



Conservative management of uterine artery pseudoaneurysm after laparoscopic-assisted myomectomy and subsequent pregnancy outcome: case series and review of the literature



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ABSTRACT

Objective: Uterine artery pseudoaneurysm is a rare potentially life-threatening complication after myomectomy. Its clinical characteristics and management, and the outcomes of subsequent pregnancy, are not well understood. The purpose of this study was to clarify these important issues.

Study design: Retrospective analysis of a case series of uterine artery pseudoaneurysm detected after laparoscopic-assisted myomectomy (LAM) in a single center over a 13-year period. During the early postoperative course, gray scale ultrasonographic evaluation was carried out routinely by searching for an anechoic or hypoechoic well-defined cystic structure in the post-myomectomy scar. In suspicious cases, further evaluation was performed by color Doppler flow analysis and three-dimensional computerized tomographic angiography. After finally confirming the diagnosis by digital subtraction angiography, uterine artery pseudoaneurysm was conservatively managed by angiographic intervention. In cases achieving successful conception, cesarean delivery was chosen and the uterine scar was evaluated.

Results: Uterine artery pseudoaneurysm was diagnosed in 9 out of 854 cases of LAM. One case was undiagnosed until massive uterine hemorrhage occurred in the late postoperative period, while the other eight cases were diagnosed in the early postoperative course without hemorrhagic complication. Eight cases were managed by uterine artery embolization, but spontaneous resolution of pseudoaneurysm was observed in one case during a difficult prolonged attempt to superselect the offending branch of the uterine artery. Postembolization course was uneventful, except in a 41-year-old woman who developed oligomenorrhea. Among five women desiring preserved fertility, three women including one after spontaneous miscarriage achieved live birth by cesarean section. One woman experienced spontaneous miscarriage and one did not become pregnant by fertility treatment. In a case with elective cesarean delivery, severe early postpartum hemorrhage occurred from the placental bed and was conservatively managed by emergency uterine artery embolization.

Conclusion: The development of uterine artery pseudoaneurysm after myomectomy may be more common than previously considered, and should be carefully monitored to avoid potentially life-threatening hemorrhage and loss of fertility. Although spontaneous resolution may occur, conservative management by angiographic intervention could be a feasible management option for future fertility preservation, once a diagnosis has been made.

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Introduction

A pseudoaneurysm is defined as a blood-filled cavity communicating with the arterial lumen due to deficiency of one or more layers of an arterial wall [1,2]. Iatrogenic causes such as surgical or

obstetrical [2] procedures can enable blood to enter the periarterial space through vascular injury and may result in the development of pseudoaneurysm in various organs of the body [1], including the uterus [2].

Uterine artery pseudoaneurysm is a rare but potentially life-threatening complication after myomectomy [3]. With the development of diagnostic modalities as well as the dissemination of knowledge, reports on this morbid condition diagnosed after various forms of myomectomy have increased in recent years

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[3–12]. However, uterine artery pseudoaneurysm after myomectomy has not yet been described as a case series with clinical characteristics and management procedures. Moreover, reports on fertility outcome after its conservative management are still limited [10]. Herein, we report 9 cases of uterine artery pseudoaneurysm diagnosed after laparoscopic-assisted myomectomy (LAM) followed by successful uterine preservation management, and their subsequent pregnancy outcomes in cases desiring to preserve fertility, with a review of the literature.

Materials and methods

Study population

Patients who underwent LAM at Gifu Prefectural Tajimi Hospital (Tajimi, Gifu, Japan) from January 2001 through May 2014 were enrolled for this study by a retrospective review of the hospital electronic database [13,14]. Preoperative evaluation of the patients included hemoglobin and hematocrit levels, pelvic examination, abdominal and vaginal ultrasonography, and magnetic resonance imaging (MRI) (Fig. 1A). Prothrombin time (PT) expressed as international normalized ratio (INR) (PT/INR) and activated partial thromboplastin time (APTT) were also measured to rule out the presence of coagulation disorders. In selected patients with anemia or myoma nodes that measured more than 8 cm, gonadotropin-releasing hormone (GnRH) agonist (Leuprin 1.88; Takeda Pharmaceutical Co., Osaka, Japan) was injected every 4 weeks for 2–3 months to improve anemia or to reduce the myoma size temporarily.

Laparoscopic-assisted myomectomy

In each case, gasless LAM was performed by either a four-port procedure [13] until November 2010 or a two-port procedure [14] from December 2010, with abdominal wall lifting, under endotracheal general anesthesia. In both procedures, hysterotomy was

performed with a Harmonic scalpel (Ethicon Japan, Tokyo, Japan). Through the suprapubic port, the myoma node was enucleated by blunt dissection. Using conventional suturing techniques, myometrial or subserosal defects were reapproximated by 1- or 2-layered closure depending on the depth of the uterine wound. Suturing was performed using 0 Polysorb sutures (Syneture, Mansfield, MA) with a Mayo–Hegar needle holder, followed by extracorporeal knot tying. Excised myoma tissue was extracted through the suprapubic port using cold-knife fragmentation.

Postoperative management and evaluation of post-myomectomy scar by image diagnostic modalities

The occurrence of immediate postoperative complications was carefully monitored with complete blood cell counts and C-reactive protein measurement [13–15]. Post-myomectomy scar was evaluated by gray scale ultrasonography in the early postoperative period. If an anechoic or hypoechoic well-defined cystic structure with or without hematoma in the post-myomectomy scar was identified (Fig. 1B, arrow) [6], color Doppler flow analysis was performed to detect swirling blood flow within the sac-like structure (Fig. 1C, arrow).

If the development of pseudoaneurysm was suspected by color Doppler ultrasonography, examination by three-dimensional computerized tomographic (CT) angiography was carried out with a 64-channel multidetector-row CT (MDCT) scanner (Aquilion 64; Toshiba Medical Systems, Tochigi, Japan) [15,16] to identify the precise structure of the pseudoaneurysm with the feeding branch of the uterine artery (Fig. 1D, arrow).

Digital subtraction angiography and transcatheter arterial embolization

If pseudoaneurysmal development was indicated, informed consent, including a statement that spontaneous resolution may occur after observational management, but angiographic

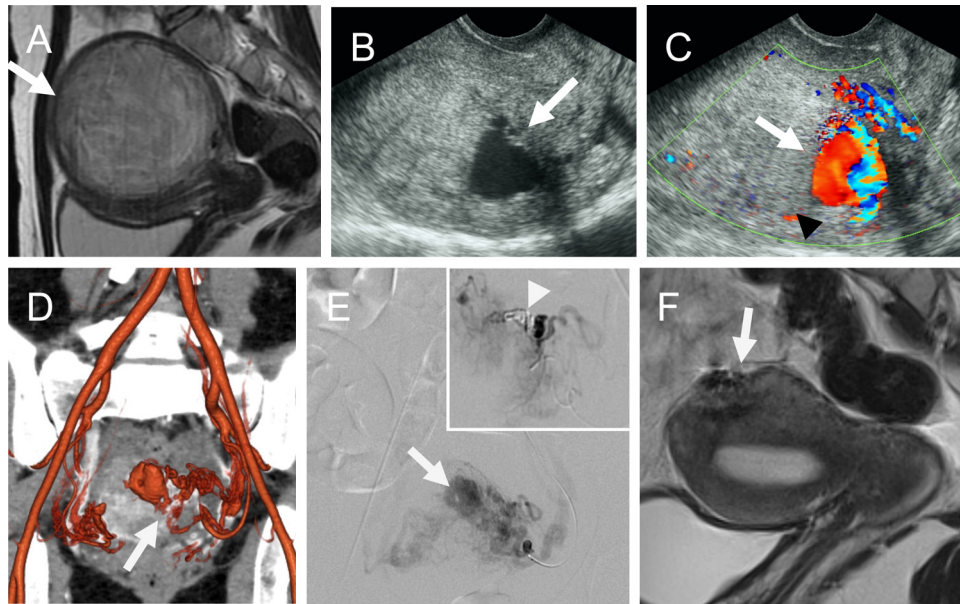


Fig. 1. A uterine artery pseudoaneurysm developed after laparoscopic-assisted myomectomy in a 28-year-old unmarried nulligravida. (A) Sagittal T2-weighted magnetic resonance image showing 8-cm intramyometrial myoma with higher signal intensity than normal myometrium in the posterior uterine wall (arrow). (B) Gray scale ultrasonographic image showing a low-echoic structure measuring 2 cm (arrow) in the post-myomectomy scar on postoperative day 4. (C) Color Doppler ultrasonographic image showing swirling blood flow characterizing pseudoaneurysm in the low-echoic structure (arrow). (D) Coronal reconstituted multiplanar image of three-dimensional CT angiography showing pseudoaneurysm originating from the left uterine artery (arrow). (E) Digital subtraction angiographic image confirming pseudoaneurysmal development (arrow). The left uterine artery was embolized using platinum coils (inset, arrowhead), and anastomosing right uterine artery was embolized by gelatin sponges. (F) Sagittal T2-weighted magnetic resonance image showing a well-preserved uterine wall structure around the post-myomectomy scar (arrow) 8 months after laparoscopic-assisted myomectomy. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

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