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Original article

Effect of tumor morcellation during surgery in patients with early uterine leiomyosarcoma

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ABSTRACT

Background: Uterine leiomyosarcomas (LMSs) are rare and aggressive but difficult to predict before surgery. Minimally invasive surgery using morcellation might cause tumor spreading during manipulating of tumor tissue. We aim to study the influence of morcellation on the prognosis of patients with early uterine LMS.

Methods: We retrospectively reviewed the medical records of all patients with stage 1 LMS treated between April 1993 and April 2014. Demographics and outcomes were compared between patients who underwent total hysterectomy without morcellation and those who underwent surgery with abdominal, vaginal, and laparoscopic morcellation.

Results: In total, 43 consecutive patients were identified, including 29 without morcellation and 14 with morcellation. Tumor size was significantly smaller (7.3 cm vs. 11.6 cm, $p = 0.006$) in patients with morcellation. Six (42.9%) patients with morcellation received reoperation at 18.5 days after the initial surgery. Patients with morcellation did not show higher recurrence rate, including the recurrence rate at the pelvic cavity, compared with patients without morcellation. Compared with patients without morcellation, Kaplan–Meier curves did not show significant difference in the disease-free survival (DFS) and overall survival (OS) in patients with morcellation. In univariate and multivariate analyses, tumor size was significantly associated with poor DFS and OS. Morcellation was not associated with survivals.

Conclusion: In patients with stage 1 LMS, survival is associated with tumor size. Morcellation does not seem to be associated with a worse prognosis in early stage LMS.

Introduction

Uterine leiomyosarcoma (LMS) is a rare disease with an annual incidence of 0.4–0.64/100,000 women[1,2] and accounts for 1–2% of uterine cancer cases.[3] It is a highly aggressive tumor with high recurrence rates, and complete surgical resection is the only established curative treatment.[4] However, there is no available imaging technique to accurately diagnose LMS arising from myoma before the operation.[5,6] Consequently, LMS are usually underdiagnosed and treated by myomectomy or minimally invasive surgeries.

Hysteroscopic or laparoscopic myomectomies or hysterectomies using morcellator knife might cause disruption of LMS during surgery. Tumor tissue spreading during surgery is associated with high tumor recurrence rates and poor patient outcomes.[7–9] Apart from morcellation, several other factors could influence the survival outcome of patients with LMS.[10] The aim of this study is to evaluate the influence of the initial surgical procedures on the survival outcome of patients with early localized stage 1 LMS. Literature review of recurrence rate and survival outcome of early LMS is also presented.

Materials and methods

Patients

This study was conducted with approval from the Institutional Review Board at the National Taiwan University College of

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Medicine, Taipei, Taiwan. All constitutive patients with stage 1 uterine LMS operated in our institute between April 1993 and April 2014 were included retrospectively. Demographic and clinical data were collected from medical records and pathological reports including patient age, parity, operative procedure, size of tumor, mitotic counts, timing, and postoperative adjuvant therapy. Follow-up data including tumor recurrence, anatomical location of tumor recurrence, and patient outcome were recorded. Pathological slides were reviewed by two experienced pathologists. Patients were divided into two groups, namely, those who underwent total hysterectomy without morcellation and those who underwent surgery with abdominal, vaginal, and laparoscopic morcellation.

Statistical analysis

Parametric continuous variables were compared using a *t* test for independent samples. Nonparametric dichotomous variables were compared using Chi-square or Fisher's exact tests. Survival time was recorded from the date of operation to the date of death from disease or the date of censor. Kaplan–Meier analysis with a log-ranking test was used to estimate survival probabilities and compare survival distributions stratified by operative procedures with or without morcellation. Univariate and multivariate regression analyses based on a Cox proportional hazard model were used to evaluate the relative importance of variables as predictors of survival time. The statistical analysis was carried out using SAS version 8.0 (SAS Institute, Cary, NC, USA). A p value < 0.05 was considered significant.

Literature review

Articles on uterine LMS published in English from 1989 to 2014 were identified systematically by computer-based searches in MEDLINE and the Cochrane Library. Only cases with International Federation of Gynecology and Obstetrics (FIGO) stage 1–2 were included. Tumor size, recurrence rate, locoregional recurrence rate, and survival outcome were tabulated.

Results

A total of 43 patients with stage 1 LMS were identified during the study period. Demographic and clinical variables of the two groups of patients are presented in Table 1. There were no between-group differences in age, parity, lymph node dissection, ovarian preservation, and mitotic count. Patients in the morcellation group had significantly smaller tumors than patients in the nonmorcellation group. One patient in the nonmorcellation group received lymph node dissection (staging surgery) 16 days after the initial surgery. All six patients who received myomectomy (by abdominal, laparoscopic, or hysteroscopic approaches) in the morcellation group were reoperated at 7–60 days after the initial surgery.

Surgical and adjuvant managements and patient outcomes are presented in Table 2. Seven patients in the nonmorcellation group and four patients in the morcellation group completed the staging procedure. None of the patients was upstaged after the staging surgery. There were no differences in postoperative adjuvant therapy such as radiotherapy and chemotherapy between the two groups. After a median and mean follow-up of 20 months and 55 (range, 1–245) months for the nonmorcellation group, and 24 months and 33 (range, 12–99) months for the morcellation group, respectively, tumor recurred in 14 patients (48.2%) in the nonmorcellation group and in eight (57.1%) in the morcellation group. Pelvic recurrence occurred in four (14%) patients in the nonmorcellation group and in three (21%) patients in the morcellation group. No significant differences were found between these two groups in recurrence rates, location of recurrence, and patient outcomes at the time of analysis. Table 3 presents the recurrence rates and sizes of tumor according to different surgical approaches. Higher tumor recurrence rate was associated with greater tumor size only in patients without morcellation.

The 3-year overall survival (OS) rate was 39.2% for all patients, 52.4% for patients in the nonmorcellation group, and 33.7% for patients in the morcellation group. The 5-year OS rate was 34.3% for all patients, 34.0% for patients in the nonmorcellation group, and 33.7% for patients in the morcellation group. In Cox proportional regression analysis for disease-free survival (DFS) and OS, tumor size was the only variable that significantly influenced survival. In multivariate analyses, the hazard ratios of tumor morcellation were

Table 1
Demographic and clinical variables ($n = 43$).

	Nonmorcellation group ($n = 29$)	Morcellation group ($n = 14$)	p
Age (y)	53.7 ± 10.4	49.7 ± 6.2	0.19
Parity	1.9 ± 1.4	1.6 ± 1.3	0.51
Size (cm)	11.6 ± 4.9 (4–21)	7.3 ± 2.9 (3–13)	0.006
Lymph node dissection	7 (24.1)	5 (35.7)	0.48
Ovarian preservation	6 (20.7)	6 (42.9)	0.16
Mitotic count			
Low (< 10/10 HPF)	6	2	
High (≥ 10/10 HPF)	19	7	1.0
Reoperation	1 (3.4)	6 (42.9)	0.003
Period between initial operation & reoperation (d)	16	18.5 ± 20.6 (7–60)	

Data are presented as *n* (%) or mean ± SD.
HPF = high power field.

Table 2
Surgical treatment, adjuvant management, and survival outcome.

	Nonmorcellation group ($n = 29$)	Morcellation group ($n = 14$)	p
Procedure performed at initial operation			
Total abdominal hysterectomy	28	0	
Bilateral salpingo-oophorectomy	23	3	
Pelvic lymph node dissection	6	0	
Vaginal total hysterectomy	1	0	
Laparoscopic-assisted vaginal hysterectomy	0	8	
Myomectomy	0	2	
Laparoscopic myomectomy	0	2	
Hysteroscopic myomectomy	0	2	
Procedure performed at reoperation			
Total abdominal hysterectomy	0	6	
Bilateral salpingo-oophorectomy	0	5	
Pelvic lymph node dissection	1	4	
Adjuvant therapy			0.15
None	15 (51.7)	3 (21.4)	
Radiotherapy	9 (31.0)	6 (42.9)	
Chemotherapy	5 (17.2)	5 (33.7)	
Recurrence			0.83
No	15 (51.7)	6 (42.9)	
Yes	14 (48.3)	8 (57.1)	
Recurrence location			0.30
Abdomen/pelvis	2 (14.3)	3 (37.5)	
Other	10 (71.4)	5 (62.5)	
Both	2 (14.3)	0 (0)	
Outcome			0.79
Alive	15 (51.7)	6 (42.9)	
Alive with disease	1 (3.4)	1 (7.1)	
dead	13 (44.8)	7 (50.0)	

Data are presented as *n* (%).