



Morcellation of undiagnosed uterine sarcoma: A critical review



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ABSTRACT

In the recent decades, laparoscopy has replaced open abdominal procedures in the setting of gynecologic surgery. Extraction of large specimens (e.g., large uteri or myomas) following operative laparoscopy is technically challenging. Technological attempts allow the removal of large and solid pelvic masses via small abdominal incisions (using instruments called morcellators), thus reducing unnecessary laparotomies and improving short-term patients' outcomes. However, morcellation of undiagnosed uterine malignancies may lead to worse survival outcomes. Therefore, the Food and Drug Administration (FDA) warns about the use of power morcellators, thus causing ongoing concerns on the applicability of minimally invasive approaches for myomectomy and the removal of large uteri. In the present review, we sought to assess pro and cons regarding minimally invasive morcellation. This review will discuss the effects of morcellation of undiagnosed uterine malignancies, focusing on possible techniques for preoperative detection of uterine sarcoma and for avoiding intra-abdominal dissemination of potentially malignant tissues. Further efforts are necessary in order to identify tools to make a more accurate and reliable preoperative diagnosis of uterine masses. However, on the light of the current evidence, intra-abdominal morcellation should be banned from clinical practice.

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1. Introduction

Recently, the safety communication from the Food and Drug Administration (FDA) warned against the use of power morcellator after the execution of minimally invasive procedures since they can promote the dissemination of potentially malignant debris (Hampton, 2014). From its publication, this communication increased concerns on the use of morcellator and on the role of minimally invasive surgery in patients affected by apparently benign uterine fibroids (Goff, 2014; Kho and Nezhad, 2014; AAGL Advancing Minimally Invasive Gynecology Worldwide, 2014; Kho et al., 2014). Consequences included the withdrawn of morcellators' sales from Johnson & Johnson and the publication of several papers underlining the negative effects of morcellation on patients' outcomes (Hampton, 2014; Goff, 2014; Pritts et al., 2015; Park et al., 2011; George et al., 2014; Lieng et al., 2014; Ton et al., 2015). Although the undoubted negative morcellation-related effects on patients with undiagnosed uterine malignancies, several issues have to be underlined. In the present review, we are going to address the most important considerations regarding the risk to benefit ratio of the use of power morcellators for the treatment of apparent benign uterine disease: (1) Incidence of unsuspected uterine sarcoma among women diagnosed with apparent benign uterine disease. (2) Preoperative workup of patients with apparent benign uterine myomas. (3) Impact of morcellation on survival outcomes of patients with undiagnosed uterine sarcoma. (4) Impact of FDA warning on clinical practice. (5) Role of minimally invasive surgery (MIS) in patients with confirmed benign uterine disease. (6) Morbidity and costs related to MIS and open abdominal procedures. (7) Minimally invasive techniques to avoid intra-abdominal morcellation.

1.2. Incidence of unsuspected uterine sarcoma

Although growing concerns advise on the use of uterine morcellation, data on incidence of undiagnosed and unexpected sarcoma among women with apparent benign disease are still scant. Recently, several investigations tried to assess the rate of unsuspected uterine malignancies among patients undergoing surgery for apparent benign uterine disease. Across different large retrospective single centre series, the rate of unexpected sarcoma in uterine specimens ranged between 3 and 100 in 10,000 women (Senapati et al., 2015; Hagemann et al., 2011). Recently, a secondary analysis of a large review including more than 1400 patients undergoing robotic sacrocolpopexy suggested that the rate of unexpected uterine malignancies in patients undergoing robotic-assisted supracervical hysterectomy plus morcellation was 0.6% (Bogani et al., 2014a). Similarly, Wright et al., (2014) using data included in the Perspective database, reported that uterine cancers were detected in 99 out 36,470 (0.27%) patients who had minimally invasive hysterectomy and morcellation, with a prevalence of 27 cases in 10,000 women (95% CI: 22–32/10,000). Although the rate of undiagnosed uterine sarcoma in the whole population is low (less than 1%) incidence of uterine sarcoma among patients with “suspected” sarcoma is quite high. To date, no data from large databases are available; but, studies focusing on patients undergoing surgery for suspected uterine sarcoma, reported that uterine leiomyosarcoma are diagnosed in about 1 out 4 patients. Interestingly, the presence of rapidly growing fibroids, very large masses and uterine masses associated with abnormal uterine bleeding correlated with uterine sarcoma in about 6%, 20% and 42%, respectively (Nagai et al., 2014). Therefore, on the light of these data seems that inpatients with apparent benign uterine disease incidence is less than 1%; while, it reaches 20–25% among patients with suspected uterine leiomyosarcoma.

2. Preoperative workup

The differential diagnosis between uterine sarcomas and myomas still remains a challenging topic in gynecologic oncology. Despite recent advances in the accuracy of imaging techniques for gynecologic malignancies, consensus on preoperative findings to consider a leiomyoma as ‘suspicious’ is still lacking. In fact, data evaluating predictors of malignancy are mainly based on small retrospective case series. Here, we evaluated the accuracy of different radiologic imaging techniques in differentiating between uterine myomas and sarcomas and point out the possibility to identify a step-by-step algorithm for the differentiation between myomas and sarcomas.

2.1. Ultrasound

After clinical examination, transvaginal ultrasound (TVUS) should be the first choice imaging technique to investigate myometrial lesions; TVUS is fast, cheap, easily available and allows the examiner to scan the pelvis with good accuracy. Exacoustos et al. (2007) suggested that the presence of a large, single, growing lesion with cystic degeneration and marked peripheral and central vascularity are all sonographic features supporting the presence of a suspect myometrial malignancy. Unfortunately these findings are also evident in a group of ‘atypical’ benign myomas with cystic, mixoid, red, hydropic or hyalin degeneration. Recently, growing attempts have been done in order to standardize the terminology used to describe myometrial pathologies at ultrasonography (Van den Bosch et al., 2015). In clinical practice a standardized terminology is essential to reduce inter- and intra-observer variability and to compare TVUS findings with other imaging techniques. It would be interesting to test the proposed terminology on large sample size, thus trying to define a consensus on atypical myomas and suspected malignancies.

Color and power Doppler could be useful ultrasonographic tools during patients' scan. Power Doppler should be preferred over color Doppler, since the former one allows to detect small vessels characterized by low flow velocities, regardless its direction (Nagai et al., 2014). Few studies suggested that the presence of a low tumor flow resistance index (RI) and the pulsatility index (PI) are described as lower in the presence of uterine sarcomas than in leiomyomas. However, Doppler imaging is not able *per se* in differentiating between benign and malignant myomas (Nagai et al., 2014; Exacoustos et al., 2007; Van den Bosch et al., 2015; Wu et al., 2011). Increased vascularization of uterine leiomyosarcomas could be expressed with the color score proposed by the International Ovarian Tumor Analysis (IOTA) group (Van den Bosch et al., 2015). Interestingly, a color score 3–4 with central increased vascularization is coherent with a suspected myometrial lesion. Fig. 1 displays ultrasonographic features of benign and malignant uterine lesions.

Elastography is a new interesting ultrasonographic tool allowing the evaluation of different tissues' densities that may help to identify suspected myometrial lesions from normal myometrium and benign myometrial tumor. In fact, uterine sarcoma seems characterized by a typical mosaic pattern while fibroids are characterized by a more homogeneous pattern (Nitta et al., 2014; Ami et al., 2009). Additionally, sarcomas seems characterized by a lower signal intensity than benign uterine fibroids (Nitta et al., 2014; Ami et al., 2009) Further studies are needed to evaluate the impact of elastography findings in the diagnostic workup of patients with atypical myometrial masses.

2.2. MRI, CT scan and FDG-PET

Magnetic Resonance Imaging (MRI) is also considered a valuable imaging technique for the preoperative evaluation of myome-

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