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Original Research Article

OCCULT UTERINE SARCOMA IN WOMEN UNDERGOING TOTAL LAPAROSCOPIC HYSTERECTOMY FOR PRESUMED LEIOMYOMA: A SEVEN-YEAR RETROSPECTIVE COHORT STUDY

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ABSTRACT

Background: Occult uterine sarcoma is an uncommon but highly aggressive malignancy that may be unexpectedly diagnosed following hysterectomy performed for presumed benign leiomyoma. The potential dissemination of malignant tissue during morcellation has raised significant concerns regarding the safety of minimally invasive surgery. This study evaluated the prevalence, clinicopathological characteristics, and outcomes of occult uterine sarcoma in women undergoing total laparoscopic hysterectomy for presumed benign leiomyoma, with particular emphasis on contained morcellation. **Materials and Methods:** This retrospective observational study included women who underwent total laparoscopic hysterectomy for presumed benign uterine leiomyoma between May 2016 and June 2023 at a tertiary care centre in North India. Patients with preoperative suspicion of malignancy were excluded. Demographic characteristics, clinical presentation, operative details, histopathological findings, adjuvant treatment, and follow-up outcomes were reviewed. The prevalence of occult uterine sarcoma was calculated among all laparoscopic hysterectomies performed during the study period. **Result:** Among 3,019 total laparoscopic hysterectomies, four cases of occult uterine sarcoma were identified, yielding a prevalence of 0.13%. Three patients had leiomyosarcoma and one had endometrial stromal sarcoma. The mean age was 50 years, and all patients presented with menorrhagia and large fibroids. Two patients underwent contained in-bag power morcellation, while two underwent contained vaginal morcellation. Despite multimodal treatment with chemotherapy and radiotherapy, three patients died within one year and one died after 18 months, reflecting the aggressive nature of these tumors. **Conclusion:** Occult uterine sarcoma during laparoscopic hysterectomy for presumed benign leiomyoma is rare but carries a poor prognosis. Careful patient selection, comprehensive preoperative counseling, and the routine use of contained tissue extraction techniques may help reduce the risk of tumor dissemination while preserving the benefits of minimally invasive surgery.

INTRODUCTION

Uterine sarcomas are rare but highly aggressive mesenchymal malignancies, accounting for approximately 3–7% of all uterine cancers and less than 1% of female genital tract malignancies.[1] The most common histological subtypes include leiomyosarcoma and endometrial stromal sarcoma, both of which are characterized by aggressive biological behavior, a high risk of recurrence, and poor overall prognosis compared with endometrial carcinoma.[2] Early diagnosis remains difficult because the clinical manifestations and imaging characteristics of uterine sarcomas frequently overlap with those of benign uterine leiomyomas. Consequently, most cases are diagnosed incidentally following histopathological examination of surgical specimens removed for presumed benign disease.

The widespread adoption of minimally invasive hysterectomy has significantly improved surgical outcomes by reducing blood loss, postoperative pain, length of hospital stay, and recovery time. However, concerns regarding the inadvertent dissemination of occult uterine sarcoma during tissue morcellation led

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the U.S. Food and Drug Administration (FDA) to issue a safety communication in 2014 discouraging the use of laparoscopic power morcellation in women undergoing hysterectomy or myomectomy for presumed leiomyomas. This advisory resulted in a decline in minimally invasive procedures and a renewed preference for open surgery despite its associated morbidity.

Previous studies, including those by Park et al., have demonstrated that tumor morcellation may increase pelvic recurrence and reduce disease-free survival in patients with occult uterine sarcoma.[3] To address these concerns while preserving the advantages of minimally invasive surgery, contained (in-bag) morcellation techniques have been introduced to minimize intraperitoneal tissue dissemination. In this study, we evaluated the prevalence, clinicopathological characteristics, and clinical outcomes of occult uterine sarcoma among women undergoing total laparoscopic hysterectomy for presumed benign leiomyoma, with particular emphasis on the role of contained morcellation.

MATERIALS AND METHODS

Study Design and Setting: This retrospective observational study was conducted at a.tertiary care centre in North India. The study involved a retrospective review of institutional medical records of women who underwent total laparoscopic hysterectomy for presumed benign uterine leiomyoma during the study period. The objective was to determine the prevalence of occult uterine sarcoma, describe its clinicopathological characteristics, and evaluate postoperative outcomes.

Study Population: The study included all consecutive women who underwent total laparoscopic hysterectomy (TLH) for presumed benign uterine leiomyoma between May 2016 and June 2023. Patients were evaluated preoperatively through detailed clinical assessment and pelvic imaging. Only those with no clinical or radiological suspicion of uterine malignancy were considered eligible. Patients undergoing minimally invasive surgery who had no contraindications to laparoscopy and who had provided written informed consent after counseling regarding the risks, benefits, available treatment options, and the possibility of unexpected uterine malignancy were included. Patients with a preoperative diagnosis or suspicion of uterine malignancy, or those undergoing hysterectomy for indications other than presumed benign leiomyoma, were excluded from the study.

Surgical Procedure: All procedures were performed by experienced gynecologic surgeons using standardized surgical techniques. The method of specimen retrieval was selected according to uterine size, operative feasibility, and surgeon preference. Tissue extraction was carried out either by contained (in-bag) power morcellation or contained vaginal morcellation, with the specimen enclosed within a retrieval bag to minimize the risk of intraperitoneal tissue dissemination.

Data Collection: Data were retrospectively extracted from hospital medical records, operative notes, pathology reports, and follow-up records. Variables collected included patient demographics, presenting symptoms, preoperative imaging findings, uterine and fibroid size, intraoperative details, method of specimen retrieval, histopathological diagnosis, postoperative adjuvant therapy including chemotherapy and radiotherapy, and follow-up outcomes such as survival status.

Outcome Measures: The primary outcome of the study was the prevalence of occult uterine sarcoma among women undergoing total laparoscopic hysterectomy for presumed benign uterine leiomyoma. Secondary outcomes included the histopathological subtype of sarcoma, patient characteristics, surgical details, adjuvant treatment received, and clinical outcomes during follow-up.

Statistical Analysis: Data were analyzed using descriptive statistical methods. Continuous variables are presented as mean with range, whereas categorical variables are expressed as frequencies and percentages. The prevalence of occult uterine sarcoma was calculated by dividing the number of histopathologically confirmed sarcoma cases by the total number of total laparoscopic hysterectomies performed during the study period. Because of the limited number of confirmed sarcoma cases, inferential statistical analyses were not performed.

RESULTS

During the study period from May 2016 to June 2023, a total of 3,019 women underwent total laparoscopic hysterectomy for presumed benign uterine leiomyoma. Histopathological examination identified four cases of occult uterine sarcoma, resulting in an overall prevalence of 0.13%. Of these, three cases (0.09%) were diagnosed as leiomyosarcoma, while one case (0.03%) was identified as endometrial stromal sarcoma.

The affected patients were aged between 49 and 51 years, with a mean age of 50 years. All patients presented with a history of heavy menstrual bleeding (menorrhagia) lasting 2–3 years before surgery. Preoperative assessment revealed large uterine fibroids ranging from 7 to 12 cm in maximum diameter, with the overall uterine size corresponding to 16–20 weeks of gestation on clinical examination. None of the patients had clinical or radiological findings suggestive of uterine malignancy before surgery.

All patients underwent total laparoscopic hysterectomy using standardized minimally invasive techniques. Specimen retrieval was performed by contained (in-bag) power morcellation in two patients (50%) [Figure 1], while the remaining two patients (50%) underwent contained vaginal morcellation [Figure 2]. Histopathological

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examination confirmed the diagnosis of uterine sarcoma in all four cases following surgery.

Figure 1: Steps of contained (in-bag) power morcellation during total laparoscopic hysterectomy. (A) Placement of the uterus within the specimen retrieval bag. (B) Introduction of the power morcellator into the sealed containment bag. (C) Morcellation of the specimen within the containment system, minimizing the risk of intraperitoneal tissue dissemination.

Figure 2: Steps of contained (in-bag) vaginal morcellation during total laparoscopic hysterectomy. (A) Exteriorization of the specimen retrieval bag through the vaginal vault following completion of hysterectomy. (B) Sequential vaginal morcellation of the uterine specimen performed entirely within the containment bag. (C) Completion of contained specimen extraction with the integrity of the retrieval bag maintained, minimizing the risk of intraperitoneal tissue dissemination.

Following diagnosis, all patients received adjuvant chemotherapy and radiotherapy as part of multimodal oncological management. Despite aggressive postoperative treatment, the clinical outcomes were unfavorable. Three patients (75%) died within one year of diagnosis, while the remaining patient (25%) survived for 18 months before succumbing to the disease. These findings indicate that although the prevalence of occult uterine sarcoma among women undergoing laparoscopic hysterectomy for presumed benign leiomyoma was low, the disease was associated with poor survival despite comprehensive multimodal treatment.

DISCUSSION

In this retrospective observational study of 3,019 women undergoing total laparoscopic hysterectomy for presumed benign uterine leiomyoma, the prevalence of occult uterine sarcoma was 0.13%. Leiomyosarcoma was the predominant histological subtype, accounting for three of the four cases identified. Although the incidence of occult uterine sarcoma was low, all affected patients experienced poor clinical outcomes despite receiving multimodal treatment, emphasizing the aggressive biological behavior and unfavorable prognosis associated with these malignancies.

The observed prevalence in our study is consistent with previously published reports, which have demonstrated that occult uterine sarcoma is an uncommon finding among women undergoing surgery for presumed benign leiomyomas. Nevertheless, the inability to reliably distinguish benign leiomyomas from uterine sarcomas before surgery continues to represent a major clinical challenge. Clinical symptoms such as abnormal uterine bleeding, pelvic pain, and uterine enlargement, together with conventional imaging findings, often overlap considerably between these conditions, resulting in most uterine sarcomas being diagnosed only after postoperative histopathological examination.

The oncological safety of morcellation has remained a subject of considerable debate since the 2014 U.S. FDA safety communication regarding the risk of disseminating unsuspected uterine malignancy during laparoscopic power morcellation. Subsequent studies have reported an increased risk of intraperitoneal dissemination, pelvic recurrence, and reduced disease-free survival in patients with occult uterine sarcoma who underwent tumor morcellation. In particular, Park et al. demonstrated significantly shorter recurrence-free survival among patients who underwent morcellation compared with those whose tumors were removed intact.[4] These findings have influenced surgical practice worldwide and prompted renewed emphasis on careful patient selection and informed preoperative counseling.

However, it is important to recognize that tissue disruption is not limited to electromechanical power morcellation. Surgical procedures such as vaginal morcellation, subtotal hysterectomy, open myomectomy, and hysteroscopic resection may also fragment an unsuspected sarcoma and theoretically contribute to intraperitoneal dissemination or disease upstaging. Therefore, the potential oncological risk should be considered whenever tissue fragmentation is anticipated, irrespective of the extraction technique employed.

To address these concerns while preserving the established benefits of minimally invasive surgery, contained (in-bag) morcellation has emerged as a valuable alternative. The use of specimen retrieval bags aims to prevent the dissemination of tissue fragments and malignant cells within the peritoneal cavity during specimen extraction. Several clinical studies have reported favorable safety profiles for contained morcellation, supporting its feasibility and effectiveness in minimizing intraperitoneal contamination.[5-8] In the present study, all tissue retrieval procedures were performed using contained techniques, either through in-bag power morcellation or contained vaginal morcellation. Although the limited number of sarcoma cases precludes conclusions regarding long-term oncological benefit, the available evidence and the theoretical advantages of containment support its routine use whenever morcellation is required.

The declining use of minimally invasive hysterectomy following concerns regarding morcellation should be interpreted cautiously. Open abdominal hysterectomy may reduce the theoretical risk of tumor dissemination but is associated with increased blood loss, longer hospitalization, greater

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postoperative pain, delayed recovery, and higher overall morbidity. Therefore, abandoning minimally invasive surgery solely because of concerns related to tissue extraction may deprive the vast majority of women with benign disease of its well-established benefits. A balanced approach that combines meticulous patient selection, comprehensive preoperative counseling, adherence to evidence-based surgical techniques, and routine use of contained specimen retrieval systems appears to offer the most appropriate strategy for optimizing both surgical and oncological outcomes.

The present study has several strengths. It includes a large institutional cohort of 3,019 consecutive laparoscopic hysterectomies, providing a reliable estimate of the prevalence of occult uterine sarcoma in routine clinical practice. The seven-year study period reflects real-world surgical experience at a high-volume minimally invasive gynecologic center, and all cases were confirmed by histopathological examination.

However, several limitations should be acknowledged. The retrospective study design is inherently subject to selection and information bias. The extremely small number of occult uterine sarcoma cases limited detailed statistical analysis and precluded meaningful comparisons between different specimen retrieval techniques. In addition, the absence of a control group and the relatively limited follow-up duration restricted the assessment of long-term oncological outcomes. Larger multicenter prospective studies are needed to better define the incidence of occult uterine sarcoma, evaluate the long-term safety of contained morcellation, and establish evidence-based recommendations for tissue extraction during minimally invasive gynecologic surgery.

CONCLUSION

Occult uterine sarcoma is a rare but clinically significant finding among women undergoing total laparoscopic hysterectomy for presumed benign leiomyoma, with a prevalence of 0.13% in the present study. Despite its low incidence, the associated prognosis was poor, highlighting the aggressive nature of these tumors and the challenges in preoperative diagnosis. The findings support the continued use of minimally invasive hysterectomy with careful patient selection, comprehensive preoperative counseling, and the routine use of contained (in-bag) tissue extraction techniques whenever morcellation is required. Larger prospective multicenter studies are needed to further evaluate the long-term oncological safety and effectiveness of contained morcellation.

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