Peritoneal Enclosure of Embolization Particles Mimicking Peritoneal Carcinomatosis

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ABSTRACT

Introduction: This case report demonstrates a rare complication that can be associated with power morcellation at the time of laparoscopic fibroid removal (myomectomy) in a patient previously treated by uterine artery embolization (UAE) that led to a relevant clinical misdiagnosis. UAE is an approved treatment option for symptomatic uterine fibroids. However, very little is known about possible migration of embolization particles into non-target organs.

Case Description: A 47-year-old woman was previously submitted to bilatera UAE due to large, symptomatic fibroids. Despite initial proven regression, she underwent endoscopic myomectomy one year later with unprotected morcellation. Approximately five years after endoscopic surgery a suspicious pelvic tumor with radiological signs of peritoneal carcinomatosis was found. The patient underwent total laparoscopic hysterectomy along with complete resection of the pelvic parietal peritoneum, where multiple peritoneal abnormalities were found. Intraoperative frozen section revealed inclusions of embolization particles within peritoneal leasions. Final pathology confirmed a uterine STUMP (smooth muscle tumor with uncertain malignant potential), a chronic inflammatory reaction of the peritoneum and the presence of multiple microspheres.

Conclusion: The current report is the first to describe the presence of embolization particles in the peritoneum, mimicking peritoneal carcinomatosis.

Key Words: Uterine artery embolization, Tris-acryl gelatin microspheres, Laparoscopic myomectomy, Power morcellation, Peritoneal carcinomatosis.

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INTRODUCTION

Several studies have demonstrated that UAE is a valid alternative to hysterectomy or myomectomy for the treatment of symptomatic uterine fibroids,[1–3] especially with regard to the control of bleeding symptoms. Since 2002, different types of particles (microspheres) have been approved by the US Food and Drug Administration (FDA) for the use in uterine artery embolization (UAE). The selective interruption of blood supply to the fibroids induces tissue necrosis and, consequently, shrinking of the nodules.[1,4,5] However, in up to 30% of women, a second intervention, such as reembolization, myomectomy, or even a hysterectomy, may be necessary.[3] In any uterine surgery has to be performed after UAE, microspheres can be found in up to 85% of histopathological specimens. The microspheres are normally visible in the leiomyomas as well as in the surrounding myometrium, but they can also be located in nontargeted regions such as the ovaries, fallopian tubes, and uterine cervix. Vascular anastomosis between the uterine and ovarian vessels is observed in 10% to 30% of women, which may explain the presence of the particles in the adnexal organs.[6] The spheres can also migrate to extravascular spaces, probably due to the formation of pseudoaneurysms.[7] In addition, the previous use of power morcellation during the initial endoscopic procedure may have caused the dissemination of embolization particles into the peritoneum. However, the observation of these particles in the peritoneal cavity as the cause of a relevant clinical condition has not been reported in the literature.

CASE PRESENTATION

A 47-year-old woman presented with a 3-month history of irregular uterine bleeding and slight discomfort in the lower abdomen. The initial transvaginal sonography and magnetic resonance imaging showed 2 confluent suspicious masses of 7.8 × 6.0 cm and 5.0 × 6.0 cm and revealed signs of peritoneal carcinomatosis in the pelvis. However, imaging modalities were not able to distinguish the exact origin, whether uterine or gonadal, of the tumors. Tumor marker values were normal. The patient's previous medical history included, along with appendectomy, UAE in 2008 and a laparoscopic myomectomy in 2009. The UAE was initially indicated due to a large symptomatic intramural fibroid measuring 8 cm with a submucosal component. The embolization was performed through the injection of 4 mL of 500- to 700-μm particles plus 1 mL of 700- to 900-μm embospheres in both uterine arteries (**Figure 1**). The procedure was uneventful and considered successful, including a significant radiological reduction in the nodule size of approximately 80%. However, 1 year after the procedure, the patient again developed menometrorrhagia and anemia, probably caused by a newly diagnosed 5-cm myoma. Laparoscopic single myomectomy with intraperitoneal unprotected morcellation was performed without intercurrences. The final histology examination showed a typical leiomyoma with partial necrosis, permeated by some embosphere particles. No signs of malignancy or increased mitotic activity were described.

After the most recent findings and after the patient provided informed consent, surgery was started with laparoscopy to elucidate the suspicious pelvic findings. Intraoperative findings were several confluent small lesions disseminated in the pelvic peritoneum along with serous ascites and a large uterine tumor that was highly suspicious for a malignant condition (**Figures 2** and **3**). The ovaries, fallopian tubes, intestines, and upper abdomen appeared normal. Initially, multiple incisional biopsy specimens of the pelvic peritoneum were taken and sent for frozen section examination. Surprisingly, the pathology report revealed an exclusively inflammatory reaction of the peritoneum and the presence of several foreign body inlays (microspheres). No malignancy was observed. In light of these findings, the decision was made to perform a total laparoscopic hysterectomy with bilateral salpingectomy along with complete excision of the parietal pelvic peritoneum. In accordance with the patient's wish, the ovaries were preserved and the uterus was removed vaginally by using a protective endoscopic bag to avoid any contamination (**Figure 4**).

The duration of the procedure was 180 minutes and neither relevant blood loss nor intraoperative complications occurred. The postoperative course was uneventful, and the patient was discharged on the fifth postoperative day. The final histology report showed a uterine smooth muscle tumor of uncertain malignant potential. Particles of the embolization spheres were detectable in the uterus, the mesosalpinx, and all parts of the removed peritoneum. After a follow-up period of 2 years, the patient has no gynecological complaints or signs of recurrence.

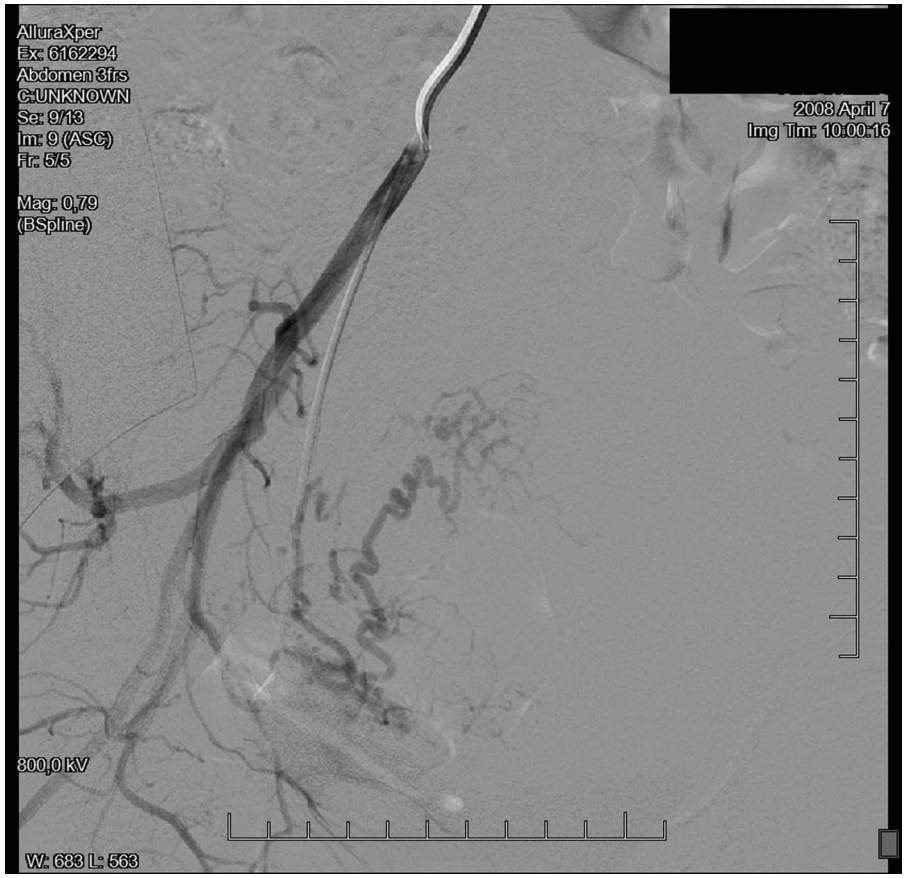

Figure 1. Embolization of the uterine artery in 2008.

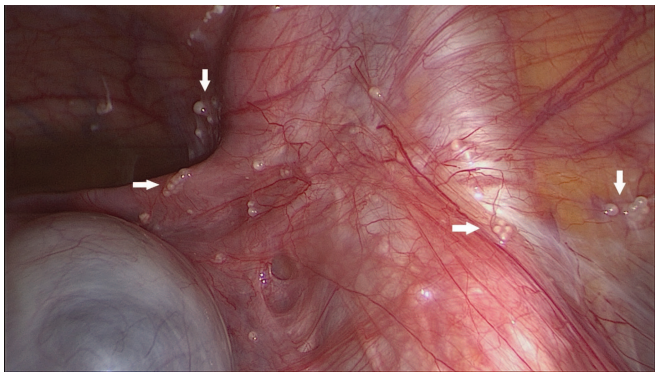

Figure 2. Initial pelvic situs before total laparoscopic hysterectomy with multiple peritoneal lesions.

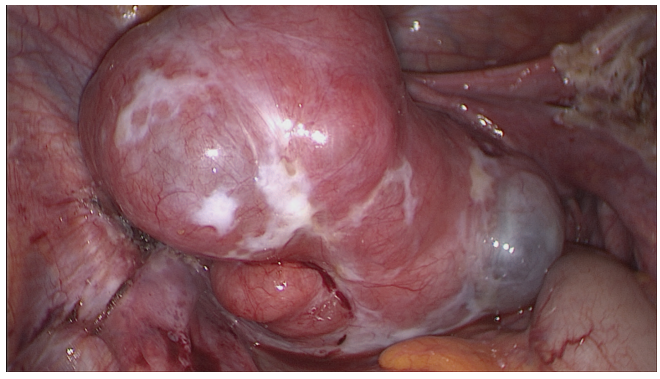

Figure 3. Large uterine tumor.

DISCUSSION

Currently, several treatment options for patients with symptomatic uterine fibroids are available including UAE, surgery (myomectomy or any kind of hysterectomy), hormonal treatment, and high-intensity focused ultrasound; all options have with known advantages and possible problems. Patients should receive individual treatment according to their symptoms and wishes, the size and number of fibroids, and associated symptoms. Several reports have already described pathological findings of different types in tissue that was removed after UAE. The observation of embolization microspheres in fibroids and in normal myometrium is a relatively frequent finding.

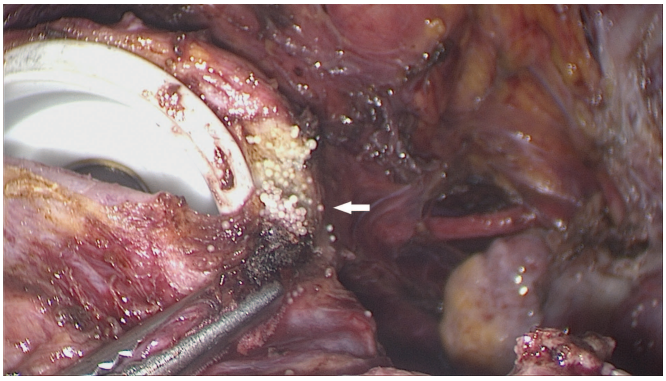

Figure 4. Embolization particles in the dissected right uterine artery (arrow); uterine manipulator in open vagina is visible.

Despite selective occlusion of the major uterine/fibroid arterial vessels, some particles can further migrate. Following the same principle, these particles can also be found in the adnexal organs when uterine-ovary vascular anastomosis are present.[7]

However, the observation of embolization particles in extravascular spaces is rarely described in the literature. In these cases, the most plausible explanation is the development of vascular pseudoaneurysms.[7] In fact, both of the previously mentioned possible physiopathologies do not entirely justify the observation of spheres encrusted in the peritoneum. One can hypothesize that due to the previous laparoscopic myomectomy and unprotected morcellation, some embolization particles were mechanically thrown to the peritoneum and developed diverse inlays. Another explanation is that bleeding from the myometrium during the myomectomy caused enclosure of the particles in the peritoneum because of incomplete lavage. In our opinion, following the same pathogenesis of iatrogenic parasitic myomas, the use of unprotected power morcellation is the most probable cause of the findings described here.[8]

In the current case, the embolization particles were encapsulated by the pelvic peritoneum in multiple small lesions. There are some known conditions that may mimic peritoneal carcinomatosis, such as endometriosis, tuberculosis, systemic inflammatory diseases peritoneal deciduosis, and peritoneal myomatosis.[9] The present case report reveals another cause of clinical misinterpretation that should always be considered in similar cases.

Taking into consideration that the necessity of secondary operative uterine procedures is not negligible (about 30%), this report also highlights another possible negative effect of unprotected laparoscopic morcellation. Since 2013, after the release of the safety communication of the FDA discouraging conventional morcellation during endoscopic uterine operations, the procedure has been the target of fierce debate among gynecologists worldwide. The discussion is based on the argument that morcellation can iatrogenically upstage occult uterine cancer and cause parasitic myomas and even peritoneal adenomyoma.[10] Supported by our findings, we conclude that unprotected morcellation should be indeed avoided in patients who previously underwent UAE. Moreover, in this case, vaginal morcellation of the uterus inside a protective bag was of crucial importance, because it permitted the implementation of an oncologically correct and safe surgical therapy for the smooth muscle tumor with uncertain malignant potential.

CONCLUSIONS

Alternative and more conservative therapies for uterine fibroids, including UAE, can potentially lead to unconventional complications. The present report is, to the best of our knowledge, the first to describe the presence of embolization particles in the peritoneal cavity. Because this observation may have important clinical and oncological consequences, this topic should also be taken into consideration and discussed with patients during the decision-making process for therapy of uterine myomas.

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