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Incidental power morcellation of malignancy: A retrospective cohort study

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HIGHLIGHTS

- 0.73% overall incidental malignancy rate among community based sample.
- Higher median uterine weight associated with incidental malignancies.

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ABSTRACT

Objective. Uterine fibroids often require hysterectomy via a laparotomy or utilizing minimally invasive surgical (MIS) approach. Morcellation is a fragmentation of the uterus into smaller pieces. The objective of this study is to determine the incidence of malignancies found in morcellated specimens at our institution.

Methods. Women who had a minimally invasive hysterectomy, for presumptive benign uterine conditions were identified, included and reviewed. Patients were divided into two groups being either benign disease or malignancies. The continuous variables uterine weight and patient age were tested for normalcy with the Shapiro–Wilk test. The exposure of subspecialist vs general gynecology was interrogated via a Chi-Squared analysis.

Results. 10 cases of malignancies were identified including endometrioid endometrial carcinomas (3), uterine serous carcinoma (1), endometrial stromal sarcomas (ESS) (3), and leiomyosarcomas (LMS) (3). An overall risk of occult cancer on a morcellated specimen was .73%; leiomyosarcoma was 0.22%, endometrial stromal sarcoma 0.22%, and endometrial cancer 0.29%. The median uterine weight for the 10 morcellated malignancies was 293.5 g whereas the median weight for the benign uteri was only 117.5 g giving a theta of −106 (95% CI −261,20). There was no difference in patient age or surgeon type between the groups (See Table 1).

Conclusions. Morcellation was associated with substantially higher risk of abdominopelvic recurrence and lower disease-free survival. Morcellated uterine malignancies were significantly heavier than benign uteri. Further research on uterine morcellation should focus on decision and cost–benefit analyses to determine the ideal candidate in whom uterine morcellation during minimally invasive hysterectomy would facilitate more good than harm.

Introduction

Uterine fibroids affect as many as 80% of women during their life time [1]. Frequent symptoms of uterine fibroids include menorrhagia, pelvic pain, pressure, and bowel or bladder complaints. Often surgical management, either myomectomy or hysterectomy, is required for the treatment of uterine fibroids. These procedures could be performed via a laparotomy or utilizing minimally invasive surgical (MIS) approach. Hysterectomies are the most commonly performed gynecologic procedure with over 90% done for benign conditions. Minimally invasive hysterectomies have become increasingly popular since the first laparoscopic hysterectomy was performed in 1988. The laparoscope offers superior visualization and global views of the abdominal and pelvic cavities. Several prospective studies suggested that MIS approaches to hysterectomy for gynecologic conditions may confer improved surgical and disease related outcomes compared to laparotomy [2]. Among

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the reported benefits of MIS are the ability to offer excellent dissection, decrease blood loss, reduce post-operative pain, shorten duration of hospital stay and accelerate the patient's return to normal activities [3]. In order to perform a minimally invasive hysterectomy, the uterus must be removed vaginally, therefore removing the cervix as well, or through the small abdominal incisions using a morcellation technique. Morcellation can be done through two approaches, by hand or using a device for power morcellation. The creation of the power morcellator has allowed for the specimen to be removed faster by slicing the tissue into long strips facilitating removal through the port site. Inadvertently, portions of tissue could be left behind as the circulating blade can spread the fragments throughout the cavity. This could disseminate fragments not only of benign uterine tissue, but could potentially disseminate fragments of an occult malignancy. Recently, due to the concern for this potential dissemination of an occult uterine cancer, the U.S. Food and Drug Administration (FDA) issued a statement discouraging the use of "power" or electromechanical morcellation for hysterectomy and myomectomy (U.S. FDA 2014). The true incidence of this phenomenon has not been well characterized. The objective of this study is to determine the incidence of malignancy found in morcellated specimens at our institution.

Methods

After institutional review board approval was obtained, a retrospective review of our system's pathology database was performed from 2005 to 2013. Data was collected from pathology reports including the words "morcellated" or "morcellation" in the documents. Women who had a minimally invasive hysterectomy, either laparoscopic or robotic, for presumptive benign uterine conditions were identified, included and individually reviewed. Surgery was performed by urogynecologists, gynecologic oncologists or general gynecologists at our institution. In conjunction with the Pathology department, medical records and final pathology reports were reviewed. Pathology specimens were reviewed by our pathologists and in few cases, sent out to other institutions for a second opinion and confirmation of diagnosis. Demographic and clinico-pathologic characteristics were obtained, including age, date of surgery, type of procedure, type of surgeon, diagnosis, final pathology, etc. Patients were divided into two groups, those with benign disease versus those with malignancies. If the patients were diagnosed with a malignancy; staging, post-diagnoses treatment and final outcome were obtained.

The analysis was completed using MiniTab 15 (MiniTab Inc.). After the categorization of variables, the continuous variables uterine weight and patient age were tested for normalcy with the Shapiro–Wilk test. Non-normal distributions were compared using the non-parametric Mann–Whitney test of medians. The distribution of morcellated cancers vs benign uteri were examined graphically. The exposure of subspecialist vs general gynecology was interrogated via a Chi-Squared analysis.

Results

We identified 1361 patients who underwent MIS surgical approach and had morcellated specimens from 2005 to April 2014. The hysterectomies were performed for various reasons including pelvic organ prolapse, menorrhagia, and symptomatic fibroids. We identified 10 cases of malignancies in the morcellated specimens, which included endometrial adenocarcinomas (3), serous carcinoma (1), endometrial stromal sarcomas (ESS) (3), and leiomyosarcomas (LMS) (3). All cases of malignancy were morcellated using a power morcellator. This resulted in an overall incidence of occult malignancy of 0.73%. In our study we showed that the overall incidence of occult malignancy on a morcellated specimen was 0.73%. The risks for leiomyosarcoma, endometrial stromal sarcoma, and endometrial cancer were 0.22%, 0.22%, and 0.29%, respectively.

Table 1
Demographic characteristics of patients with morcellated uteri.

	Morcellated uterus final pathology		
	Benign n = 1342 (median)	Malignant n = 10 (median)	Normally distributed
Patient age	50	54	No**
Uterine weight*	117.5	293.5	No**
Subspecialist vs generalist†	860 vs 490	4 vs 6	N/A

* $p < 0.05$ and statistically significant result using Mann–Whitney *U* test.
** $p < 0.05$ on Shapiro–Wilk test for normalcy.
† No statistically significant difference in Chi-Squared test.

The age (49–64) and uterine weight (41–883 g) are not normally distributed (Shapiro–Wilk $p < 0.01$). While there was no statistically difference in age (Mann–Whitney *U* test $p = 0.15$), uterine weight was found to be statistically significantly higher for uteri with occult malignancy ($p = 0.046$). The median uterine weight for the 10 morcellated malignancies was 293.5 g whereas the median weight for the benign uteri was only 117.5 g giving a theta of −106 (95% CI −261,20).

There was no statistically significant difference between the type of surgeon that performed the initial surgeries among patients with benign disease and those with occult malignancy ($p > 0.05$). Sixty percent of the malignancies were performed by subspecialists and 40% of the cases were performed by generalists (see Table 1).

Of the endometrial carcinomas, none of the specimens had a preoperative endometrial biopsy. Out of the LMS cases, two of the three cases had a normal endometrial biopsy and the other one did not have a preoperative endometrial biopsy. Of the endometrial stromal sarcomas, two had normal biopsies, one did not have a biopsy, and one had no record. None of the specimens had intraoperative frozen specimens sent.

Two out of the three patients with endometrial carcinoma were reoperated and surgically staged. The other patient had a follow up CT scan and was found to have a small nodule, which was of benign histology on interventional radiology (IR) guided biopsy. Of the patients with the endometrial cancers, only one of four was upstaged. That patient had a grade 2 endometrial adenocarcinoma and at her reoperation was found to have a positive lymph node. The remaining patients had no evidence of further disease on followup imaging.

All the patients with leiomyosarcomas had preoperative menorrhagia. Only one of the three had a preoperative MRI which showed an area of necrosis within one of the fibroids and could not rule out a malignancy. The other two patients did not have any preoperative imaging. Postoperatively, two out of three of the LMS patients underwent reoperation by gynecologic oncologists at our institution. There was no evidence of extra-uterine disease at the time of the initial surgery. One of the patients was re-operated within a month of the initial surgery and found to have metastatic disease on the sigmoid colon and peritoneum. The patient was followed with CT scan and was found with a 10 cm implant and ascites at the three month postoperative imaging. She underwent a secondary debulking procedure with a resection of metastatic bladder implants and bowel resection for implants. Subsequently, five months after the secondary procedure, the patient was found to have new complex solid masses on CT scan. The other patient followed at our institution underwent her staging procedure 11 days after the initial hysterectomy and found to have metastatic disease in the cervix, omentum, appendix, bilateral adnexa and on multiple pelvic and peritoneal biopsies. These findings could constitute fragments of tissue which were not retrieved. She is currently undergoing chemotherapy treatments.

Discussion

With the utilization of power morcellation, surgeons are able to offer a minimally invasive surgical approach to women undergoing surgery for benign gynecologic conditions. However, limitations of preoperative