

Microwave Ablation of Abdominal Wall Endometrioma: Case Report

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1. Abstract

Abdominal wall endometriosis (AWE) is an uncommon type of endometriosis that develops more often after a surgical procedure. Typically, wide surgical excision is the treatment of choice when hormonal therapy fail to control the symptoms, although negative margins are necessary to minimize recurrences. However, in some patients the surgical approach may lead to further trauma that outweighs the benefits, thus minimally invasive techniques need to be considered. We present the case of a woman with AWE on the scar of a prior cesarean section that was successfully treated with percutaneous microwave ablation (MWA). There is wide experience in the use of MWA in other fields and is considered a safe and effective ablative technique with minimal complications. Hence, MFA could be considered in selected patients with AWE.

2. Introduction

Abdominal wall endometriosis (AWE) is an uncommon type of endometriosis, defined as the presence of endometrial glands and stroma within the abdominal wall [1]. More frequently, these nodules develop within surgical scars in the context of previous surgeries, comprehending up to 80% of the AWE cases [2]. It can affect any segment or depth of the abdominal wall, and between 57-92% [3] of these cases it appears among women with prior history of cesarean section (CS). The overall incidence of AWE is estimated to be between 0.03 and 3.5% [4, 5], and even though it

is underdiagnosed, it is reported to affect up to 0.45% of women with previous CS [1, 6]. In these cases, the mean age at diagnosis is 35 years, and its most common presentation is the triad of a palpable nodule in the abdominal wall, together with cyclic pain and swelling related to menses and history of previous abdominal surgery [7, 8]. When suspected, the ultrasound is the recommended imaging modality because of its accessibility and low cost. Although magnetic resonance imaging (MRI) may offer a higher resolution due to enhanced definition of soft tissues. Nonetheless, an US-guided fine-needle aspiration biopsy can provide a histological specimen for diagnostic confirmation [9]. Women with AWE can benefit from nonsteroidal anti-inflammatory drugs for pain relief, and hormonal therapy to reduce the size of the nodule and improve symptoms. Depending on the size and the symptoms, the surgical excision of the nodule is the treatment of choice [3, 10], and based on the layer that is affected the surgical approach may vary [11, 12]. However, more conservative strategies, including percutaneous ablation of the nodule could be considered. In this paper, we present the clinical case of a woman with AWE on the scar of a prior CS that was successfully treated with a percutaneous microwave ablation.

3. Case Report

A 38-year-old woman presented for evaluation of an abdominal wall nodule in the context of cyclic abdominal pain. In the initial test prior to the visit, the computed tomography (CT) scan

described a solid nodule of 40 x 38 mm located in the midline of the CS scar, and considered the differential diagnosis between AWE, desmoid tumor or granulomatous reaction in the context of prior surgery. The patient referred cyclic progressive pain since menstruations begun after birth, that was located in the midline of the CS scar, together with fluctuating swelling. The patient's prior medical history revealed 3 CS, the last one 3 years before. Besides, the patient suffered from morbid obesity, with a body mass index (BMI) of 54.6 kg/m², high blood pressure, obstructive sleep apnea syndrome, deep venous insufficiency, and dyslipidemia, among others. At physical exam, the excessive abdominal obesity posed a limitation to examine the abdominal wall nodule, although the patient referred tenderness in the midline of the CS scar. The pelvic examination did not detect any signs of infiltrating endometriosis. The vaginal ultrasonography described absence of endometriomas, uterine scar from previous CS, and positive sliding sign around the uterus and both adnexa. An MRI was scheduled, although the excessive weight and volume of the patient did not allow the performance of either closed or open MRI. The abdominal ultrasonography described a multiloculated hypoechoic cyst of 54 x 16 mm (Figure 1) with predominantly exophytic growth into the subcutaneous fat tissue, and with no involvement of the superficial fascia nor the muscular layer suggestive of AWE. The high-risk

score on the American Society of Anesthesiologists' (ASA) classification of Physical Health in a morbidly obese patient required to consider a non-surgical approach. Since the patient was markedly symptomatic, and the endometriotic nodule had no fascial involvement radiofrequency ablation was offered.

A percutaneous microwave ablation (MWA) was performed under ultrasound guidance, with 4 different entries and combining moving-shot and pull-back techniques (HS Amica, probe 16Fr, HS Hospital Service, Aprilia, Italy). The procedure was performed under mild sedation, with an output power of 60 Watts and a total ablation time of 540 seconds (s). A postprocedural CT scan to evaluate the immediate treatment response showed an adequate inclusion of the endometrioma within the treated area, except for a thin area corresponding to the deepest margin of the lesion, closest to the fascia, that was left untreated to prevent hernia occurrence. The follow-up at 4 months after procedure the patient reported full remission of the abdominal pain during menses. The ultrasonography of the ablated area revealed a collection with fluid content and poorly defined walls of 10 x 5 x 9 cm in the interface between the subcutaneous fat tissue and the fascia, suggestive of a Morel-Lavallée lesion (Figure 2). No residual endometriosis nor parietal abdominal fascia defect was observed.



Figure 1: Endometriotic nodule in the abdominal wall



Figure 2 : Morel-Lavallée lesion post microwave ablation

4. Discussion

The most accepted hypothesis for AWE among women with prior surgery is the iatrogenic implantation of endometrial tissue at any segment or depth of the abdominal wall. Several authors have reported an association between the development of AWE at the incision and a raised BMI above 25 kg/m², suggesting that the technical difficulties in performing surgery in obese patients might translate into inadequate hysterorrhaphy [13, 14].

Traditionally, the complete surgical excision of AWE is the treatment of choice when hormonal therapies fail to control symptoms. In order to minimize the risk of recurrence after resection wide negative margins are recommended. However, in some cases, the complete surgical excision of the nodule might entail further trauma that could outweigh the benefits, including complete abdominal wall repair or prophylactic mesh placement to prevent hernia formation [15]. In this regard, nonsurgical ablative techniques have emerged as an alternative to treat AWE.

Percutaneous image-guided cryoablation has also been described as an effective procedure to treat AWE with minimal intra and postsurgical complications [16–19]. However, the procedure requires a non-contrast CT or MRI at 2-4min intervals to monitor the growth and position of the ice ball in relation to the lesion, although the ultrasound can also be used. Besides, deep AWE that involve the rectus muscle takes longer to heal after cryoablation and it can cause inflammatory myositis, compared to the cryoablation of the subcutaneous tissue [20].

Instead, high-intensity focused ultrasound (HIFU) induces coagulative necrosis through ultrasound waves without damaging the adjacent tissue [21, 22]. It has been used over 150 AWE lesions with positive outcomes, including shorter hospital stay, lack of bleeding and fewer adverse events. However, the pain control is comparable to the surgical strategy, and the recurrence rate may range from 0 to 8% of the cases [21–24]. In addition, scars can block the acoustic beam from entering the subcutaneous tissue [15, 25], and in some cases the inaccurate positioning of the wand during the procedure can result in skin burns [21].

Regarding the radiofrequency ablation, even though it is a well-known thermal ablation technique, there is little evidence regarding its benefits on AWE and one case report has been published with positive outcomes [26]. In addition, ultrasound-guided microwave ablation (MWA) has also been used for the treatment of AWE [15, 27]. Compared to other techniques, it can treat large ablation volumes, and obtains higher ablation temperatures with shorter ablation times [28–30]. MWA has been largely used in other fields, such as hepatocellular carcinoma [31, 32], renal cell carcinoma [33, 34], adrenal tumors [35], lung malignancies [36] and thyroid nodules [37]. However, the major limitation of conventional MWA has been reported to be the difficulty for predicting the size and shape of the ablation zone, which might lead to the

ablation of the surrounding healthy tissue and potentially higher risk for complications [31].

Considering that the endometriosis is a benign disease, the ablation technique could differ in comparison with ablation of malignant tumors as the safety margins could be reduced. Furthermore, in order to preserve the surrounding healthy tissue a two-step approach could be used: the largest, central part of the endometrioma could be treated initially in order to shrink the lesion, and in second, separated session, the reduced remnant of the endometrioma could be targeted with further ablation(s) thus improving the accuracy of the ablation. It is an interesting approach in cases of larger lesions that entail higher risk of compromising the integrity of the surrounding structures, such as muscle, skin or fascia, thus reducing the risk of postablative hernias.

In the case we present, we considered a minimally invasive approach particularly due to the BMI of 54.6 kg/m². As mentioned earlier, extreme obesity confers a higher risk for anesthetic and surgical complications, including higher rate of dehiscence and infection (PMID). Additionally, the excessive subcutaneous fat tissue could serve as a surgical limitation to completely excise the nodule with negative margins. In our center, there is experience in the use of MWA, irreversible electroporation, cryoablation and radiofrequency ablation, for the treatment of benign thyroid nodules, breast, liver and renal malignancies, bone metastasis and abdominal wall nodules. In the case we present, MWA was considered of choice because of the size and location of the tumor, with successful results.

5. Conclusion

Traditionally, the treatment of choice for symptomatic AWE is the surgical wide resection of the lesions. However, in some cases the surgical approach can cause further trauma that outweighs its benefits, and minimally invasive techniques need to be considered. MWA is a safe and effective ablative technique with minimal intra and postprocedural complications, and seems a good option in selected patients. Unfortunately, the evidence in the treatment of AWE is sparse and further trials are needed to evaluate what AWE nodules are more likely to respond to MWA, and to establish a safety distance between the ablation zone and the skin or fascia to minimize the likelihood of skin burn and hernia, respectively.

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