



## Removal of a Huge Uterine Mass, Weighing 11000 Grams, In an Elderly Woman with a Minimally Invasive Surgical Approach: Feasibility and Safety

Antonio Macciò<sup>1\*</sup>, Giacomo Chiappe<sup>1</sup>, Fabrizio Lavra<sup>1</sup>, Elisabetta Sanna<sup>1</sup> and Clelia Madeddu<sup>2</sup>

<sup>1</sup>Department of Gynecologic Oncology, Azienda Ospedaliera Brotzu, Italy

<sup>2</sup>Department of Medical Sciences and Public Health, University of Cagliari, Italy

### Abstract

The weight limit of a uterine mass that can be removed laparoscopically and the possible complications of such a surgery remain unclear.

Here, we describe the case of an 80-year-old woman who underwent a minimally invasive approach to a huge uterine mass weighing 11000 grams. Computed tomography showed a large, partially cystic mass undistinguishable from the uterus associated with left hydroureteronephrosis. The patient was advised on the different surgical alternatives, including the possibility of minimally invasive surgery, as well as the risks of morcellation of a potential occult uterine leiomyosarcoma or smooth muscle tumor of uncertain malignant potential, and she opted for a laparoscopic approach if possible. After fluid drainage from the mass, total laparoscopic hysterectomy was performed successfully. Surgery was complicated by ureteral injury that was immediately repaired laparoscopically in the same operative session. Microscopic examination showed a leiomyoma of the uterus with cystic degeneration and calcific content without histologic signs of malignancy.

**Conclusion:** We were able to remove a very large uterus using a minimally invasive approach, reaffirming it is currently impossible to define the maximum uterine weight limit for laparoscopic removal.

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#### \*Correspondence:

Antonio Macciò, Department of Gynecologic Oncology, Azienda Ospedaliera Brotzu, Via Jenner, 09100 Cagliari, Italy, Tel: +390706754228; E-mail: antoniomaccio56@gmail.com

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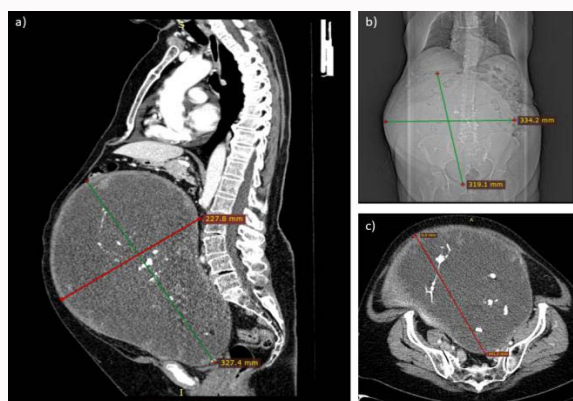
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### Introduction

Since 1993, when the first Total Laparoscopic Hysterectomy (TLH) was described, surgical treatment for uterine fibroids has changed significantly. Initially, surgeons discussed the feasibility and safety of TLH compared with vaginal and laparotomy approaches. Presently, surgeons are working to better understand the limits of TLH, especially relative to its complexity, when associated with particular clinical conditions, such as presence of adnexal masses, adhesions, endometriosis, and in terms of the size of the uterus to be removed. In recent years, we have been attempting to demonstrate that expert teams can successfully perform TLH of large-sized uteri that were once removed only by laparotomy [1,2]. In 2016, in a large series of large uteri removed laparoscopically, we reported a maximum uterine weight of 4000 g [3]. Subsequently, we described the possibility of laparoscopically removing a uterus weighing 5320 g with the support of a uterine manipulator [4] as well as a uterus weighing 5720 g without the aid of a uterine manipulator [5], both with no complications. Thus far, the weight limit of a uterus that can be removed laparoscopically and the possible complications of such a surgery remain unclear. Here, we describe an 80-year-old patient who underwent laparoscopic removal of a huge uterine mass with cystic degeneration weighing 11000 g.

### Case Presentation

An 80-year-old multiparous woman was admitted to our department with a giant abdominal mass, worsening dyspnea, swallowing problems, constipation, and pain that gradually worsened over the previous months. Her medical and surgical histories were unremarkable. She was anemic (hemoglobin, 11 g/dL) with normal liver and renal functions and her CA125 level was 29.5 ng/mL. On physical examination, the abdominal wall was tense, with a mass occupying the entire abdominal cavity. On bimanual pelvic examination, it was not possible to identify the uterine cervix. On ultrasound, which was performed both abdominally and vaginally, a large, complex, solid-cystic mass extending from the pelvis to the subdiaphragmatic area was observed. The cystic parts of the



**Figure 1:** Computed tomography imaging of the abdomen: Sagittal (a), coronal (b) and axial (c) scans showing the huge partially cystic mass measuring 32 cm × 23 cm × 33 cm, undistinguishable from the uterus and extending from the pelvis to the subdiaphragmatic area.



**Figure 2:** Final esthetic results of the minimally invasive surgery.

mass were almost anechoic, suggesting serous fluid collection. On abdominal Computed Tomography (CT), a large, partially cystic mass predominantly on the left side of the abdomen and pelvis was observed. The mass measured approximately 32 cm × 23 cm × 33 cm and was not distinguishable from the uterus (Figure 1). The adnexa were not visible and left hydronephrosis was observed.

Given the clinical picture, urgent surgery was required. The patient was advised on the different surgical alternatives, including the possibility of minimally invasive surgery, as well as the risks of morcellation of a potential occult uterine leiomyosarcoma or smooth muscle tumor of uncertain malignant potential, and she opted for a laparoscopic approach if possible. Written informed consent was obtained for the surgical procedure as well as the publication of this report and accompanying images.

We opted for a laparoscopic approach on the assumption that it would afford the patient the best and most effective overall management and care. Under general anesthesia, with the patient in the lithotomic position, and under ultrasound guidance to identify the largest fluid area of the complex mass (which coincided with the periumbilical region), we performed open-entry laparoscopic access according to the Hasson technique without the use of a uterine manipulator due to the unfavorable possibility of identifying the cervix. The mass wall was then inspected with the index finger to

evaluate its regularity and the presence of possible adhesions prior to its drainage. In the absence of apparent signs of malignancy, the mass was drained with a 14-gauge cannula needle using a suction spillage. After approximately 2.7 L of clear fluid was collected, the puncture zone was closed with a suture point and the first trocar (10 mm to 12 mm) was introduced and fixed with a circular suture of the muscle fascia. Another 10 mm to 12 mm trocar was placed by an open procedure just below the xiphoid process to obtain the best visualization of the irrigation device to achieve maximum possible decompression of the mass, while paying close attention to minimize mass. Using a 10-mm, 0° telescope (Karl Storz, Tuttlingen, Germany) for visualization; we found that the abdominal cavity was completely occupied by a voluminous mass with a smooth and regular wall, which developed mainly from the left iliac fossa. Subsequently, 5 ancillary trocars (5 mm) were positioned under laparoscopic visualization: 4 lateral to the rectus abdominis muscle at different heights and 1 in the suprapubic position. The liver, gallbladder, stomach, and diaphragm appeared normal and only identification of the adnexa attached to the mass allowed us to understand that it was a voluminous uterus with cystic degeneration. TLH was continued using our typical technique, as described in previous reports [1], without significant bleeding. In particular, the uterus was easily dissected in the upper abdomen since there was no infiltration or invasion of the surrounding tissue in this region. However, it was firmly fixed to the left cardinal ligament; in fact, in that area, a tangle of arteries and veins of large caliber complicated the preparation, coagulation, and sectioning of uterine vessels. Furthermore, the significant size of the uterus and its difficult lateralization made it very difficult to identify the left ureter. After having completed the TLH, we expanded the Hasson periumbilical incision by a few centimeters and the mass was carefully removed from the abdominal cavity with external morcellation using the outermost layer of the uterine musculature as a container to avoid tumor spillage. During this time, an additional 1500 mL of clear liquid was collected. After the initial fluid emptying (2700 mL), the mass weighed 8300 g (total weight, 11000 g). Blood loss was less than 100 mL. No blood transfusion was required. The operating time was approximately 300 min.

At the end of surgery, after closure of the accessory laparotomy, we laparoscopically checked the abdominal cavity to proceed with the vaginal suture. At that time, by checking the ureters beforehand, we observed serious thermal damage of the left ureter. Then, the same team of gynecologic oncologist having a high skill in such surgery, proceeded with the ureteral damage repair. In detail, the ureter was transected near the area of injury, the bladder was filled with 180 mL of normal saline, and the overlying peritoneum was divided between the obliterated umbilical ligaments. This step allowed for entrance into the space of Retzius and subsequent mobilization of the bladder. To expose the vesical mucosa, the detrusor muscle was opened approximately 2 cm using laparoscopic monopolar scissors. Then, ureterovesical anastomosis was performed with separate 3.0 vicryl sutures. A double-J catheter was placed through the 5-mm suprapubic trocar, anastomosis was completed, and the detrusor muscle was closed with separate 0.0vicryl sutures as an anti-reflux tunnel. A drain was placed into the pelvis through the left lateral trocar site and surgery was completed. The drain was removed on the fourth postoperative day in the absence of drained fluid and the patient was discharged the following day.

Microscopic examination showed a leiomyoma of the uterus with cystic degeneration and calcific content without histologic signs of

malignancy. Both the adnexa and endometrium were normal for the age of the patient.

The postoperative period was uneventful. The Foley catheter was removed on the 10th postoperative day after CT urogram examination of the ureters and bladder. The patient has remained healthy, with neither hernia, urinary, or bowel problems, nor any other symptoms, and returned to her usual daily activities. Figure 2 shows the esthetic results of surgery. The ureteral stent was removed after 4 weeks. After xx month from surgery an ultrasound control showed normal kidney morphology and size, with no evidence of enlargement of the renal pelvis (hydroureteronephrosis). The bladder walls were intact with regular left ureteral reimplantation.

## Discussion

With the aging of the population, and since minimally invasive surgery is becoming preferred by both patients and surgeons, it is assumed that the number of laparoscopic hysterectomies, both for benign and malignant diseases, in elderly patients will increase [5-8]. Thus, this manuscript may be relevant in today's society. To the best of our knowledge, this case describes the largest uterus removed using a minimally invasive approach, and reaffirms the feasibility of TLH as an alternative to open surgery even in the case of a giant uterus. Typically, we use a minimally invasive approach for all fibromatous uteri regardless of their size, which allows us to form a highly experienced, well-coordinated surgical team capable of performing the most complex laparoscopic surgical techniques to guarantee a minimal invasive approach with a likely better quality of life even in apparently extreme conditions.

Here, we described a patient who underwent TLH for removal of a very large uterine mass with cystic degeneration (weight 11000 g), which was complicated by thermal damage of the left ureter. Nevertheless, the complication was diagnosed intraoperatively and immediately resolved in the same laparoscopic surgery, delaying the patient's discharge by only a few days and not modifying her health status and subjective well-being in either the short or longterm (6 months).

Accidental ureteral injury is a known complication of minimally invasive gynecologic surgery. Previous cesarean section, severe endometriosis, multiple myomas, and large uterus are recognized as risk factors for ureteral injury [9]. Most injuries occur during division of the uterine artery at the level of the internal cervical space. In this case, in which the mass developed mainly from the left isthmic level and the anatomical region was particularly altered, definition and visualization of the ureter was very complicated. Additionally, because of the large uterine mass, visualization of the ureter at the pelvic brim and side wall without retroperitoneal dissection was inadequate because the segment of the ureter between the intersection of the uterine artery and bladder was not visible. Therefore, it is difficult to determine whether the ureteral damage was closely linked to the particularly large size of the mass modifying the anatomy or to the possible/expected complications of laparoscopic surgery. It should be noted that even laparotomy in such cases is not without such complications [10].

Moreover, it should be underlined that in this case, it was not possible to use a uterine manipulator, although we have published reports on the possibility of removing a large uterus without the aid of a uterine manipulator without any damage [5]. Indeed, some technical strategies, such as the use of a uterine manipulator, are known to

reduce the risk of ureteral injury, although they might not be sufficient to prevent injury in patients with anatomical variations or complex pathology, as in the present case. Moreover, the maneuverability of such a large uterus is very complex whether working laparotomically or laparoscopically, making it difficult to determine whether laparotomy would have avoided any complications. Indeed, in a study by Wallis et al. [11], which included 100,000 cases of hysterectomy for benign pathology, 5484 of which were laparoscopic, patients who underwent laparoscopic hysterectomy had a higher incidence of complications of the urinary tract compared with those who underwent a vaginal approach but not compared with those who underwent an open abdominal approach; in both approaches, the main risk factors were large uterus and diagnosis of endometriosis.

Ultimately, in the present case, we were able to achieve TLH after drainage of the fluid content of the huge mass, reaffirming it is currently impossible to define the maximum uterine weight limit for laparoscopic removal. It is essential, however, to remember that early identification and immediate repair of surgery-related injuries in the same operative time can prevent the risk of increased patient morbidity [12]. In fact, a large meta-analysis by Adelman et al. [13] showed that the vast majority of ureteral injuries associated with laparoscopic hysterectomy are recognized postoperatively, often necessitating a return to the operating room, with consequently higher stress for the patient as well as increased risk of various morbidities.

Therefore, as demonstrated by the present case, uterine size is no longer a determinant for the final decision to perform TLH. Thus, if not contraindicated by the patient's comorbidities or anatomical variations, we believe that TLH can be performed without a hypothetical uterine weight limit.

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