Case Report

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Internal iliac artery balloon occlusion as a hemostatic method for spontaneous rupture of vulvar hematoma during delivery: A case report

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Abstract

Spontaneous rupture of a vulvar hematoma during delivery is a relatively uncommon event and may cause excessive hemorrhage. Exact identification of anatomic structures and bleeding points is challenging. We herein present a case involving a pregnant woman at 39 weeks' gestation with a large vulvar hematoma that spontaneously ruptured during the second stage of labor, likely due to rupture of varices in the vulva or vagina. It was difficult to accurately expose and suture the deep bleeding points. The estimated blood loss volume was 1591 mL, and the hemoglobin concentration dropped from 132 g/L before delivery to 84 g/L after delivery. To prevent hemorrhagic shock, bilateral internal iliac artery balloon occlusion was performed and proved to be an effective way to achieve hemostasis. Once hemostasis was established, ligation of the bleeding sites and suturing of all dead space were rapidly completed. Bilateral internal iliac artery balloon occlusion can be used as an effective treatment for excessive vaginal bleeding. The presence of varices or hemangiomas in the vulva or vagina should be carefully checked during antenatal care.

Keywords

Delivery, spontaneous rupture, vulvar disease, hematoma, balloon occlusion, internal iliac arteries

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Introduction

Most vulvar hematomas reportedly result from traumatic injury including straddle injuries, sexual assault, or aggressive coitus in non-pregnant women.[1,2] However, spontaneous rupture of a vulvar hematoma during vaginal birth is a relatively uncommon event. One case report described a large vulvar hematoma that ruptured during the second stage of labor, and the authors emphasized that hemostasis should be achieved rapidly with adequate drainage, suturing, and packing.[3] However, if the hematoma is large and the deep bleeding point cannot be exposed, exact identification of anatomic structures and bleeding points subsequent to rupture of such a large hematoma is challenging.

Prophylactic balloon occlusion of the internal iliac arteries was first described by Dubois et al.[4] The advantages of this technique are a reduction in blood loss and improved visualization of the surgical field. Intrapartum and postpartum hemorrhage can also be prevented, reducing the need for transfusion. Therefore, this technique has been widely used as an adjunct for patients with placenta accreta.[4,5]

We herein present a case involving a pregnant woman at 39 weeks' gestation with a large vulvar hematoma that spontaneously ruptured during the second stage of labor. This case is being reported to illustrate that bilateral internal iliac artery balloon occlusion is an effective way to achieve hemostasis.

Case report

Ethical approval and verbal patient consent were acquired prior to the submission of this manuscript. All ethical approval and consent procedures were approved by the Medical Ethical Committee of West China Second University Hospital, Sichuan University.

A 28-year-old gravida 1 para 0 at 39 weeks' gestation presented to the delivery room in active labor with her cervix completely dilated and at +3 station. The position of the fetal head was left occiput anterior, and the fetal heart rate was 120 beats per minute. An enlarging vulvar hematoma measuring approximately 4×4 cm was noted in the region of the right labia minora. Her pregnancy course was uncomplicated. She reported no prior surgeries and denied any drug allergies. On physical examination, her vital signs and general examination findings were normal. The patient reported no history of perineal or abdominal trauma, insect bites, recent exposure to new allergens, or recent sexual intercourse.

With each uterine contraction and maternal expulsive effort, the hematoma expanded and ultimately reached a size of 8×6 cm within a few minutes. As the fetal head began to crown, the hematoma caused a soft tissue obstruction. When the maternal expulsive forces surpassed the obstructive forces, however, before the fetal head was delivered, the hematoma ruptured with clots taking a parabolic trajectory and landing 1.7 m away from the vulva. The infant was rapidly delivered. The Apgar score was 10 at 1 and 5 minutes, and the infant weighed 2890 g.

The ruptured hematoma site continued to rapidly bleed, and the patient was immediately transferred to the operating room for hemostasis. General anesthesia was induced prior to surgical management. The hematoma cavity was extended along the vaginal wall and deep into the posterior vaginal fornix, reaching approximately 10×8 cm. It was difficult to accurately expose and suture the deep bleeding points. The estimated blood loss volume was 1591 mL, and the hemoglobin concentration had dropped from 132 g/L before delivery to 84 g/L after delivery. The patient was transfused with 3.5 units of red blood cells.

To prevent hemorrhagic shock, bilateral internal iliac artery balloon occlusion was performed by a radiologist. Fluoroscopy with dilute contrast medium was used to guide and confirm placement of the catheters. A pelvic angiogram confirmed no damage to the internal iliac artery branches. The balloon catheters were placed on both sides of the proximal segment of the internal iliac arteries and flattened for occlusion (Figure 1). Once hemostasis was secured, the hematoma cavity was closed with several figure-of-eight sutures, leaving no dead space (Figure 2). At this point, both internal iliac balloons were deflated, and no further bleeding was observed. The vulva and vagina were packed with long gauze, which was left in place for 48 hours. Antibiotics were administrated for 72 hours. The balloons and femoral sheaths were removed within 12 hours. A Foley catheter was inserted, and strict bed rest was required.

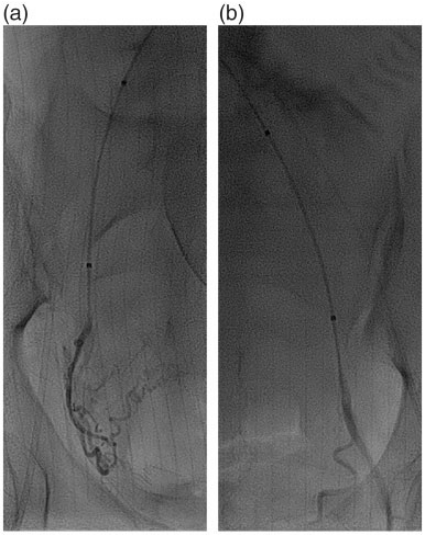

Figure 1. Bilateral internal iliac artery balloon occlusion. The balloon catheters were placed on the (a) left and (b) right sides of the proximal segment of the internal iliac arteries and flattened for occlusion

The patient was discharged home on her fifth postpartum day with an increased hemoglobin concentration of 112 g/L. Subsequent follow-up confirmed that the vulvar and vaginal laceration had healed and that the infant was doing well.

Discussion

A spontaneous vulvar hematoma occurring during pregnancy has rarely been reported in the literature. If the patient has varices or hemangiomas in the vulva or vagina, a spontaneous hematoma is more likely to develop and even rupture during labor.[6] Management strategies for vulvar hematomas have generally consisted of conservative and surgical methods, which are heavily influenced by expert opinion and the experience of the attending physician. However, no randomized trial has been performed to clarify this issue.

In the present case, a vulvar hematoma rapidly expanded during the second stage of labor without any traumatic injuries. The delivery was imminent and proceeded quickly, which inhibited conservative management and observation. Additionally, given the spontaneous rupture of the hematoma, operative vaginal delivery was not performed to minimize further tissue trauma. Surgery is usually reserved for larger hematomas measuring >5 cm or an estimated blood loss volume of >200 mL.[7] Surgical management includes drainage of blood, ligation of bleeding sites, and suturing of the dead space cavity. A vulvar hematoma often results from injury to the branches of the pudendal vessels, including the inferior rectal, transverse perineal, or posterior labial branches located in the superficial fascia of the pelvic triangle. Moreover, the perineal veins are valveless and have free anastomoses with the intrapelvic venous plexuses. The presence of loose connective tissue provides spaces for a massive hematoma. Therefore, blood loss

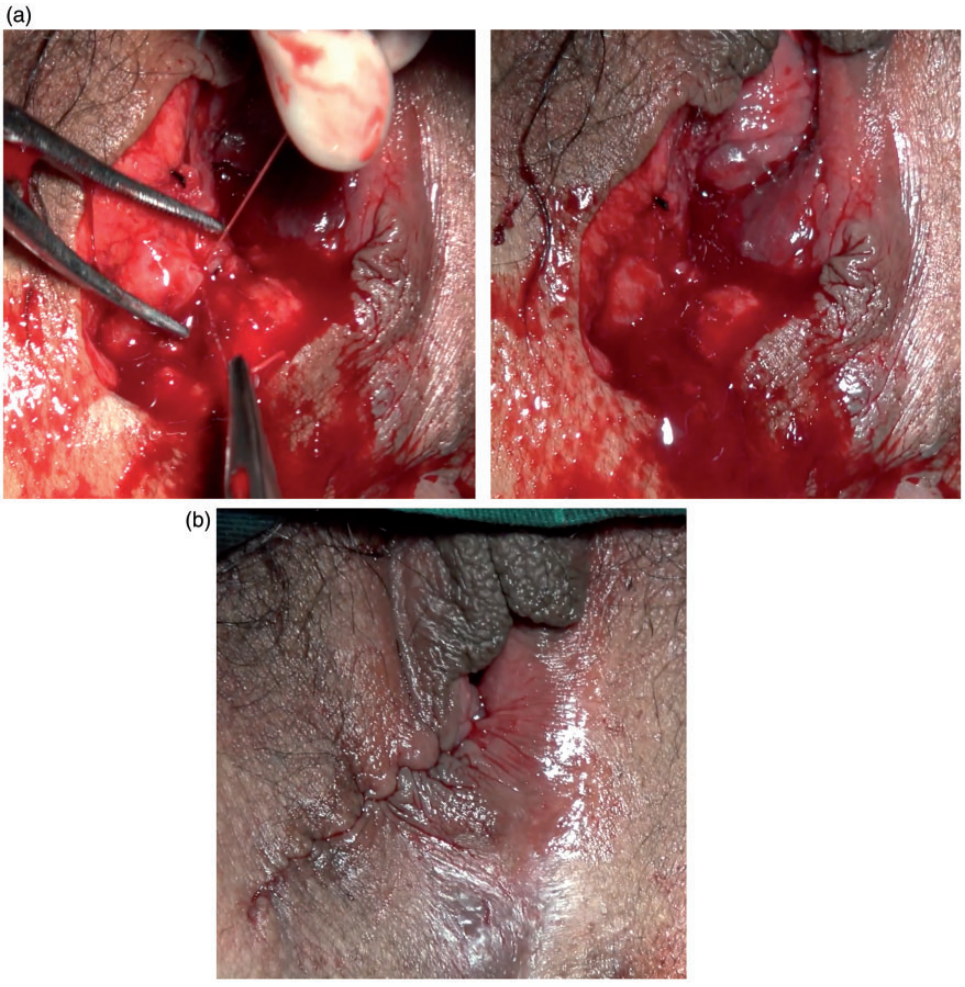

Figure 2. (a) Operation area of vulvar hematoma cavity after rupture. (b) Operation area after surgery

can be excessive. In the present case, the pelvic angiogram confirmed no damage to the internal iliac artery branches, and vaginal and vulvar varices were noticed during surgical management. Due to the spontaneous rupture of the hematoma in this patient, we considered the possibility of injuries to the deeper structures including the clitoral vessels and bulbospongiosus and ischiocavernosus muscles. Ligation of bleeding vessels can be technically difficult in a setting of anatomical distortion and tissue friability. Exact identification of these structures and bleeding points subsequent to rupture of such a large hematoma is challenging.

The use of bilateral balloon occlusion of the internal iliac artery is reportedly associated with a reduction of intraoperative blood loss, blood transfusion requirement, and the need for intensive care unit admission.[8] Therefore, this radiologic method has been widely applied for treatment or prophylactic management for patients with placenta previa, placenta accreta, or cesarean scar pregnancy to block the uterine

blood supply. To the best of our knowledge, vulvar hematomas are often accompanied by injury to branches of the pudendal artery, which is subsequent to the internal iliac artery. Moreover, in the present case, the hematoma had extended into the posterior vaginal fornix with injuries to the deeper paravaginal structures and tissues, which are supplied by branches of internal iliac artery. Therefore, complete hemostasis was achieved by selective angiographic embolization proximal to the vascular branch irrigating the bleeding site without complications. In one reported case, advanced selective angiography embolization as used as an effective alternative to surgery for intractable hemorrhage of a vulvar hematoma.[9] In another recent case report, definitive treatment of arterial embolization was used to treat rupture of an internal pudendal artery aneurysm following spontaneous vaginal delivery.[10] In the present case, bilateral balloon occlusion of the internal iliac artery was performed for arterial embolization by an experienced and well-trained radiology team. In such cases, the balloon can be removed immediately after surgical management, which may reduce post-embolization complications such pain, benign fever, infection, and ovarian failure.

Spontaneous rupture of a vulvar hematoma is a rare complication of vaginal delivery. Bilateral internal iliac artery balloon occlusion could be used as an effective treatment for excessive vaginal bleeding. Patients should be carefully checked for varices or hemangiomas in the vulva or vagina during antenatal care.

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Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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