

# Leiomyosarcoma Diagnosed Six Years After Laparoscopic Electromyolysis

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## Abstract

**Background:** Making a histologic diagnosis of leiomyosarcoma in the specimen from a hysterectomy performed for suspected benign fibroids is rare. Currently, there are no reliable diagnostic tools to diagnose uterine sarcomas preoperatively.

**Case:** A 38-year-old woman presented with menorrhagia and a uterine fibroid measuring 6.0 cm × 8.1 cm × 6.2 cm on ultrasonography. The patient underwent a laparoscopic myolysis with 50% shrinkage of the fibroid volume at follow-up after six months. Six years after myolysis, the patient presented with right lower quadrant pain and a rapidly enlarging uterus. Hysterectomy and bilateral salpingo-oophorectomy was performed and a diagnosis of leiomyosarcoma was histologically confirmed. CT scan was performed bi-annually after hysterectomy. One year after surgery, the patient presented with radiologic evidence of a right pulmonary nodule. The nodule was excised thoracoscopically and histologic examination demonstrated metastatic leiomyosarcoma. One year later, another pulmonary lesion appeared in the left lung and was excised thoracoscopically. Again, histological assessment showed metastatic leiomyosarcoma. This patient has remained healthy and asymptomatic for two years since the last thoracoscopic excision of the leiomyosarcoma metastasis.

**Conclusion:** The current trend in treatment for symptomatic fibroids is therapy sparing the uterus. Such treatment includes both medical therapy and fibroid necrosing therapies such as vascular occlusion, embolization, and thermal coagulation technologies. Women considering uterus-sparing treatment should be advised of the potential risk of uterine malignancy, even though that risk is quite minimal (< 0.5%). A delay in the diagnosis of uterine malignancy may ultimately compromise long-term survival.

**Key Words:** Leiomyosarcoma, leiomyoma, myolysis, laparoscopy, thoracoscopy

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## Résumé

**Contexte :** Il est rare d'établir un diagnostic histologique de léiomyosarcome à partir d'un prélèvement issu d'une hystérectomie effectuée en raison de la présence de fibromes que l'on soupçonne être bénins. À l'heure actuelle, il n'existe aucun outil diagnostique fiable permettant de diagnostiquer les sarcomes utérins de façon préopératoire.

**Cas :** Une femme de 38 ans présentait une ménorragie et un fibrome utérin dont les dimensions avaient été établies à 6,0 cm x 8,1 cm x 6,2 cm au cours d'une échographie. La patiente a subi une myolyse laparoscopique; au moment du suivi, six mois par la suite, le volume du fibrome avait diminué de 50 %. Six ans à la suite de la myolyse, la patiente présentait des douleurs au quadrant inférieur droit et un utérus s'hypertrophiant rapidement. Une hystérectomie et une salpingo-ovariectomie bilatérale ont été effectuées, et un diagnostic de léiomyosarcome a été confirmé par histologie. Une tomодensitométrie a été effectuée deux fois l'an à la suite de l'hystérectomie. Un an à la suite de la chirurgie, la patiente présentait des signes radiologiques de la présence d'un nodule pulmonaire droit. Le nodule a été excisé par thoracoscopie; l'examen histologique a démontré qu'il s'agissait d'un léiomyosarcome métastatique. Un an plus tard, une autre lésion pulmonaire est apparue dans le poumon gauche et a été excisée par thoracoscopie. Une fois de plus, l'évaluation histologique a indiqué qu'il s'agissait d'un léiomyosarcome métastatique. Cette patiente est demeurée en santé et asymptotique pendant deux ans à la suite de la dernière excision thoracoscopique d'un léiomyosarcome métastatique.

**Conclusion :** La tendance actuelle dans le domaine de la prise en charge des fibromes symptomatiques est le recours aux modes de traitement qui épargnent l'utérus. Parmi ces modes de traitement (lesquels englobent tant le traitement médical que les traitements entraînant la nécrose des fibromes), on trouve l'occlusion vasculaire, l'embolisation et les technologies de coagulation thermique. Les femmes envisageant le recours à des modes de traitement qui épargnent l'utérus devraient être avisées du risque potentiel de malignité utérine, et ce, même si ce risque est assez minime (< 0,5 %). La présence d'un délai dans le diagnostic de malignité utérine peut, en fin de compte, compromettre la survie à long terme.

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## INTRODUCTION

Uterine leiomyomas (fibroids) are the most common solid pelvic tumour, occurring in 20% to 40% of reproductive age women.<sup>1-3</sup> In a United States epidemiological study, using ultrasound in 1364 randomly selected women aged 35 to 49 years, a cumulative incidence of fibroids of approximately 80% in African and 70% in Caucasian women was described.<sup>4</sup> Even though most fibroids are asymptomatic and do not require treatment, uterine fibroids have been listed as the primary indication for 40% to 50% of hysterectomies performed in both the United States and Canada.<sup>5,6</sup>

In the 1990s, health care providers began exploring less invasive therapies for the major indications for hysterectomy. Laparoscopic myoma coagulation (myolysis), using a variety of techniques and energy sources, was first introduced in the early 1990s.<sup>7-10</sup> The general aim of myolysis is to disrupt, decrease, or eliminate the blood supply to the fibroid. This results in deprivation of essential nutrients, hormones, and growth factors, which will eventually lead to coagulative necrosis and up to 50% shrinkage of the fibroid.<sup>7-10</sup>

The principal author (GAV) previously described a series of laparoscopic electromyolysis procedures in 40 patients performed between December 1994 and December 1998.<sup>10</sup> This case report describes the clinical course of one of these patients, who was found to have a leiomyosarcoma six years after laparoscopic electromyolysis and who had thoracoscopic resection of metastatic pulmonary lesions.

## THE CASE

A 38-year-old multiparous woman presenting with menorrhagia had a pelvic ultrasound performed in December 1994. The ultrasound identified a dominant uterine fundal fibroid measuring 6.0 cm × 8.1 cm × 6.2 cm (volume 158 cm<sup>3</sup>), and a separate calcified mass, along the fundus of the uterus, measuring approximately 2 cm in maximal diameter. In April 1996, the patient underwent hysteroscopic endometrial electrocoagulative ablation using a rollerball with 100 watts of power. Concomitantly, the patient underwent laparoscopic electromyolysis with a bipolar electrode using 35 watts of power. The 8 cm fundal and smaller 1 cm posterior fibroids were circumferentially electrocoagulated as previously described.<sup>10</sup> Immediately prior to electromyolysis, the fibroid measured 8.2 cm × 7.4 cm × 6.8 cm (volume 216 cm<sup>3</sup>) on ultrasonography.

Six months after myolysis, the dominant fibroid measured 6.0 cm × 7.3 cm × 4.8 cm (volume 110 cm<sup>3</sup>) on ultrasound examination, representing a reduction in myoma volume of approximately 50%. The second fibroid (with central

calcification) measured 3.9 cm × 3.7 cm × 2.6 cm. At one year post myolysis, the patient reported occasional spotting, less than one episode per month, and pelvic pressure symptoms. On bimanual examination, the uterus was found to be approximately the size of a 12-week pregnancy. At four years post myolysis, the patient continued to have occasional spotting. Ultrasound examination showed several fibroids within the uterus, the largest lying posteriorly and measuring 7.1 cm × 6.9 cm × 5.3 cm (volume 136 cm<sup>3</sup>). The calcified fibroid was again identified, and it had not changed in size.

At six years following myolysis (2002), the patient was assessed by another gynaecologist because of right lower quadrant pain. She was now 47 years old. She stated that she felt the pain in association with exercise and when the abdominal wall was compressed immediately above the pubis. She also experienced intermittent throbbing pain in the right lower quadrant at night when lying supine. On physical examination the uterus was enlarged to the size of a 16-week pregnancy.

Three months later, the right lower quadrant pain persisted, and the patient was re-examined. The uterus was found to have enlarged to a 19- to 20-week gestational size. At this time, the patient was advised to undergo abdominal hysterectomy with bilateral salpingo-oophorectomy, and this was performed shortly thereafter. The surgical specimen weighed 856 grams, and the fundus of the uterus, on sectioning, was distorted by several white, whorled masses. The largest mass measured 8.0 cm × 8.0 cm × 13.0 cm (volume 436 cm<sup>3</sup>) and was composed of neoplastic smooth muscle cells with moderate and focally marked nuclear atypia with scattered foci of coagulative necrosis. A mitotic count of 24/10 high power fields was obtained in the most cellular proliferative area. In some areas, the lesion invaded the adjacent myometrium. There was no lymphatic or vascular space involvement. The pathologic diagnosis was leiomyosarcoma of the uterine body. The smallest lesions ranged from 1 to 2 cm in maximal diameter and were histologically confirmed to be leiomyomas.

A CT scan of the chest, abdomen, and pelvis was performed following hysterectomy and was repeated six months later. There was no radiologic evidence of metastatic disease. However, a repeat CT scan performed one year after hysterectomy demonstrated a new 10 mm pulmonary nodule located in the superior aspect of the right lower lobe of the lung. The nodule was excised using a thoracoscopic approach. Histologic examination of the specimen demonstrated metastatic leiomyosarcoma.

In February 2004, a repeat CT scan showed a new, solitary, 5 mm pulmonary lesion in the superior segment of the left

lower lobe of the lung. Thoracoscopic excision was again performed and histologic examination again confirmed metastatic leiomyosarcoma.

The patient continues to have bi-annual CT scans of the chest, abdomen, and pelvis and, to date, she has not developed any new lesions and remains asymptomatic.

## DISCUSSION

Uterine sarcomas are rare malignant tumours with an occurrence rate of 1.7 per 100 000 women over 20 years of age.<sup>1</sup> The mean age at diagnosis for women with leiomyosarcoma has been reported to be between 44 and 57 years, and approximately one half of these women present between the ages of 40 and 50 years.<sup>11</sup> Most leiomyosarcomas have non-specific presenting signs and symptoms, including abnormal uterine bleeding in up to 50% of women. In descending order of frequency, other symptoms include pain, increased abdominal girth, and abnormal vaginal discharge.<sup>1</sup>

Preoperative diagnosis of leiomyosarcoma is infrequent. As a rule, the diagnosis is usually made after hysterectomy/myomectomy or failure to respond to other traditional treatment for symptomatic fibroids or abnormal uterine bleeding. The available evidence indicates that uterine sarcomas have been found in less than 0.5% of all hysterectomies performed for suspected fibroids.<sup>11–13</sup> Even in women with a preoperative diagnosis of “rapidly enlarging uterus,” the prevalence of leiomyosarcoma is only 0.27%.<sup>12</sup> In one study, only one sarcoma was found in 1332 women (0.07%) who had undergone hysterectomy for suspected fibroids.<sup>12</sup> These authors stated that, given that 80% of women with fibroids do not have surgery, the true incidence of uterine sarcomas is likely to be even smaller (1 in 6660 or 0.015%).

In an Italian multicentre study, the complications encountered at 2051 laparoscopic myomectomies for myomas greater than 4 cm in maximal diameter were described.<sup>14</sup> Two (0.1%) fibroids were found to be malignant. Cases of myometrial leiomyosarcomas encountered during hysteroscopic endometrial resection for abnormal uterine bleeding have also been reported.<sup>15</sup> There is currently no evidence to support performing either hysterectomy or myomectomy in women with asymptomatic fibroids to ensure that there is no malignancy. The surgical mortality associated with a hysterectomy (1 to 1.6 per 1000 women) is approximately equal to the frequency of leiomyosarcomas.<sup>16,17</sup>

Since most leiomyosarcomas are identified serendipitously, after hysterectomy or myomectomy for suspected benign fibroids, it should come as no surprise that the newly introduced uterine-sparing treatments for symptomatic fibroids

would occasionally yield unexpected leiomyosarcomas. Indeed, since the introduction of uterine artery embolization, several leiomyosarcomas have been inadvertently embolized.<sup>18–21</sup> Between 1998 and 2005, two leiomyosarcomas have been identified in our hospital after performing 540 uterine artery embolizations. Leiomyosarcomas diagnosed following laparoscopic myolysis has not been previously reported. One study reported a case of leiomyosarcoma discovered prior to myolysis.<sup>22</sup> After one month of the required pre-treatment with leuprolide acetate (3.75 mg) the patient experienced sudden, rapid uterine growth and was referred to an oncologist. She died within six months of having a hysterectomy. A case of an expelled leiomyosarcoma after treatment with leuprolide acetate has also been reported.<sup>23</sup>

Preoperative diagnosis of leiomyosarcoma is not easy. Routine ultrasonography, including colour Doppler, has not been found to be particularly reliable for making the diagnosis.<sup>11,24</sup> MRI has been used to distinguish between benign and malignant smooth muscle tumours.<sup>24</sup> Finding ill-defined margins of uterine smooth muscle tumours on MRI is a sign suggestive of malignancy. Preliminary studies assessing the efficacy of percutaneous or transcervical needle biopsy for the diagnosis of uterine smooth muscle malignancy have not been conclusive.<sup>25–27</sup>

Up to 80% of uterine leiomyosarcoma recurrences occur at extrapelvic sites, and responses to radiation and chemotherapy are poor.<sup>28,29</sup> Surgical excision of pulmonary metastases is widely accepted and should be considered as the first line therapy, especially if preoperative evaluation suggests the possibility of complete resection. Survival benefit for surgical resection of metastatic sarcoma has been proven in many studies. Leitao and colleagues found a disease-specific two-year survival rate of 71.2%, while Levenback reported a five-year survival rate of 43% and a 10-year survival rate of 35% after excision of recurrent uterine leiomyosarcoma.<sup>30,31</sup> With regard to all metastatic sarcomas, surgical excision of pulmonary metastases can lead to three-year survival rates of 46% to 54%, and five-year survival rates of 25% to 38%.<sup>32–34</sup> Even after complete resection of sarcomatous pulmonary metastases, 45% to 83% of patients can have further recurrences in the lung.<sup>35,36</sup> Weiser and colleagues reported a disease-specific survival interval of 42.8 months and an estimated five-year survival rate of 36% after repeat resection.<sup>37</sup> Good prognostic factors for resection of pulmonary metastases include complete resection of the metastasis with negative margins, unilateral disease, and a disease free interval of more than 12 months.<sup>30–33,37</sup>

This case illustrates the worse possible consequence of uterine-sparing therapy for symptomatic fibroids: the diagnosis of a leiomyosarcoma may be delayed or missed, or a

sarcoma may develop following the uterine-sparing procedure. It is unlikely that the sarcoma in our patient was present at the time of the myolysis, or that myolysis itself induced a sarcomatous change in the fibroid. However, we cannot rule out the possibility that the tumour was present, at a very small size, at the time of the myolysis. The second interesting point in this case is the minimally invasive surgical management of the metastatic pulmonary nodules. To our knowledge, this is the first reported case of leiomyosarcoma developing after laparoscopic myolysis with metastatic nodules to the lung treated with repeat thoracoscopic excision. Interestingly, a recent report describes complete regression of metastatic uterine leiomyosarcoma to the lung using an aromatase inhibitor.<sup>38</sup>

**CONCLUSION**

The current trend in treatment for symptomatic fibroids is therapy sparing the uterus. Such treatments include both medical therapy and fibroid necrosing therapies such as vascular occlusion, embolization, and thermal coagulation technologies. Women considering uterus-sparing treatment should be advised of the potential risk of uterine malignancy, even though that risk is minimal (< 0.5%). A delay in the diagnosis of uterine malignancy may ultimately compromise long-term survival.

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