



## Expert Opinion

## Long-term efficacy and quality of life associated with laparoscopic bilateral uterine artery occlusion plus partial resection of symptomatic adenomyosis



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## ABSTRACT

**Objective:** To assess the long-term efficacy and quality of life associated with laparoscopic bilateral uterine artery occlusion plus partial resection of symptomatic adenomyosis.

**Study design:** A total of 182 eligible patients with symptomatic adenomyosis were treated by laparoscopic bilateral uterine artery occlusion plus partial resection of adenomyosis from July 2003 to July 2009. Menstrual blood loss was measured using a pictorial blood loss assessment chart. Pain intensity during menstruation was evaluated on a 10-point visual analog scale (VAS). Health-related quality of life was measured using the WHOQOL-BREF.

**Results:** A total of 179 patients with 3 years follow-up were enrolled in this retrospective study. No severe complications were noted during the surgical procedure or follow-up period. The mean postoperative dysmenorrhea and menorrhagia scores were significantly improved (all  $p < 0.01$ ) at 3, 12 and 36 months postoperatively, compared with preoperative scores. The volume of the uterus was continuously reduced at 3, 6, 12 and 36 months postoperatively, and had shrunk by 58.3% at 36 months after surgery, compared with the preoperative volume. Notably, only 1.7% (3/179) of patients had received a hysterectomy at 36 months follow-up. In addition, patient's health-related quality of life scores were significantly increased ( $p < 0.01$ ) compared with preoperative scores.

**Conclusion:** Laparoscopic bilateral uterine artery occlusion plus partial resection of symptomatic adenomyosis is effective. There was a very low recurrence rate detected by ultrasound at 36 months.

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### 1. Introduction

Adenomyosis is a prevalent, benign gynecologic condition, in which endometrial tissue invades the myometrium, causing myometrial inflammation and hypertrophy, often resulting in menorrhagia and dysmenorrhea. The reported frequency of adenomyosis ranges from 35% to 50% [1]. Hysterectomy can provide a cure for adenomyosis in all cases, but involves removing the uterus. Progress in imaging and endoscopic techniques, however, has allowed the development of various minimally invasive procedures. Among these, uterine artery embolization (UAE) and laparoscopic uterine artery occlusion (LUAO) are being used to treat symptomatic fibroids [2,3].

The mechanisms responsible for the effects of UAE and LUAO are not yet fully understood. In 2000, Burbank suggested the

unifying hypothesis of transient uterine ischemia, whereby occlusion of the uterine arteries causes the blood flow to stop, with consequent thrombus formation in small vessels. Different pathophysiological changes occur in small vessels in the normal myometrium and in myomas. After a few hours, clots are lysed in myometrium vessels, but not in vessels in myomas, resulting in recovery of the myometrium, but necrosis of the myoma [2,3].

UAE has recently been reported for the treatment of adenomyosis, though these studies have focused more on the clinical success of UAE in patients with adenomyosis, rather than on trying to explain the causes of treatment failure after UAE. Several more recent studies have provided additional insights into UAE in patients with adenomyosis. In 2005, Weichert et al. [4] evaluated hysterectomy specimens from two women with adenomyosis with failed UAE. They found that adenomyosis foci remained unaltered at 34 and 48 weeks post-embolization, and no morphological changes were seen in the endometrium. Particles were randomly distributed throughout the outer half of the myometrium. Similarly, Dunder et al. [5] examined three hysterectomy specimens from women with adenomyosis who underwent UAE. Again, particles were randomly distributed throughout the myometrium,

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with no morphological changes in areas of adenomyosis. They suggested that UAE had failed in these cases [5,6].

We hypothesized that the success rates of UAE and LUAO may be correlated with the extent and depth of muscle invasion. Bilateral LUAO plus partial resection of adenomyosis has therefore been carried out in our hospital since 2003. A previous study of the midterm results [7] revealed significant symptom resolution in 35 of the 37 patients with symptomatic adenomyosis. The volume of the uterus decreased by almost 60%. Thirty-six (97.3%) of the 37 women experienced marked improvement in chronic pelvic pain.

The aim of the current study was to determine the long-term clinical efficacy of and quality of life (QOL) following bilateral LUAO plus partial resection of adenomyosis.

## 2. Materials and methods

We analyzed data for all patients treated for symptomatic adenomyosis between July 2003 and July 2009 at the Gynecological Department of Yang-Pu District Central Hospital. This was a retrospective review of a prospectively collected database. The study was approved by the hospital ethics committee.

The criteria for adenomyosis were: myometrial cyst, distorted and heterogeneous myometrial echotexture, and a globular and/or asymmetric uterus. A total of 193 patients with symptomatic adenomyosis were invited to participate if they met the following inclusion criteria: (1) preoperative examination and postoperative pathological examination excluded malignant disease and fibroids (uterine adenomyoma diagnosed by preoperative ultrasound, uterine fibroids by postoperative pathology); (2) history of failed drug treatment including progestin, gonadotropin-releasing hormone agonist, and mifepristone, and the last injection of gonadotropin-releasing hormone agonist was at least 6 months before the operation; (3) no desire for a future pregnancy; and (4) size of the adenomyosis lesion >2 cm, estimated by preoperative ultrasound.

Eligible patients ( $n = 182$ ) (Fig. 1) were thoroughly counseled, and informed consent was obtained from all patients. The possibilities of treatment failure, recurrence of symptoms, and hysterectomy were explained.

Menstrual blood loss was measured using a pictorial blood loss assessment chart. Pain intensity during menstruation was evaluated using a 10-point visual analog scale (VAS) [8]. A reduction of 50% compared with the score before surgery was considered to indicate efficacy. The definition of menorrhagia was abnormally heavy and prolonged menstrual bleeding at regular intervals. Transvaginal sonography was performed by the same physician before and after surgery. The volume of the uterus was calculated using the prolate ellipse equation ( $\text{length} \times \text{width} \times \text{height} \times 0.523$ ).

Health-related QOL was measured preoperatively and at 12 and 36 months after surgery, using the World Health Organisation (WHO) QOL-BREF. The WHOQOL-BREF consists of 28 items and covers four aspects of QOL, including physical domain (D1), psychological domain (D2), social relationship domain (D3), and environmental domain (D4), encompassing a total of 26 features. There are also two general questions, one on the overall QOL (Q1) and the other on overall health condition (Q2). In accordance with the provisions of the WHO, the score for each area was four times the average of all entry points. The higher the score, the better the patient's QOL.

### 2.1. Surgical techniques

All laparoscopic operations were performed under routine general anesthesia. Bilateral LUAO combined with partial resection of adenomyosis was performed as described previously [7,9]. The triangular area enclosed by the round ligament, external iliac

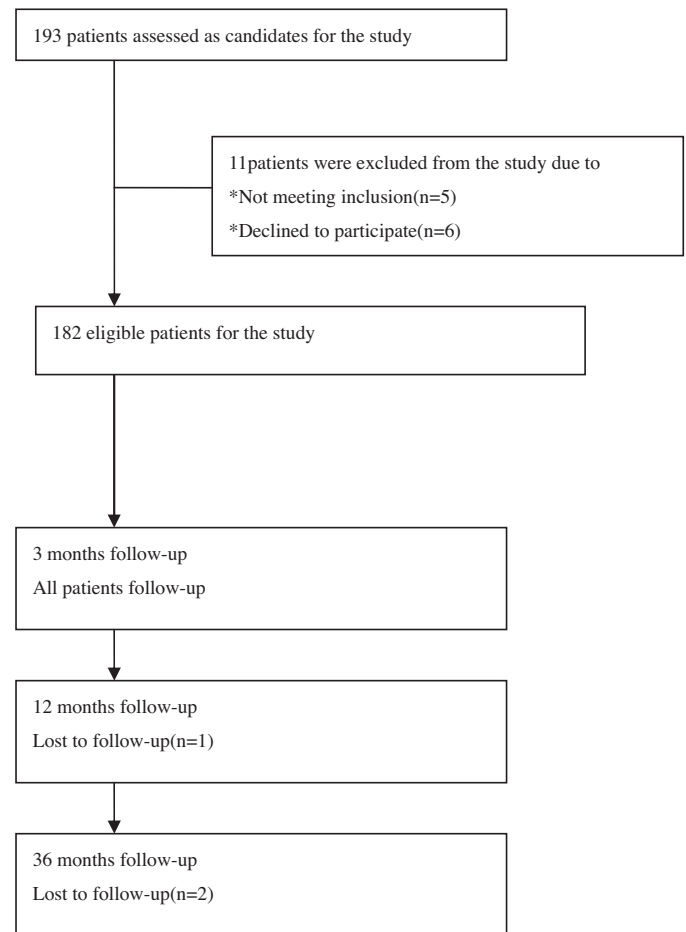


Fig. 1. Flow program.

vessels, and infundibulopelvic ligament was chosen as the incision site. The ureter and internal iliac artery were exposed. The uterine artery was isolated and occluded with bipolar forceps (Gyrus ACMI Inc., UK) or PK forceps (Gyrus ACMI Inc.) under direct vision. Bipolar forceps or PK forceps were used for thermal coagulation of tissues or blood vessels for hemostasis. Adenomyosis can be subclassified as focal (Fig. 2) or diffuse. The former can usually be almost completely resected. The raised portion of the focal adenomyosis was dissected using a monopolar incision. Adenomyosis tissue was then excised from the edges of the defect to access the healthy myometrium via a monopolar incision, or with



Fig. 2. The posterior adenomyoma.

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