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Pseudoaneurysm after abdominal myomectomy: A rare but catastrophic complication

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ABSTRACT

Background: Uterine artery pseudoaneurysm is a rare diagnosis made postoperatively after pelvic surgery. The exact etiology is unknown however it is speculated to occur when an artery is lacerated and the perivascular tissue maintains persistent blood flow with the parent vessel. It can present with severe hemorrhage two to four weeks after an uncomplicated post operative course. Case: A 45-year old presented with vaginal hemorrhage and hypotension two weeks after abdominal myomectomy. Transvaginal ultrasound with doppler diagnosed pseudoaneurysm of the uterine artery. The patient was successfully treated with endovascular embolization utilizing micro coils. Conclusion: Transvaginal ultrasound is a useful technique in diagnosing pseudoaneurysms. Endovascular embolization is a minimally invasive, safe and effective way to treat this rare complication in institutions that have access to interventional radiology procedures.

Keywords: Myomectomy; Pseudoaneurysm; Ultrasound

1. INTRODUCTION

Pseudoaneurysm is a tear through all the layers of an artery with persistent flow outside the vessel into a space contained by the surrounding perivascular tissue [1]. The perivascular tissue maintains persistent blood flow with the parent vessel and forms a pseudoaneurysm. In contrast to a true aneurysm, pseudoaneurysm boundaries are formed by a thrombus and are not surrounded by the three arterial layers.

Pseudoaneurysm is a rare but reported complication of pelvic surgery. Cesarean section is the most frequently reported cause but this complication has also been reported in association with abortion, repeated curettage, myomectomy, hysterectomy and uncomplicated vaginal delivery.

Patients with pseudoaneurysm often present with delayed onset bleeding which can present anywhere from a few weeks to a month following the procedure. However there are case reports of bleeds only two to three days following laparoscopic myomectomies [2].

This phenomenon has been diagnosed via color Doppler ultrasound, CT angiography and MRI, with ultrasound being the most common diagnostic modality [3].

Treatments include: hospital admission with close observation, uterine artery embolization, and hysterectomy. Due to the infrequency of this occurrence, there are no prospective clinical trials comparing the different treatment methods. However case reports have documented successful treatment with uterine artery embolization [3,4].

In this case report we present a uterine artery pseudoaneurysm diagnosed two weeks after an uncomplicated abdominal myomectomy. To our knowledge, Higone *et al.*, 2007 reported the only other case following abdominal myomectomy [4].

2. CASE REPORT

Our patient was a 45-year old gravid 0 with no prior surgery with a 10 week sized fibroid uterus. On ultrasound imaging multiple fibroids were visualized. The largest of which was 4 cm and intramural in location. Due to the pelvic pain and menorrhagia caused by these myomas, she elected to have an abdominal myomectomy. Once uterine access was gained, vasopressin was injected into the myomas for vasoconstriction and two serosal incisions were made. The largest fibroid was a right fundal intramural 2.5 cm fibroid which was excised via the first right fundal incision. Another anterior fundal incision was made to remove the remaining fibroids. The endometrial cavity was entered on the second incision. The uterine endometrium and myometrium was reapproximated with multiple 0-Vicryl absorbable sutures and

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the uterine serosa was reapproximated with 2 - 0 Vicryl suture. The incisions were coated with Interceed for adhesion prevention. At closure, the surgery was deemed uncomplicated with an estimated blood loss of 100 cc. The patient was discharged home post operative day 2.

Twelve days following the surgery the patient presented to the hospital emergency department complaining of heavy vaginal bleeding for 5 days. The patient reported soaking 10 pads with blood and passing clots the previous night. In addition she complained of weakness, dizziness and crampy abdominal pain. Prior to this episode she reported minimal vaginal bleeding in the post operative period. She was noted to be hypotensive with a blood pressure of 62/40. The rest of her vitals were within normal limits. On physical exam we noted 10 cc dark blood in the vaginal vault however with no active bleeding. On transvaginal ultrasound with Doppler flow the uterus was noted to be 10.2 × 5.2 × 7.8 cm with a poorly delineated endometrial stripe and marked distended endometrial cavity filled with echogenic fluid. Also noted was a discrete, ovoid structure at the myometriumendometrium junction on the anterior aspect of the uterine body measuring 11 × 9 × 13 mm demonstrating bidirectional high flow velocity (**Figure 1**). These findings favored the diagnosis of pseudoaneurysm.

Following intravenous infusion of 2 liters of crystalloid, her blood pressure and heart rate normalized and her symptoms resolved. The patient was deemed hemodynamically stable with no active bleeding, stable vital signs and an unchanged hematocrit of 25 on serial blood draws. The decision was therefore made to proceed with an embolization procedure by our team of interventional radiologists the following morning. She was admitted to the hospital for close observation and frequent pad checks.

Selective uterine artery embolization was performed under local anesthesia. The right common femoral artery was accessed with a micro puncture set and a 4 French Omni Flush catheter was advanced into the distal abdominal aorta. Digital subtraction angiography was performed of the pelvis in AP projection. This demonstrated delayed opacification of a one cm diameter left pelvic pseudoaneurysm which appeared to be filling via branches of the left uterine artery (**Figure 2**). A microcatheter was successfully advanced into the uterine artery beyond the area of vascular injury. Platinum microcoils were deployed first distal, then proximal to the area of arterial injury. Completion angiography with injections into both the left and right uterine arteries demonstrated no further opacification of the pseudoaneurysm (**Figure 3**).

The patient was discharged home on post operative day 1. Two weeks post operatively the patient reported feeling well and noted no further bleeding.

3. DISCUSSION

A pseudoaneurysm is a rare, but severe complication of abdominal or vaginal surgery. The risk of rupture proportionally increases with size [3] and a life threatening hemorrhage can ensue especially in cases of aneurysmal rupture [2].

The incidence of pseudoaneurysm may be slightly higher than reported due to a larger percentage of asymptomatic cases not requiring intervention. A prospective study of patients imaged 3 days post laparoscopic myomectomy via transvaginal ultrasound found a diagnosis of asymptomatic pseudoaneurysm in 3/476 or 0.6% of cases [2].

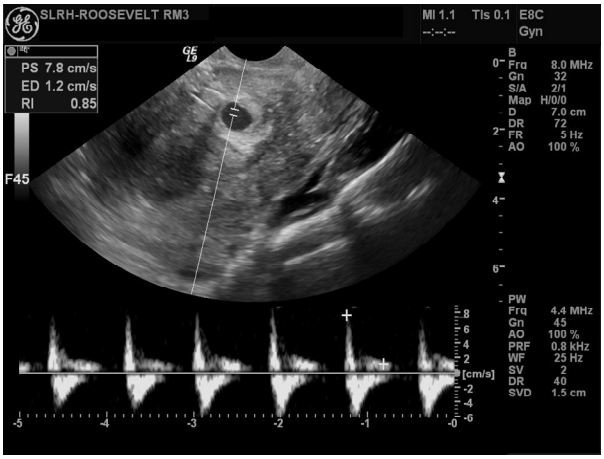

Figure 1. Transvaginal ultrasound with doppler demonstrating pseudoaneurysm with arterial high flow velocity.

Figure 2. Selective angiographic study of the left uterine artery demonstrating a pseudoanuerysm.

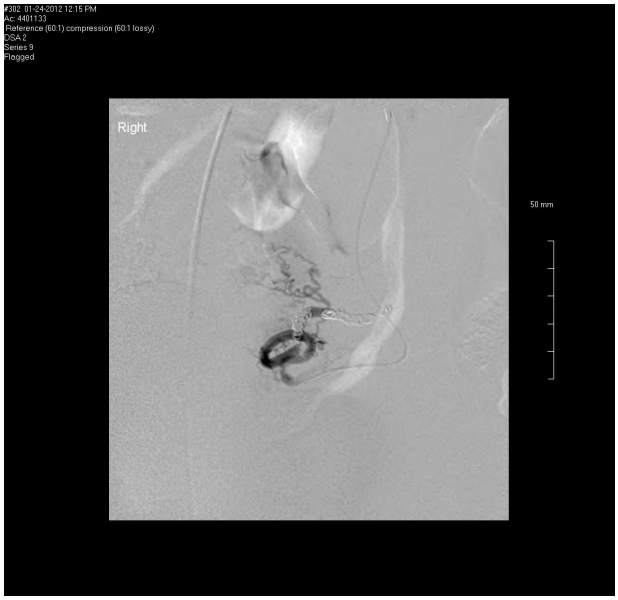

Figure 3. Resolution of pseudoaneurysm after coil placement distal and proximal to neck of pseudoaneurysm.

Diagnosis of pseudoaneurysm via ultrasound with doppler color flow has a documented sensitivity of 94% and specificity of 95% in pseudoaneurysm's in various parts of the body [5]. It has a characteristic appearance of central arterial-like turbulent blood flow surrounded by thrombus making it easy to differentiate from other post surgical complications such as a hematoma, seroma or abscess. The Doppler flow demonstrates a classic to-and-fro pattern, with a flow velocity that is very high immediately following systole, and then slow or reversed during diastole [3].

The mechanism for pseudoaneurysm formation is unknown however it is speculated that injury to the feeding vessel occurs during excision of the fibroid or reapproximation of the uterine wall after fibroid removal. In our case we propose that a branch of the uterine artery was likely lacerated during uterine myometrial reapproximation.

Endovascular embolization is the preferred treatment modality due to the demonstrated high rate of success (97%) in achieving homeostasis in pelvic hemorrhage [6] and the minimally invasive nature of this approach. In contrast surgical approaches are more likely to result in increased blood loss, difficulty in locating the pseudoaneurysm, and increased length of hospital stay and recovery times.

Pseudoaneurysm can also be managed with close observation. In one such case, of a pseudoaneurysm diagnosed 2 months following laparoscopic myomectomy, the patient was observed and reported spontaneous resolution within 6 months. However she did report one additional episode of heavy bleeding during this 6 month period [7].

In conclusion our case demonstrates that pseudoaneurysm and the resultant hemorrhage may be a serious complication following abdominal myomectomy. Diagnosis may be delayed if appropriate imaging modalities are not used. Imaging by transvaginal ultrasound with doppler is crucial for the diagnosis. In centers where embolization is available this may be the best treatment modality. This treatment modality has been shown to be effective and safe, however not all centers have access to interventional procedures for emergency cases. In these situations expectant management or exploratory surgery are necessary.

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