



The value of re-exploration in patients with inadvertently morcellated uterine sarcoma[☆]



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HIGHLIGHTS

- Morcellation appears to be changing the natural history of uterine leiomyosarcoma (ULMS) and smooth muscle tumor of uncertain-potential (STUMP).
- Patients with morcellated sarcomas appear to be at an increased risk for disseminated intraperitoneal recurrence.
- Surgical re-exploration may yield useful information regarding staging in patients with incidental ULMS/STUMP after morcellation for presumed benign disease.

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ABSTRACT

Objective. To describe the role of immediate re-exploration in patients with inadvertently morcellated uterine leiomyosarcoma (ULMS) and smooth muscle tumors of uncertain malignant potential (STUMP).

Methods. All patients with ULMS/STUMP who were managed or referred to the participating institutions from January 2005 to January 2012 following minimally invasive gynecology surgery with morcellation were detected through the pathology database. The diagnosis was confirmed by gynecologic-pathologists following post-surgery pathology review.

Results. Twenty-one patients with the diagnosis of ULMS (N = 15) and STUMP (N = 6) after morcellation were identified. The median age of occurrence was 46 years (range, 25–58 years). Median follow-up duration was 27 months (range, 1.8–93.1 months). None of the 21 patients had documented evidence of extra-uterine disease at the time of original surgery. Ultimately 12 patients were immediately re-explored to complete staging. The median time to the staging surgery was 33 days (range 15–118 days). Two (28.5%) out of seven patients with presumed stage I ULMS and one (25%) out of four patients with presumed stage I STUMP had significant findings of disseminated intraperitoneal disease detected at immediate surgical re-exploration. One of the 8 patients with confined early ULMS and STUMP at the second surgery had intraperitoneal recurrence, while the remaining 7 patients have had no recurrence and remain disease free.

Conclusion. Surgical re-exploration is likely to show findings of disseminated peritoneal sarcomatosis in a significant number of patients diagnosed with ULMS after a morcellation procedure. Findings from re-exploration can contribute to the knowledge of natural history of morcellated ULMS/STUMP and allow for accurate prognostication.

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Introduction

Uterine fibroids are a common problem experienced by women in middle to later reproductive ages, and it is the most common pelvic tumor in women [1]. Increasing use of minimally invasive surgical approaches to gynecologic surgeries has prompted a rise in the number of patients undergoing minimally invasive gynecology surgery (MIGS)

with morcellation for treatment of fibroids [2]. Thus, clinicians are faced with the important task of ruling out the possibility of uterine leiomyosarcoma (ULMS) or smooth muscle tumor of uncertain malignant potential (STUMP) preoperatively. Although the diagnoses of ULMS and STUMP are rare, differentiating them from benign fibroids preoperatively is challenging because of the similarities in their clinical presentation and a limited ability of current imaging modalities to clearly distinguish them [3,4]. This results in unnecessary delay in appropriate tumor staging that additionally delays appropriate treatment. Patients with inadvertently morcellated ULMS/STUMP have an increased risk for disseminated peritoneal disease (13% vs. 40%), a worse 5-year disease free interval (50% vs. 79%) and overall 5 year survival rate (45 vs. 71%) compared to patients whose lesions were removed intact [5].

There is limited literature pertaining to the management of patients with inadvertently morcellated LMS/STUMP. A recent study on patients with inadvertently morcellated endometrial cancer of all types, showed evidence that a significant proportion of patients were upstaged as a result of surgical re-exploration, specifically patients with incidentally identified ULMS [6]. The current project was undertaken to better define the role of re-exploration in patients with inadvertently morcellated ULMS/STUMP and to better characterize the natural history of morcellated ULMS/STUMP, particularly relating to the patterns of recurrence and the implications that immediate re-exploration poses for subsequent management.

Materials and methods

The institutional review boards at the participating institutions approved the study. Patients were identified through a search of the archives of the pathology departments at the participating institutions. The databases included all cases identified prospectively and also cases seen in consultation for ULMS and STUMP obtained between January 2005 and January 2012. Patients who had a myomectomy or hysterectomy performed for presumed fibroid uterus, vaginally, laparoscopic, or robotic, with either power or hand morcellation, with a final diagnosis of ULMS and/or STUMP were included. Once the patients were identified, their medical records were reviewed and data pertaining to demographic data, clinicopathologic data, surgical procedures performed at initial and re-operation, adjuvant therapy, complications, follow-up interval and disease status were collected. At least one representative diagnostic Hematoxylin & Eosin stained slide from each case (from surgical procedures performed at initial and re-operation) and any available immunohistochemical stained slides were reviewed by two dedicated gynecology pathologists.

The Brigham and Women's Hospital (BWH), Dana Farber Cancer Institute (DFCI), and the Massachusetts General Hospital (MGH) adopted a policy of surgically re-exploring patients with a pathological diagnosis of morcellated ULMS/STUMP, however the type of surgery performed was based on each surgeon's preferences. Assignment to stage was in accordance with the 2009 FIGO staging criteria for sarcoma [7]. Given that the specimens from the initial surgeries were morcellated, the AJCC staging was not used.

The decision to offer adjuvant therapy (chemotherapy or radiation therapy) was based on the attending physician's judgment. Those patients who received adjuvant pelvic external beam and brachytherapy were grouped as having received radiation therapy (RT). Treatment of recurrent disease consisted of chemotherapy, radiotherapy and/or cytoreductive surgery if accessible and was determined on a case-by-case basis.

Statistical analysis

Descriptive statistics were tabulated by patient group. Continuous variables were summarized by either means with standard deviations or medians with ranges. Length of survival was calculated from the

Table 1
Demographic and clinical characteristics of the study population.

	All N = 21	LMS N = 15	STUMP N = 6
Age (years) median (range)	46 (24–58)	47 (41–58)	40 (24–49)
Race [N (%)]			
Caucasians	19 (90.5)	14 (93.3)	5 (83.3)
Hispanic	1 (4.8)	0	1 (16.7)
Asian	1 (4.8)	1 (6.7)	0
Parity			
Median (range)	2 (0–4)	2 (0–4)	2 (0–3)
≤2, n (%)	12 (70.6)	7 (63.6)	5 (83.3)
>2, n (%)	5 (29.4)	4 (36.4)	1 (16.7)
BMI (kg/m ²)			
Mean (SD)	27.3 (±7.3)	27.6 (±8.4)	26.6 (±4.6)
<30 [N (%)]	12 (70.6)	8 (66.7)	4 (80.0)
≥30 [N (%)]	5 (29.4)	4 (33.3)	1 (20.0)
Menopausal [N (%)]			
No	18 (85.7)	12 (92.3)	6 (100.0)
Yes	1 (4.8)	1 (7.7)	0
Unknown	2 (9.5)		
Smoking [N (%)]			
No	13 (81.2)	9 (90.0)	4 (66.7)
Yes	3 (18.8)	1 (10.0)	2 (33.3)
Co-morbid medical disease [N (%)]			
No	15 (75.0)	10 (71.4)	5 (83.3)
Yes	5 (25.0)	4 (28.6)	1 (16.7)
Initial presenting symptoms [N (%)]			
Menorrhagia	11 (55.0)	9 (60.0)	2 (40.0)
Pelvic/abdominal pain	7 (35.0)	5 (33.3)	2 (40.0)
Abdominal fullness	4 (20.0)	4 (26.7)	
Post-menopausal bleeding	0	0	0
Incidental	2 (10.0)	1 (6.7)	1 (20.0)
Irregular bleeding	1 (5.0)	1 (6.7)	0

Values for continuous measurements are means, unless otherwise specified.

date of initial surgery to the date of death; surviving patients were censored at the date of last contact.

Statistical analyses were performed with the SAS statistical software (version 9, Cary, NC).

Results

Twenty-one patients with inadvertently morcellated ULMS (N = 15) and STUMP (N = 6) were identified. Seven (33%) patients were initially managed at the participating institutions and fourteen (67%) patients were referred after initial management at a different institution. The demographic characteristics of the patients are presented in Table 1. The median age was 46 (range, 24–58). The median follow-up was 27 months (range 1.8–93.1 months). Information regarding preoperative endometrial sampling was available for 17 patients and none were suggestive of ULMS. None of the patients had a history of breast cancer or pelvic radiation therapy and the preoperative presumptive diagnosis was uterine leiomyoma in all patients.

The initial surgical procedures are presented in Table 2. All the above cases involved morcellation of the specimen with 16 (76.2%) of patients undergoing motorized morcellation procedure and five (23.8%) undergoing hand morcellation procedure.

All the patients were assigned an initial stage based on the initial surgery (operative findings and pathology report) and the metastatic work-up that was performed after the diagnosis of ULMS or STUMP. Fifteen (71.4%) patients were presumed to have stage I disease while two patients, both with ULMS, were presumed to have stages III and IV because the metastatic work-up after the initial surgery showed abdominal and pelvic metastasis in one patient, and lung metastases in the other. The last four patients were not staged because the pathology from initial surgery was diagnosed as bizarre leiomyomas and diagnosed as ULMS/STUMP after recurrence.

The final stages were based on the restaging procedures and metastatic work-up. The median interval between the first surgery and re-

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