

Uterine adenomyosis and adenomyoma: the surgical approach

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The appropriate surgical treatment of adenomyosis, a benign invasion/infiltration of endometrial glands within the underlying myometrium, remains a subject of discussion. Since 1990, in place of the classical V-shaped resection method, various kinds of surgical management have been attempted, including a uterine muscle flap method that emphasizes fertility preservation, an asymmetric dissection method, and various modified reduction methods. Laparoscopic adenomyomectomy has also become an alternative to laparotomy for surgically managing the focal type of adenomyosis, although it seems to be associated with a higher risk of uterine rupture than laparotomy. This article reviews the surgical treatment of adenomyosis, including 23 uterine rupture cases that occurred during post-adenomyomectomy pregnancies, and provides an updated picture of the state of the field. (*Fertil Steril*® 2018;109:406–17. Copyright © 2018 The Authors. Published by Elsevier Inc. on behalf of the American Society for Reproductive Medicine. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

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Adenomyosis is a benign gynecologic tumor and is classified into diffuse or focal adenomyosis, depending on the extent and location of the disease as well as the histological classification (1, 2). The surgical treatment of adenomyosis remains a subject of discussion. Since 1990, in place of the classical V-shaped resection method (3, 4), various forms of surgical management have been attempted, including a uterine muscle flap method that emphasizes fertility preservation (5–8), an asymmetric dissection method (9), and various modified reduction methods (10, 11). Laparoscopic adenomyomectomy has also been attempted as an alternative to laparotomy for surgically managing the focal type of adenomyosis (12–15), although it may be associated with a higher risk of uterine rupture than laparotomy. As many reports

pertaining to the surgical treatment for adenomyosis have been published (16–19), this article mainly reviews the post-1990 literature, focusing on the 23 uterine rupture cases that occurred during post-adenomyomectomy pregnancies.

A search of the main medical literature shows that 2,365 cases of adenomyomectomy have been reported since 1990, including 2,123 (89.8%) in Japan. A total of 397 post-procedural pregnancies were reported, with 337 (84.89%) resulting in live births and 23 instances of ruptured uterus. Adenomyomectomy is a recognized treatment for certain types of dysmenorrhea and menorrhagia. However, in postoperative pregnancies, it is characterized by a high miscarriage rate, thinning of the uterine walls, and silent uterine ruptures occurring during the mid-term pregnancy. A higher incidence of placenta accretes and placenta percreta

compared to cesarean section and myomectomy has also been reported (15). Electrically-powered instruments are associated with most cases of uterine rupture, and a causal relationship is suspected (13, 20, 21).

INDICATIONS

Adenomyomectomy is now at the stage where new surgical methods are being tried, but the indications for surgery differ depending on the surgeon. The indications include dysmenorrhea and hypermenorrhea that are difficult to control with medication, infertility and recurrent miscarriages, and a desire to preserve fertility or the uterus. Focal adenomyosis resection is performed using either laparotomy or laparoscopic surgery, whereas diffuse adenomyosis is limited to using laparotomy. Laparoscopic procedure can be used for treating focal adenomyosis, although it entails a risk of leaving some of the lesions unexcised. Laparoscopy is also used in conjunction with laparotomy for treating diffuse adenomyosis, to reduce operative stress such as adhesion. For the treatment of diffuse adenomyosis, however, since the size of the lesion and of the areas involved

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and the boundary between the lesion and the normal tissues can only be grasped by palpation, laparotomy or preferably laparoscopy-assisted laparotomy is required in order to excise the lesion accurately and to repair the uterine wall by suturing in layers.

PREOPERATIVE EXAMINATIONS

Magnetic resonance imaging (MRI) examination is performed in order to grasp accurately the location and extent of the uterine adenomyosis and the position of the uterine cavity in order to determine the site, direction, and depth of the incision to be made into the uterus. Hysterosalpingography is also performed to examine the shape and size of the uterine cavity (5, 8, 20).

SURGICAL TREATMENT FOR ADENOMYOSIS

The conservative surgical treatment for adenomyosis in young women was first reported in 1952 (4). Subsequently, the partial excision of an adenomyosis, as a cytoreductive surgery, became common after the introduction of wedge resections, in which the uterine wall is excised in a V-shape.

Prior to the 1970s, the most common suturing materials were silk and catgut (both plain and chromic). These heterogeneous protein materials contributed to complications, such as suture failure, due to strong responses to foreign materials. Nevertheless, adenomyomectomies continue to be performed due to the development of absorbable sutures that elicit less severe tissue responses, as well as to the development of powered devices, such as electric, ultrasonic, high-frequency scalpels, which have resulted in surgeries with minimal bleeding.

LAPAROTOMIC SURGERY: PARTIAL REDUCTION SURGERIES

Wedge Resection of the Uterine Wall

In this classic technique, parts of the serosa and uterine adenomyoma are removed via wedge resection, after the part of the seromuscular layer where the adenomyoma is located has been identified using laparotomic or laparoscopic methods. In this procedure, part of the adenomyoma tissue may remain on one or both sides of the incision. The uterine wall wound created by the adenomyoma resection is sutured together with the remaining muscular layer and serosa (22). The postoperative clinical effectiveness on dysmenorrhea and menorrhagia is small, and recurrence occurs due to the presence of remaining adenomyomatous tissue.

Modified Reduction Surgery

These include various laparotomic and laparoscopic technique modifications (11, 13, 14, 20, 23–36). In 1991, a modification of the partial adenomyosis excision was reported to have been performed on 37 patients. This involved cutting the adenomyomatous tissue into thin slices using a microsurgical technique in conjunction with laparotomic surgery. Consequently, 6 women become pregnant, and none miscarried (23).

In 1993, another laparotomic modification involving partial excision of adenomyoma was reported to have been

performed on 28 patients. Of these, 18 attempted to conceive, with 13 achieving clinical pregnancies. Eventually, there were 9 (50.5%) live births and 7 (38.8%) miscarriages (24).

Transverse H Incision of the Uterine Wall

There has been a report describing a laparotomic modification which compared 5 women treated with the classical method with 6 women undergoing modified reduction surgeries involving the transverse H incision technique (10). The transverse incision was made on the uterine fundus, using an electro-surgical scalpel, separating the uterine serosa from the uterine myometrium. After widely opening the bilateral uterine serosa, the adenomyoma tissue was removed using an electro-surgical scalpel or scissors. A tension-less suturing technique was used to apposition the myometrial edges and close the wound in one or two layers. The first layer of sutures was applied to close the defect in the uterine wall and establish hemostasis. The bilateral serosal flaps resulting from the vertical incision, and the upper and lower flaps resulting from the transverse incision, were closed with a sub-serosal interrupted suture.

In the later study by the same author, based on data collected up to 2010, out of the 41 patients who underwent the H-incision technique, 31 attempted to conceive; and 12 (38.7%) achieved clinical pregnancy, 5 (16.1%) miscarried and 7 (22.5%) reported live births (25). One other study reported on 14 women who underwent this technique (26). All of them wished to conceive; and 3 (21.4%) achieved pregnancy and all had healthy babies.

Wedge-shaped Uterine Wall Removal

This method has been reported in a recent study where adenomyoma is resected with a thin margin (wedge-shaped removal), after a sagittal incision in the uterine body. The radical resection involves the laminate layers on both the endometrial and serosal sides. Reconstruction of the uterine wall involves suturing using the continuous horizontal mattress technique. The external serous layer is sutured such that the cut edges are inverted to reduce incisional adhesion to the omentum, intestines, and peritoneum. This suturing technique involves the 'baseball' or continuous Lembert stitch method. Among 103 patients, 70 attempted to conceive during the study period, of them, 21 (30%) achieved clinical pregnancies; and 16 (22.8%) achieved live births (27).

LAPAROTOMIC SURGERY: COMPLETE ADENOMYOSIS EXCISION

Triple-flap Method

This adenomyomectomy technique is based on a completely new idea that differs from conventional surgical methods. The method involves reconstructing the uterine wall defect using normal uterine muscle. The technique is not only effective for diffuse uterine adenomyosis, but also for nodular adenomyosis, and it has the potential to contribute to the prevention of uterine ruptures during postoperative pregnancies (5–8,20).

The technique has the following three characteristics: complete extraction of the uterine adenomyosis (Fig. 1A

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