

## GYNECOLOGY

# Uterine sarcomas and parasitic myomas after laparoscopic hysterectomy with power morcellation

Jasmine Tan-Kim, MD, MAS; Katherine A. Hartzell, MD; Caryl S. Reinsch, MD; Cristina H. O'Day, MD; John S. Kennedy, MD; Shawn A. Menefee, MD; Terry A. Harrison, MD

**OBJECTIVE:** The purpose of this study was to describe the incidence and risk factors for uterine sarcomas and parasitic myomas at the time of power morcellation.

**STUDY DESIGN:** We performed a retrospective review of 3523 women who underwent laparoscopic hysterectomy from 2001-2012. Univariate analyses were used for the morcellation cases to identify potential risk factors. Multivariable logistic regression was performed.

**RESULTS:** Nine hundred forty-one patients underwent power morcellation at the time of hysterectomy; 10 of 941 patients (1.1%) were diagnosed subsequently with uterine sarcomas or parasitic myomas. The overall incidence of uterine sarcoma was 6 of 941 (0.6%), with a median age of 47 years (range, 41–52 years). There was no association among any of the factors analyzed and uterine sarcoma. Three of 6 patients had sarcoma diagnosed on initial pathologic evaluation of the morcellated specimen; 3 patients had delayed diagnosis of sarcoma

with benign disease at the time of the initial procedure (median time to second evaluation, 6 years). For parasitic myomas ( $n = 4$ ), the median age was 35 years (range, 32–40 years), and the median time to second evaluation was 5 years. On multivariate analysis, age  $<40$  years (odds ratio, 26; 95% confidence interval, 2.7015–261.9;  $P \leq .01$ ) was associated with higher risk of the development of parasitic myomas.

**CONCLUSION:** Uterine sarcoma was found in 0.6% of patients who underwent power morcellation but was not found to be associated significantly with any preoperative factors. All 6 cases were noted to have apparent fibroid tumors as an indication for their hysterectomy. Age  $<40$  years was a risk factor for parasitic myomas after power morcellation. Patients should be counseled about these complications before power morcellation.

**Key words:** laparoscopic hysterectomy, parasitic myomas, power morcellation, uterine sarcoma

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More than 600,000 hysterectomies are performed in the United States annually, with 40% performed laparoscopically.<sup>1,2</sup> Laparoscopic hysterectomy is associated with fewer postoperative complications, less blood loss, less postoperative pain, decreased hospital stay, and faster recovery time when compared with the open abdominal

approach.<sup>1,3</sup> Power morcellation is performed during laparoscopic supracervical hysterectomy, laparoscopic myomectomy, and laparoscopic total hysterectomy when the uterus is too large to pass through the vaginal canal.<sup>4</sup> It involves the division of uterine tissue with the use of a rotating circular blade to facilitate removal of the specimen.

Power morcellation has raised concern for potential dissemination of benign or malignant tissue. The Food and Drug Administration (FDA) recently issued a warning discouraging the use of power morcellation with uterine fibroid tumors.<sup>5</sup>

Spindle cell neoplasms are tumors of the uterine smooth muscle or

From the Divisions of Female Pelvic Medicine and Reconstructive Surgery (Drs Tan-Kim and Menefee) and Gynecologic Oncology (Dr Harrison), Department of Obstetrics and Gynecology (Drs Hartzell, Reinsch, and Kennedy), Kaiser Permanente San Diego, San Diego, and Department of Obstetrics and Gynecology (Dr O'Day), St. Joseph Hospital, Orange, CA.

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Corresponding author: Jasmine Tan-Kim, MD, MAS. [Jasmine.X.Tan-Kim@kp.org](mailto:Jasmine.X.Tan-Kim@kp.org)

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endometrial stroma. They include parasitic myomas and uterine sarcomas. Uterine sarcomas are malignant tumors of uterine connective tissue and include leiomyosarcoma, endometrial stromal sarcoma, carcinosarcoma, and undifferentiated sarcoma, with a reported incidence of 0.2%.<sup>5-7</sup> They often behave more aggressively and are associated with a poorer prognosis than endometrial cancers.<sup>8,9</sup> There are no specific symptoms or signs or reliable diagnostic modalities to differentiate benign from malignant uterine tumors before they are morcellated and removed.<sup>10,11</sup> *Parasitic myomas* are defined as leiomyomas that are not attached to the uterus and are “parasitic” because they receive their blood supply from surrounding organs.<sup>12</sup> They have a reported incidence of 0.12-0.9% after laparoscopic surgery with power morcellation.<sup>12-15</sup>

The objectives of this study were (1) to describe the rates of spindle cell neoplasm formation after power morcellation and (2) to identify risk factors for formation of either uterine sarcoma or parasitic myomas at the time of laparoscopic hysterectomy with power morcellation.

## MATERIALS AND METHODS

This was an institutional review board–approved, retrospective study of women who underwent laparoscopic hysterectomy at Kaiser Permanente San Diego from 2001-2012.

Patient charts were reviewed after cases were identified with the use of surgical case logs. Demographic and clinical characteristics, surgical techniques, pathology reports, and perioperative complications were abstracted by physician reviewers and individually entered into an Access Database (Microsoft Access 2007; Microsoft Inc, Seattle, WA). Baseline characteristics were collected: age, gravidity, parity, ethnicity, body mass index, presence of diabetes mellitus, hypertension, collagen vascular disease, use of tobacco, alcohol, or drugs, presence of sexual activity, menopausal status, use of hormones, use of leuprolide or the progestin intrauterine device, number of vaginal deliveries, and history of

pelvic surgery or endometrial ablation. Pathology reports were carefully reviewed and coded for the presence of fibroid tumors, endometriosis, adenomyosis, endometrial hyperplasia, cervical dysplasia, or malignancy. Operative techniques, removal of the ovaries, uterine specimen weight, estimated blood loss, and complications were also abstracted.

*Total laparoscopic hysterectomy* was defined as removal of the uterus and cervix. If the uterine body was too large to fit through the vagina, it was often morcellated laparoscopically to facilitate retrieval. *Laparoscopic supracervical hysterectomy* was defined as removal of the uterus above the level of the cervix followed by laparoscopic morcellation to remove the uterine body. In this study, bags were not used to contain morcellated contents.

To address our primary objective, we evaluated patients who underwent power morcellation and identified those diagnosed with either uterine sarcoma or parasitic myomas. Fisher exact test and Mann Whitney *U* test were used to conduct univariate analyses to identify potential risk factors for parasitic myomas and for uterine sarcoma. The 28 baseline characteristics listed previously were analyzed as potential risk factors. Multivariable logistic regression was used to assess the independent risk factors. Variables were included if they had a probability value of  $< .10$  on univariate analysis or if the variable was determined to be an important biologic risk factor. Odds ratios (ORs) and 95% confidence intervals (CIs) were reported. A probability value of  $< .05$  was considered statistically significant. Statistical analysis was performed with SPSS software (version 18.0, SPSS Inc, Chicago, IL).

## RESULTS

A total of 3523 women underwent laparoscopic hysterectomy. Of these, 941 women underwent power morcellation. Of those who had power morcellation, 10 women were subsequently diagnosed with uterine sarcoma or parasitic myomas, for an overall incidence of 1.1% (10/941 women).

## Uterine sarcoma

Of the 10 women who received a diagnosis of spindle cell neoplasms, 6 tumors (0.6%) were uterine sarcomas. Demographic characteristics are shown in Table 1. Three of the 6 uterine sarcomas were endometrial stromal sarcomas, and 3 were leiomyosarcomas (2 low-grade and 1 high-grade; Table 2). Only 3 of the 6 patients received a diagnosis of uterine sarcoma on pathologic evaluation at the time of hysterectomy with morcellation. These 3 patients underwent subsequent exploratory laparotomy, trachelectomy, and bilateral salpingo-oophorectomy (if not performed at time of hysterectomy). One patient required resection of metastatic implants, omentectomy, appendectomy, and adjuvant therapy with the use of Megace (Table 3; patients #1-3). The other 3 patients were examined from 2-7 years after hysterectomy with  $\geq 1$  pelvic masses; pathologic evaluation of these recurrent masses revealed uterine sarcoma (patients #4-6). There were no significant associations among any of the potential risk factors and uterine sarcoma.

## Uterine sarcoma with initially benign pathologic evidence

Three of the women in the uterine sarcoma group had benign leiomyoma on initial pathologic evaluation and then had a delayed presentation of  $\geq 1$  abdominal or pelvic masses that subsequently were found to be uterine sarcoma. Incidence of this presentation was 0.3% (3/941 women). The median age of these patients at the time of initial procedure was 45 years, and the median uterine weight at the time of morcellation was 486 g. The median amount of time to second evaluation was 6 years. All patients were imaged with a computed tomography scan, which revealed single or multiple pelvic masses, the largest of which was  $15 \times 16$  cm (Figure 1). All patients underwent exploratory laparotomy and resection of masses. On final pathologic evaluation, 1 patient was diagnosed with endometrial stromal sarcoma, and 2 patients were diagnosed with leiomyosarcoma (1 low

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