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Review

Long-term sequelae of unconfined morcellation during laparoscopic gynecological surgery

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ABSTRACT

Although rare, unconfined morcellation of occult sarcoma has been associated with reduced survival rates. Morcellation of uterus and myoma can also lead to iatrogenic endometriosis, parasitic myoma and, albeit rarely, disseminated peritoneal leiomyomatosis. These benign sequelae of morcellation occur more often than malignant dissemination of sarcomatous tissue. Accordingly, confined morcellation should be performed with a minimally invasive technique while eliminating tissue dissemination inside the abdominal cavity. The ideal technique and device remain to be determined.

Contents

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1. Introduction

Uterine myoma or fibroid is the most common benign tumor in the female genital tract. Its prevalence is estimated to be 70% among women by the age of 50 years [1]. Although most women with uterine myoma are asymptomatic, 15–30% of them will have severe symptoms [2]. In 2012, Cardoso et al. estimated that 200,000 hysterectomies and 30,000 myomectomies are performed for myoma-related symptoms annually in the United States [3].

Surgical treatment of uterine myoma could be done by laparotomy or by minimally invasive approaches. The advantages of minimal invasive surgery include decreased blood loss, reduced wound infections, short hospital stay, and rapid recovery and return to daily activities [4]. These benefits resulted in increased in hysterectomy by laparoscopy from 11% in 2003 to 29% in 2013 [5]. For supracervical hysterectomy or total hysterectomy in which the uterus is too large to be delivered through a colpotomy incision, traditionally the uterus is first morcellated allowing delivery through a small incision.

Morcellation refers to fragmentation of tissue into small pieces granting removal of large specimen by laparoscopy such in myomectomy, supracervical (or subtotal) hysterectomy or total hysterectomy for a large uterus. The introduction of the first electrical morcellator in 1993 and its approval by the Food and Drug Administration (FDA) in 1995 has led to improvement in tissue retrieval and decreased operative time [6]. However, in 2014 following a case of morcellated occult leiomyosarcoma, the FDA published a statement discouraging the use of power morcellators [7]. Besides malignant dissemination, benign spread of morcellated tissue can also occur.

Our review focuses on malignant and benign risks associated with morcellation of myoma or uterus, their impact on clinical practice and the available alternatives to open or unconfined power morcellation.

2. Methods

We conducted an electronic based search using the following databases: Pubmed, EMBASE, Ovid MEDLINE, Google Scholar, and Cochrane Central Register of Controlled Trials. The following medical subject heading (Mesh) terms, keywords, and their combinations were used: “morcellation; sarcoma; leiomyosarcoma; parasitic myoma; uterine leiomyoma; uterine fibroid; laparoscopic myomectomy; laparoscopic total hysterectomy; and laparoscopic supracervical hysterectomy.” The search was limited to trials in humans and published in English language up to September 2016. We manually searched the reference lists of identified studies. We included all original articles as well as systematic reviews. Two authors (AC and TT) assessed each article independently.

3. Morcellation of occult uterine cancer

The most serious impact of unconfined power morcellation is dissemination of malignant cells inside the peritoneal cavity. This is despite copious and thorough irrigation.

3.1. Endometrial cancer

Endometrial cancer comprises 95% of uterine malignancies. However, it could be detected preoperatively by endometrial sampling [8]. The prevalence of endometrial carcinoma in women with presumed uterine myomas ranges between 0 and 0.53%, probably related to the differences in pre-operative evaluation [9–12].

3.2. Uterine sarcoma

Uterine sarcomas comprise less than 5% of uterine malignancies and leiomyosarcoma is the most common subtype [8]. Unlike endometrial cancer, pre-operative diagnosis of uterine sarcoma is challenging due to its non-specific presentation and the resemblance of the symptoms to those of uterine myomas.

According to the FDA safety communication, the estimated risk of occult uterine sarcoma in women with uterine myoma is 1:350, and 1:458 for leiomyosarcoma [7]. This estimation was based on a review of 9 single-institution However, only studies in which women with histopathologic diagnosis of uterine cancer were included [13]. Moreover, the included studies were not stratified by risk factors for sarcoma, and were not necessarily performed in the setting of reproductive age women with benign myoma.

In a meta-analysis of 133 studies, Pritts et al. evaluated the risk of leiomyosarcoma in women with presumed uterine myomas, including studies in which sarcoma was not diagnosed [14]. The estimated risk for occult leiomyosarcoma was 1:1960 when including all studies and 1:8300 when restricting the meta-analysis to prospective studies. In a nationwide retrospective cohort study between the years 2000–2012, of 7061 women who underwent laparoscopic hysterectomy for myoma and/or menorrhagia, 6 women (0.08%) were diagnosed with uterine sarcoma [15]. Yet, a high incidence of uterine sarcoma (0.29% or 1:335) among women with presumed uterine myoma was found in a single institution’s retrospective study [16].

When evaluating the risk of occult leiomyosarcoma, it is important to evaluate the subgroup of patients who will ultimately undergo uterine morcellation, as not all of them are candidates for this procedure. The importance of this issue is further emphasized by the study of Lieng et al. [17]. In their study, six women who had a hysterectomy for presumed uterine myoma were diagnosed with occult uterine sarcoma (0.12%). However, as 5 of the women had laparotomy due to tumor size, the risk for morcellated leiomyosarcoma was only 1:4771. Other studies reported that the prevalence of occult uterine sarcoma in women who underwent uterine morcellation was between 0.05%–0.6% [18–20]. Tan-Kim et al. reported that of 6 women who were subsequently found to have uterine sarcoma (1:156), 3 patients had an initial diagnosis of benign disease. Further, the diagnosis of sarcoma was made a few years later in the presence of a pelvic mass [20].

3.3. Tumor dissemination

The greatest concern of morcellation of malignant tissue is the effect of tissue disruption and dissemination on recurrence and survival. Other concerns include the difficulties of proper diagnosis, grading and staging [21]. Seidman et al. examined the risk of tumor dissemination with subsequent upstaging after occult uterine cancer morcellation [22]. Four of 7 women diagnosed with leiomyosarcoma were found to have tumor dissemination at a second-look laparoscopy. Two of them were diagnosed at least 13 months after the primary surgery. It suggests that these cases could represent cancer recurrence rather than dissemination.

Oduyedo et al. examined the value of abdominal re-exploration after morcellation of uterine leiomyosarcoma or smooth muscle tumors of uncertain malignant potential (STUMP) [23]. The median interval between the primary surgery and the re-exploration was 33 days. Of the eleven women with presumed stage I leiomyosarcoma or STUMP, disseminated peritoneal disease was diagnosed in 28.6% and 25% of the women, respectively.