginal artery, and transarterial embolization was then performed by injection of large Gelfoam pieces mixed with cefazolin until stasis of vascular flow (Figure 1B). The whole procedure took about 70 minutes, and the patient tolerated it well without complications. Her vital signs became stable, and her pelvic pain was partially relieved to a tolerable level. A transfusion of 2 units of packed red blood cells was given, as her hemoglobin level dropped from 12.3 g/dL before delivery to 9.3 g/dL 2 hours after transarterial embolization.

Magnetic resonance imaging was arranged 2 days later. This showed a lobulated hematoma on the right side of the pelvic region, extending from the right side of the perirectal fossa to the right paravesical space and the prevesical fossa region, about 15 × 7 × 11 cm in size (Figure 2). Further drainage of the hematoma was cancelled, because the patient remained hemodynamically stable without significant pain or fever. The postpartum course was otherwise unremarkable, and she was discharged 2 days later. Except for mild right

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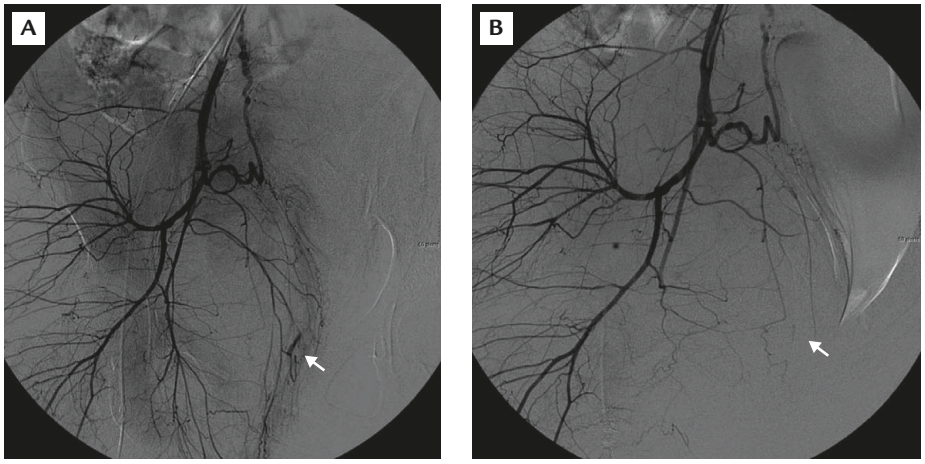

Figure 1. (A) Preliminary internal iliac arteriography showed contrast extravasation at right vaginal artery territory (arrow). (B) After arterial embolization, the bleeding ceased and the angiogram showed occlusion of the right vaginal artery (arrow).

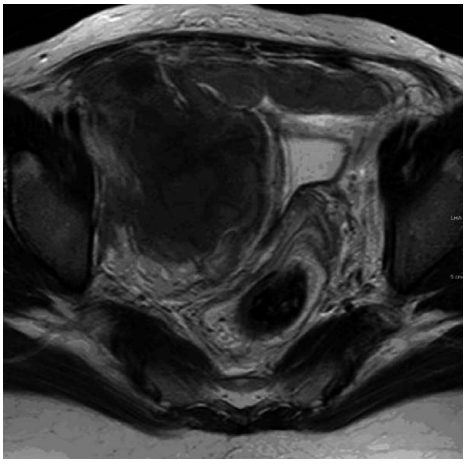

Figure 2. Magnetic resonance image 2 days after embolization. A lobulated hematoma at the right pelvis, from the right side of the perirectal fossa to the right paravesical space, and extending to the prevesical fossa region.

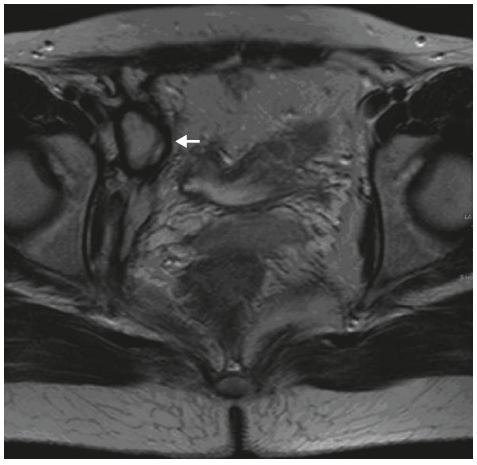

Figure 3. Follow-up magnetic resonance imaging 2 months after embolization showed shrinkage of the hematoma compared with previous images, to about 3 cm in size (arrow).

pelvic pain and weakness of the right thigh, there were no other complaints during the puerperal period. We followed up with the patient weekly. Pelvic examinations showed gradual shrinking of the hematoma with no signs of infection. The follow-up was performed 2 months postpartum and showed shrinkage of the hematoma to about 3 cm in size (Figure 3).

Puerperal hematomas are most commonly caused by birth trauma or inadequate hemostasis during episiotomy repair. In rare instances, hematomas may develop following injury to the vessel without laceration of the superficial tissues. In our case, the hematoma was initially located at the upper vagina, distant from the episiotomy and laceration wound. The right vaginal artery might have been torn by crushing of the vagina during passage of the fetus.

Puerperal hematoma is readily diagnosed based on frequent and severe perineal pain, though the absence of perineal pain does not rule out a developing hematoma [5]. Our patient appeared to be slipping into a shock-like state after delivery, without signs of significant vaginal bleeding. Vaginal and pelvic examinations detected the hematoma, which dissected into the retroperitoneal pelvis. Such hematomas do not distend the relatively pain-sensitive female vulvoperineum, and can be nearly painless while being very dangerous. Earlier reports described a mortality risk of 20% for retroperitoneal hematomas [6], though the aggressive use of blood transfusion, surgical intervention and antibiotics have reduced the incidence of serious sequelae in recent years.

The conventional treatment for puerperal hematomas is prompt incision and evacuation of the blood and clots, ligation of bleeding points, and packing of the vagina. Occasionally, these measures are not successful, and attempts to search for specific bleeding

vessels may be impossible owing to distortion and friable tissues. In this situation, angiographic embolization may be considered [7]. In our case, surgical repair was initially abandoned, not only because identification of the bleeding source was difficult after pelvic examination, but also because incision of the hematoma could cause intractable vaginal bleeding due to further decompression of the bleeding points if the hematoma drained.

Transcatheter arterial embolization has been used for decades to treat hemorrhage associated with tumors, vascular malformations, and pelvic trauma. The widespread use of this technique for the prevention and treatment of obstetric hemorrhage has been associated with high success rates and few major complications [4,8]. However, most studies reported the use of embolization in intractable hemorrhage after surgical approaches failed. Primary treatment of a puerperal hematoma by transcatheter arterial embolization has rarely been reported. Specific bleeding sites are often impossible to identify during surgery, but are usually easily identified by angiography. Friable tissues also predispose to surgical complications such as ureter or bladder injury. In our case, immediate arterial embolization instead of surgery achieved bleeding control with no complications.

Large pelvic hematomas often cause pelvic discomfort and pose the risk of abscess formation. Laparotomy or image-guided drainage of the hematoma after cessation of the bleeding by embolization has been considered. Percutaneous computed topography-guided transgluteal drainage has been reported as a safe and effective alternative to surgery, without major complications [9]. However, because the tamponade effect could be preserved by the retroperitoneal hematoma, and because the hematoma was enclosed in the retroperitoneal pelvis with no communication to the vagina, the risk of infection was not especially high in this case. We finally decided to continue to observe the patient, without attempting drainage. The hematoma had shrunk significantly within 2 months postpartum.

Our experience in this case suggests that transcatheter arterial embolization is an excellent alternative to definitive treatment of puerperal hematoma. It is more effective than conventional measures such as suturing and packing, and is associated with less morbidity. This procedure should be considered for use early in the course of treatment to prevent more serious hemorrhagic complications, especially in patients with severe postpartum hemorrhage that may not respond to other measures, such as hysterectomy [8].

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