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CLINICAL ARTICLE

Gynecology

Risk of unexpected uterine leiomyosarcoma during laparoscopic procedures: Experience from a single tertiary institute in Italy

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Abstract

Objective: To evaluate the incidence of occult uterine sarcomas and investigate whether an accurate and well-established preoperative assessment for uterine fibroids could help identify uterine sarcomas more effectively.

Methods: A retrospective analysis of patients who underwent gynecological laparoscopic surgery for presumed uterine fibroids at Sant'Anna Hospital, a single tertiary institute in Turin, Italy, between January 2003 and December 2019.

Results: Over the 17-year period, 5826 laparoscopic surgical procedures (myomectomies or subtotal/total hysterectomies) were performed for presumed uterine fibroids. A total of 48 patients with a final diagnosis of uterine sarcoma were identified, the majority of which (n = 39; 81.3%) were recognized as suspicious uterine sarcomas during the preoperative assessment, and morcellement was avoided. The occurrence of unexpected uterine sarcomas was 0.1% (6/5826). Morcellation was conducted in one patient with uterine sarcoma.

Conclusion: Analysis of our data showed that unexpected uterine sarcomas are uncommon. Accurate preoperative evaluation can help avoid, but does not exclude, the possibility of morcellation of unknown uterine sarcomas.

KEYWORDS
laparoscopy, leiomyosarcoma, morcellation, ultrasound, uterine fibroids, uterine sarcomas

1 | INTRODUCTION

Laparoscopic power morcellators are used during laparoscopic surgery to cut tissue into smaller pieces for removal through an incision site typically measuring 2 cm or less. They are often used in gallbladder, kidney, liver, and spleen removal surgery, and in hysterectomy and myomectomy for uterine fibroids—a common benign tumor in women. In contrast, uterine sarcomas are a heterogeneous group of tumors that are characterized by aggressive clinical behavior.

Uterine sarcomas can be divided into three categories: (1) uterine leiomyosarcoma (anomalous proliferation of the myometrial layer of the uterus); (2) endometrial stromal sarcoma (anomalous proliferation of the connective tissue underlining the endometrium); and (3) undifferentiated sarcoma. Uterine sarcomas are rare, with an

estimated incidence of 0.36 per 100 000 woman-years.[1] Globally, the average age at diagnosis is 55 years.[2] The US Food and Drug Administration (FDA) guidance states that the prevalence of occult uterine sarcomas in women undergoing surgery for presumed uterine fibroids is in the range of approximately 1 in 250 to 1 in 580. These rates are higher than had traditionally been quoted prior to 2014 (as uncommon as 1 in 10 000).[3]

Other published data demonstrate a much lower prevalence of uterine sarcomas identified at the time of surgery for presumed uterine fibroids. A 2015 meta-analysis of 133 studies determined that the overall prevalence of uterine sarcomas among women having surgery for presumed uterine fibroids was 1 in 1961 (0.051%).[4] In this same meta-analysis, when considering only the 64 prospective studies, the prevalence was approximately 1 in 8300 (0.012%) surgeries for presumed uterine fibroids. A single institution series, also published in 2015, found two instances of occult uterine sarcomas in 8720 women undergoing surgery for presumed uterine fibroids (1 in 4360 or 0.023%).[5]

The clinical problem is that the features of uterine sarcomas (clinical and radiological findings) can sometimes mimic uterine fibroids. In case of absence of preoperative diagnosis or doubt of uterine sarcomas, the patient could undergo laparoscopic surgery and morcellation of the sarcoma. Morcellation of uterine sarcoma strongly impacts its prognosis and clinicians must avoid it. Morcellation can be manual or instrumental (power morcellation), both of which can affect patient prognosis. In power morcellation, the specimen is grasped with a tenaculum and fed into the rotating blades of the morcellator under direct visualization. Manual morcellation with a scalpel requires a mini-laparotomy or vaginal access. The 2017 Agency for Healthcare Research and Quality meta-analysis stated that in the case of uterine sarcoma, the expected five-year survival was 30% for women undergoing power morcellation (95% CI, 13.0%–61.0%), 59% for scalpel morcellation (95% CI, 33.0%–84.0%), and 60% for women in whom no morcellation was used (95% CI, 24.0%–98.0%).[6]

The aim of the present study was to evaluate the incidence of occult uterine sarcomas in our hospital and to highlight the importance of preoperative assessment of uterine fibroids and hence more effective preoperative identification of uterine sarcomas.

2 | MATERIALS AND METHODS

Retrospective data collection was done of patients who had undergone gynecological surgery for presumed uterine fibroids at Sant'Anna Hospital, a single tertiary institute in Turin, Italy, between January 01, 2003 and December 31, 2019. Gynecologic ultrasound (transvaginal and transabdominal) was performed preoperatively by the same team of expert gynecologists dedicated full time to ultrasound diagnosis of gynecological pathology in a dedicated ultrasound center. Preoperative assessment was completed by magnetic resonance imaging (MRI) in only a few highly suspected cases. The histological diagnosis of fibroids or sarcomas was confirmed by gynecologic pathologists following postsurgical pathology review. We identified presumed uterine fibroids by ICD-9-CM codes 21.81, 21.80, or 21.82 from the hospital discharge forms. All uterine fibroids treated in our hospital were stratified according to the different surgical procedures (laparoscopic, laparotomic, or vaginal myomectomy or hysterectomy) using the following ICD-9-CM codes: 68.31, 68.39, 68.41, 68.49, 68.51, 68.59, 68.61, 68.69, 68.71, 68.79, 68.9, or 68.29. No ethical approval or specific patient informed consent was required owing to the retrospective nature of the study.

3 | RESULTS

Over the 17-year study period, 5826 laparoscopic surgical procedures (myomectomies or subtotal/total hysterectomies) were performed for presumed uterine fibroids in our department. A total of 48 patients with a final diagnosis of uterine sarcomas were identified (Table 1). The mean age at diagnosis was 58 years.

Uterine sarcomas were suspected preoperatively in 39 (81.3%) of the 48 patients. The features of uterine sarcomas were large diameters (mean maximum diameter: 148 ± 53 mm or high color score (color score of 3 or 4 in 100% of patients). A total of 42 (87.5%) patients underwent laparotomic elective surgery for preoperative evaluation suggestive of uterine sarcomas (n = 39) or for laparoscopic contraindications (n = 3). Six (12.5%) of the 48 patients with uterine sarcomas were not diagnosed preoperatively (0.1% overall; 6/5826). In two out of 48 (4.2%) cases, transvaginal myomectomy was performed because of a transvaginal expulsion of an intrauterine mass.

Three patients underwent laparoscopic surgery; in one case, laparotomic conversion was performed after laparoscopic myomectomy with use of an endobag for specimen asportation and intraoperative histological diagnosis of uterine sarcoma; in one case of laparoscopic hysterectomy, the specimen was removed through the vagina using an endobag; in only one case was morcellation conducted.

All cases of uterine sarcomas in our series were classified as leiomyosarcomas. Median follow-up length was 30 months (range, 2–65 months). Adjuvant chemotherapy or radiotherapy was indicated according to prognostic factors such as tumor grade, maximum

TABLE 1 Women diagnosed with uterine sarcoma (n = 48)[a]

Characteristics	n = 48
Age, years	58 ± 11
Preoperative diagnosis of uterine sarcoma	39 (81.3)
Maximum diameter, mm	148 ± 53
Color score	
3	21 (43.7)
4	27 (56.3)
Laparotomic surgery	42 (87.5)
Histological diagnosis of leiomyosarcoma	48 (100.0)
Adjuvant chemotherapy	22 (45.8)
Adjuvant radiotherapy	17 (35.4)

[a]Values are given as mean ± SD or number (percentage).

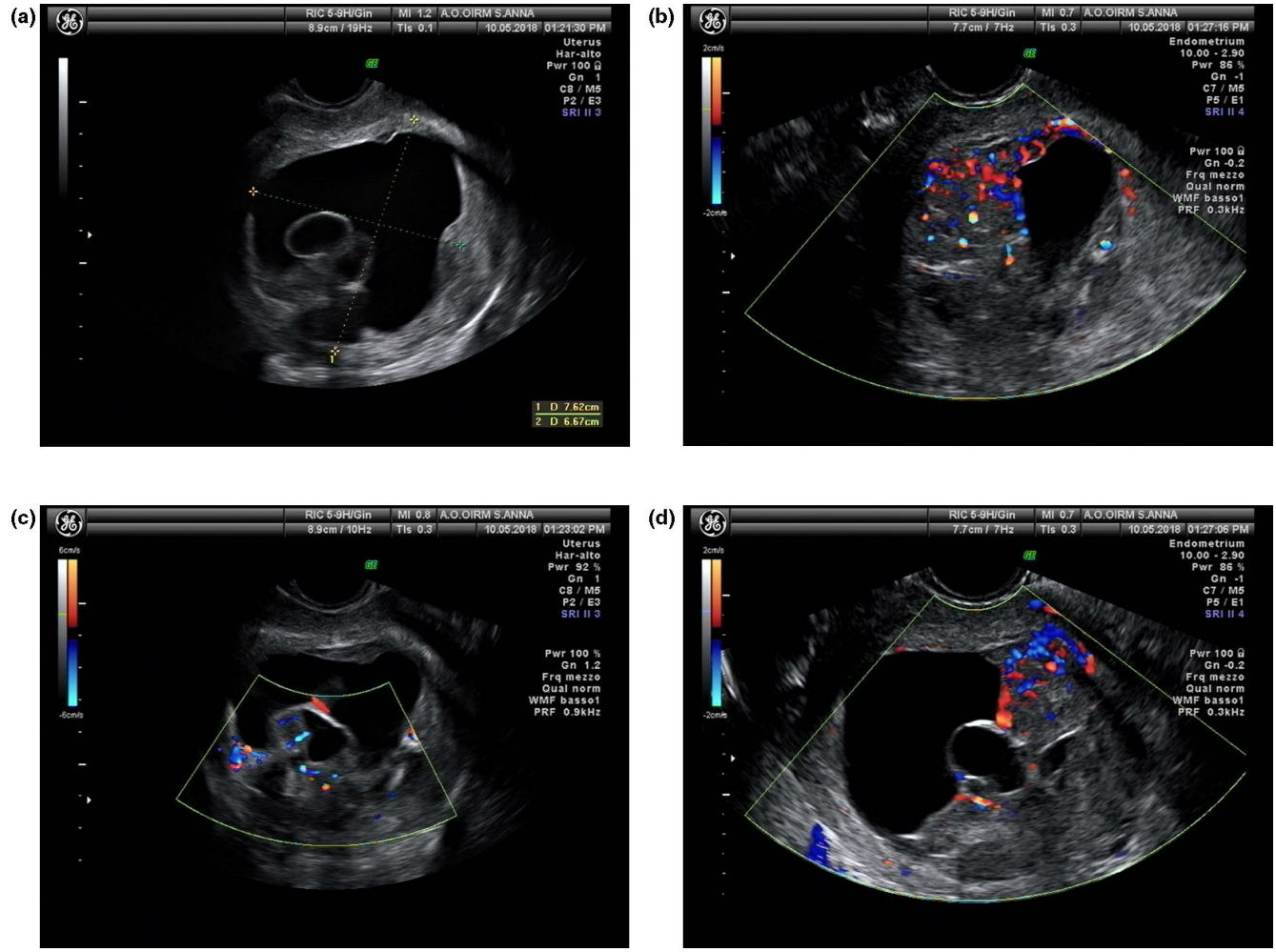

FIGURE 1 Ultrasound features of a leiomyosarcoma identified from the study sample. (a) Multilocular-solid lesion with anechoic content (76 × 66 × 71 mm). (b–d) Color score 4 from the posterior uterine wall

dimension of the uterine sarcoma, and tumor extension outside the uterus. In our sample, 22 (45.8%) and 17 (35.4%) patients were treated with adjuvant chemotherapy and radiotherapy, respectively, because of their class risk (grade 2–3, tumor diameter greater than 5 cm, or cervical infiltration).

4 | DISCUSSION

A review and analysis of the scientific evidence regarding power morcellation and undetected malignancy in gynecologic surgery recommended that physicians consider risk factors such as patient age, menopausal status, uterine size, presence of rapid uterine growth, as well as history of treatments such as tamoxifen or pelvic radiation, hereditary conditions, such as Lynch syndrome or hereditary leiomyomatosis, and renal cell cancer.[7] In our sample, only one case of uterine sarcoma was treated by morcellation, which is a relevant clinical problem because it affects patient prognosis. Our unique case was a patient treated for presumed uterine fibroids in 2003.

Analysis of our data revealed that unexpected uterine sarcomas are uncommon (0.1% overall; 6/5826). Accurate preoperative evaluation could help to avoid, but does not exclude the possibility of, morcellation of unknown uterine sarcomas. Several imaging modalities have been evaluated for detection of uterine sarcomas, including Doppler ultrasound, computed tomography, and MRI, but none has shown superiority.[8,9] Uterine sarcomas are conventionally described on ultrasound as unique heterogeneous ill-defined tumors. On color Doppler, the distribution of vessels is irregular, with a low resistance index and high systolic velocities; despite these characteristics, color score may not be high owing to internal areas of necrosis due to the rapid growth of uterine sarcomas. MRI is considered a second-line imaging technique, especially when the mass is suspected uterine sarcoma, with a specificity of 93%–100% and a positive predictive value of 53%–100%.[10,11] On T1-weighted images, uterine sarcomas show heterogeneous hypointensity with hemorrhagic areas in high T1 intensity. After contrast administration they present heterogeneous enhancement due to areas of necrosis and hemorrhage. Goto et al[10] studied the possible role of MRI, suggesting that the combined use of dynamic MRI and serum measurement of LDH seems to be useful in making a differentiated diagnosis of US from

UF before treatment Hagemann et al[12] suggested an algorithm for preoperative evaluation before uterine fibroid surgery, including Pap test, endometrial biopsy, MRI and/or pelvic ultrasound. From analysis of our sample and the scientific literature, transvaginal and transabdominal ultrasound can highlight uterine masses that are presumed to be uterine sarcomas. Uterine sarcomas must be suspected in the presence of large size, color score 3 or 4,[13] or rapidly growing masses (Figure 1).

According to the algorithm of the European Society of Gynaecological Endoscopy,[14] our sample demonstrated that the association of clinical features and radiologic findings allows an improved surgical strategy and that a specialized gynecologic ultrasound team highlighting clinical cases that are suspected uterine sarcomas prevents morcellation.[2]

The primary limitation of our study is the long study period (almost 17 years) because the accuracy of preoperative assessment of uterine fibroids and the differential diagnosis of uterine sarcomas by ultrasound or MRI have improved over this time. A second limitation is that our study is retrospective. Furthermore, our analysis does not show the impact of overdiagnosis on women's fertility and its trend during the study period, which will be the primary goal of further study.

While additional randomized trials are warranted to investigate the role of innovative imaging techniques and preoperative diagnoses of uterine sarcoma, our data suggest that accurate preoperative patient evaluation in a tertiary institute with a dedicated ultrasound center might reduce the risk of morcellation of an unexpected malignancy. Moreover, introduction of a safe tissue morcellation bag, such as MorSafe (Veol Medical Technologies; Mumbai, India), reduce the risks related to morcellation of unexpected US.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

AUTHOR CONTRIBUTIONS

AS, MB, MM, and EP contributed to conception and design. GB, SP, and CP contributed to data acquisition, analysis, and interpretation. AS, EP, MM, MB, and SD drafted the manuscript and revised it critically. All authors approved the final version.

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