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CLINICAL ARTICLE

Gynecology

Abdominal wall endometriosis: Report of 83 cases

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Abstract

Objective: To investigate the clinical course and management of abdominal wall endometriosis (AWE).

Methods: A retrospective study was carried out from January 2010 to December 2020, at Vita-Nações Hospitals, Curitiba, Brazil, in order to evaluate data of patients undergoing surgery for the excision of AWE.

Results: 83 women with AWE were included in the study. Umbilical scar endometriosis was found in 26 patients (31.3%), being primary in 20 cases (76.9%) and secondary to a laparoscopic procedure in 6 cases (23.1%). 2 patients had secondary implants outside the umbilicus after laparoscopic surgery. Secondary implant after cesarian section in 55 patients (66.3%). Diagnosis was made by ultrasound in 65 patients (78.3%) and by MRI in the remaining 18 (21.7%). Complete excision of the nodule was carried out and no case of recurrence was registered up to now.

Conclusions: Painful abdominal mass presenting in women, especially with a previous history of abdominal and pelvic surgery, should be suspected of AWE. It occurs most often secondary to obstetric or gynecological surgeries and seems to be related to iatrogenic transfer of the endometrial tissue at the level of the surgical scar. Cesarean scar endometriosis is the most common presentation. Surgical excision including the surrounding fibrotic tissue should be performed.

KEYWORDS
abdominal wall, abdominal wall endometriosis, cesarean section, parietal repair, scar endometriosis

1 | INTRODUCTION

Abdominal wall endometriosis (AWE) is defined as the presence of endometriotic infiltration in any segment or depth of the abdominal wall. It is a rare and uncommon presentation of endometriosis.[1] This localization of the disease is poorly reported in the literature and its pathophysiology is only partially understood.[2–4]

Spontaneous AWE occurs in a scarless abdomen and accounts for about 20% of all AWE.[5] More frequently, secondary AWE develops in a surgical scar resulting from an obstetric or gynecologic

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surgery. The etiology of the latter type of AWE may be due to the direct implantation of endometrial cells into the soft tissues of the abdominal wall, via an iatrogenic process during abdominal-pelvic surgeries.[6] It has been reported that 57%–92% of these cases develop secondary to cesarean section.[7]

The reported incidence of AWE varies from 0.03 to 3.5%,[8,9] and the reported incidence of AWE within the cesarean section scar is 0.03%–0.45%.[1,10] Nevertheless, the disease is probably underdiagnosed.

Mean age at diagnosis is 33.2–35 years,[11,12] and the elapsed time between the previous surgery and the diagnosis of secondary AWE may vary from 3 months to two decades.[9]

The characteristic clinical triad includes: mass in the abdominal wall or nodule at the previous scar, cyclic pain related to the menses, and history of a previous abdominal surgery.[13–15] Depending on the layer of the abdominal wall affected, skin changes (ecchymosis or hyperpigmentation), swelling and bruising of the surgical scar associated with the menstrual cycle may be observed.[16–18]

Ultrasound and magnetic resonance imaging of the pelvis and abdomen, including the abdominal wall study, play an important role in the diagnosis.[1,15]

Wide surgical excision is the only curative therapy of AWE.[1,10] The final and precise diagnosis is given by histological analysis of the nodule.[17]

The aim of this paper is to investigate the clinical course and management of AWE.

2 | MATERIALS AND METHODS

This retrospective, observational and descriptive study included 83 women who underwent surgical treatment of AWE in 2 different private general hospitals (Vita Batel and Nações Hospitals, Curitiba, Brazil) from January 2010 to December 2020. All patients were operated by the same surgeon and all cases were confirmed by histopathological examination.

According to Brasil and Italian legislation, this study not require ethics committee approval for their retrospective nature.

Data collected included patient's history, characteristics, possible risk factors, clinical presentation, previous surgical/gynecological/obstetric history, diagnostic methods, nodule size and location, type of surgery performed and recurrence.

Pain complaint was quantified using the Visual Analogue Scale, giving a score from 1 to 10. The pain was considered mild to intermediate when the score ranged from 1 to 6 and intense when it ranged from 7 to 10.

Preoperative work-up included abdominal ultrasound or pelvic/abdominal MRI, depending on each specific situation (Figure 1).

3 | SURGICAL PROCEDURE

Overall, the main objective of the surgery was to entirely remove the nodule, including the surrounding fibrosis, in order to reduce the recurrence rate.

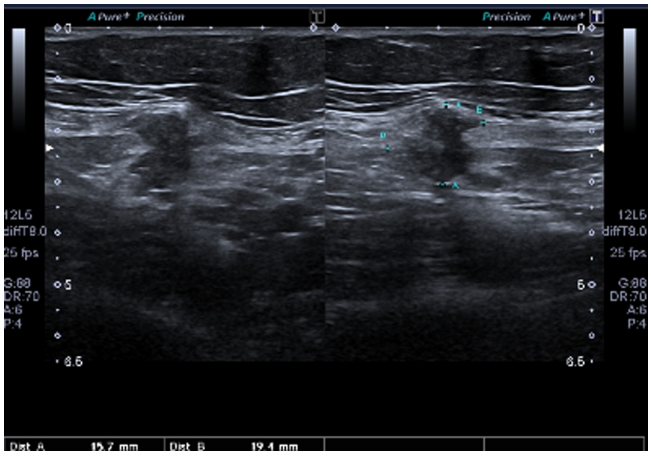

FIGURE 1 Ultrasound imaging exam showing a hypoechoic solid mass with ill-defined margins

The role of the radiologist was very important for non-palpable nodules. They were located by 2 different ways:

- Abdominal wall ultrasound on the day before surgery. In this case, the skin right above the nodule was marked using a pen;
- Intraoperative abdominal wall ultrasound.

For umbilical nodules, the darkened tone of the navel skin was an indicator for the need for skin excision along with the nodule. Whenever complete excision of the umbilicus was necessary, reconstruction using a skin graft with the help of a plastic surgeon was performed (Figure 2). Partial infiltration of the navel skin was treated with partial umbilical preservation and reconstruction (Figure 3).

For implants secondary to laparoscopic ancillary port placement, the incision was performed over the nodule.

For the remaining cases, an incision was performed over the previous Pfannenstiel incision and dissection was carried out down to the level of the nodule. Nodules might be located at the subcutaneous fatty tissue, aponeurosis, abdominis rectus muscle, and/or peritoneum. During surgery, the nodule was resected completely regardless of the affected layer of the abdominal wall. Usually, nodules greater than 50 mm diameter which infiltrate the aponeurosis generally required reconstruction of the abdominal wall using mesh (Figure 4). Small nodules affecting the aponeurosis, nodules affecting only the subcutaneous fatty tissue, and nodules affecting below the aponeurosis (abdominis rectus muscle with or without peritoneum) were usually reconstructed without the need for mesh placement.

A closed suction drain was placed at the end of the procedure in those patients requiring excision of nodules larger than 50 mm in order to try to avoid seroma/hematoma. The drain was removed when drainage reduced in the following days after surgery.

Laparoscopic approach (Figure 5) of AWE nodules was considered in cases of infiltration below the aponeurosis (peritoneum and abdominis rectus muscle).

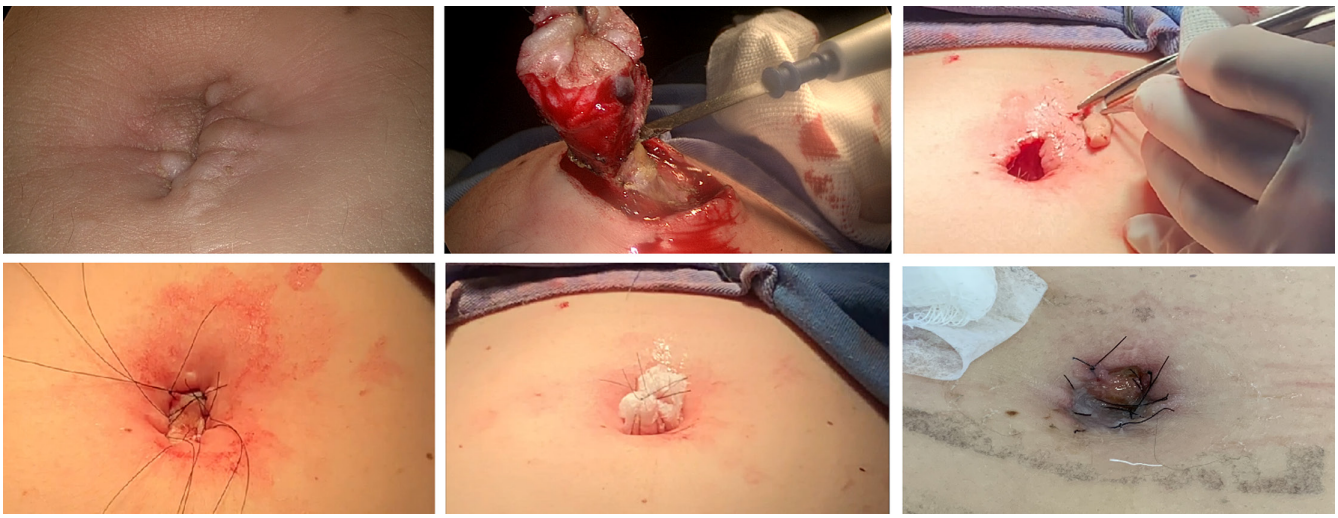

FIGURE 2 Complete umbilical scar excision. Umbilical reconstruction using a skin graft

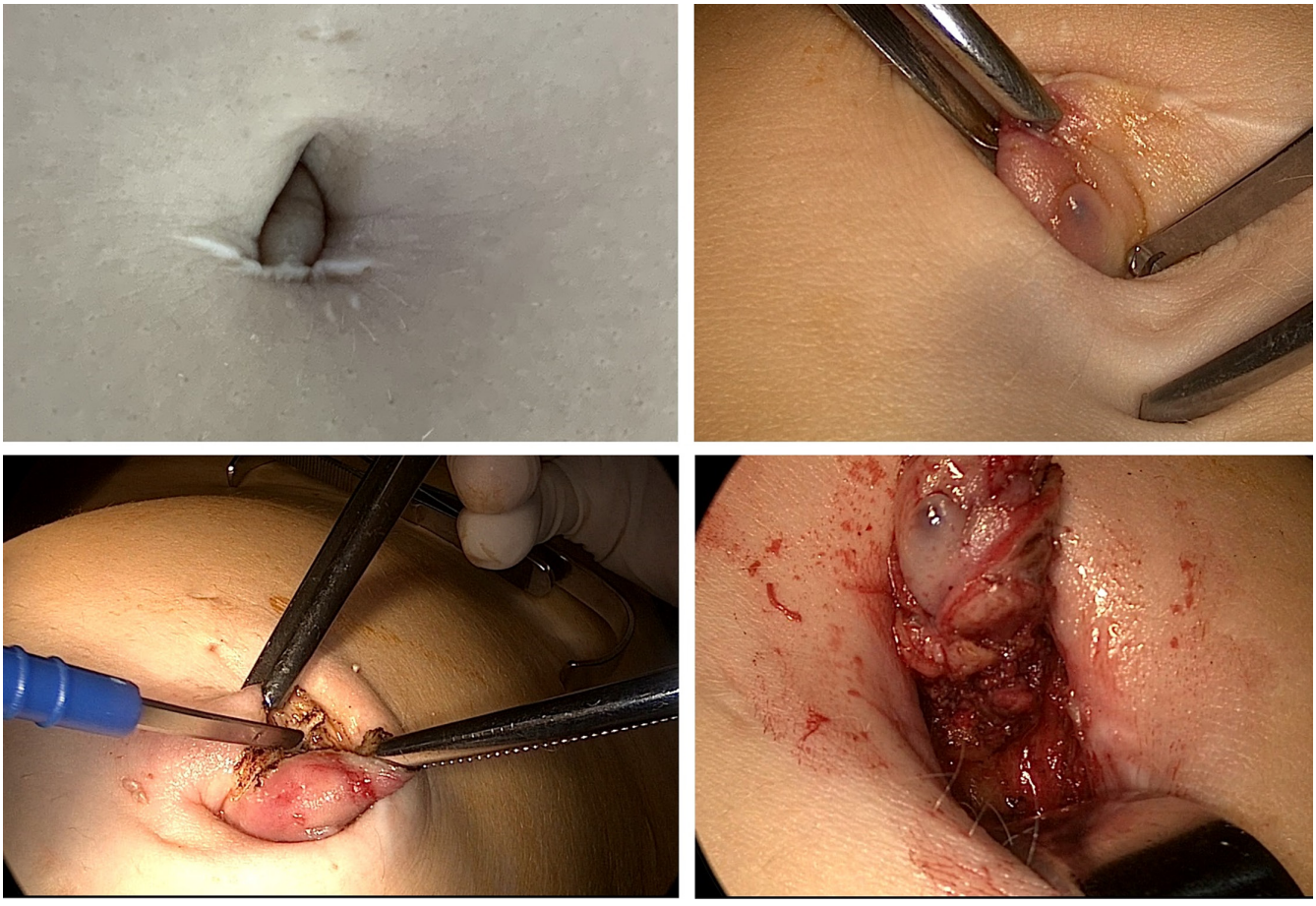

FIGURE 3 Partial excision of the umbilical scar along with the endometriosis nodule

4 | RESULTS

Baseline characteristics of the patients are summarized in Tables 1 and 2.

Mean age at diagnosis of AWE was 39.5 years.

Cyclical pain at the abdominal wall was the most important complaint in 72.3% of the cases (n = 60), being reported as mild to intermediate in 85% and intense in 15% of the casesThe presence of an abdominal wall mass was reported by 32.5% of the patients (n = 27).

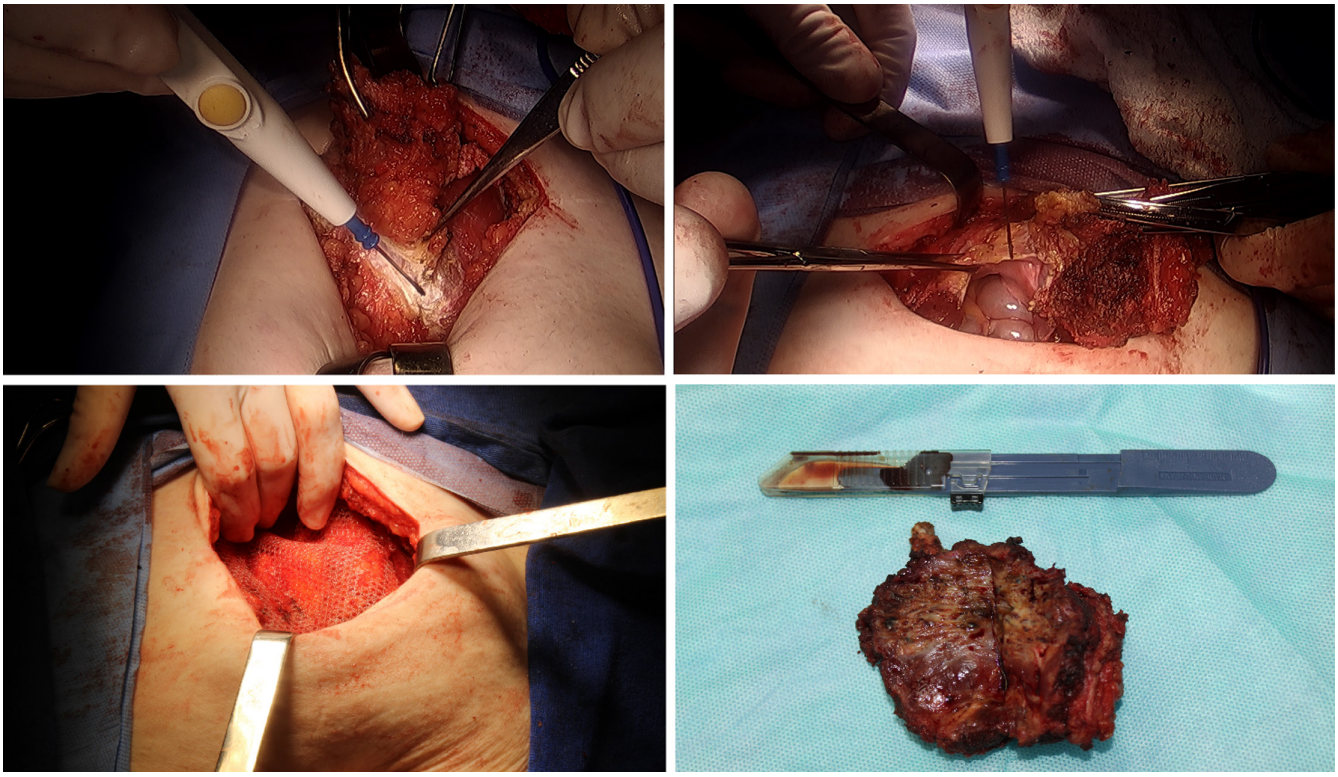

FIGURE 4 Large AWE nodule affecting the aponeurosis, left abdominis rectus muscle, posterior aponeurosis, preperitoneal fatty tissue and peritoneum. Abdominal wall reconstruction using polypropylene mesh

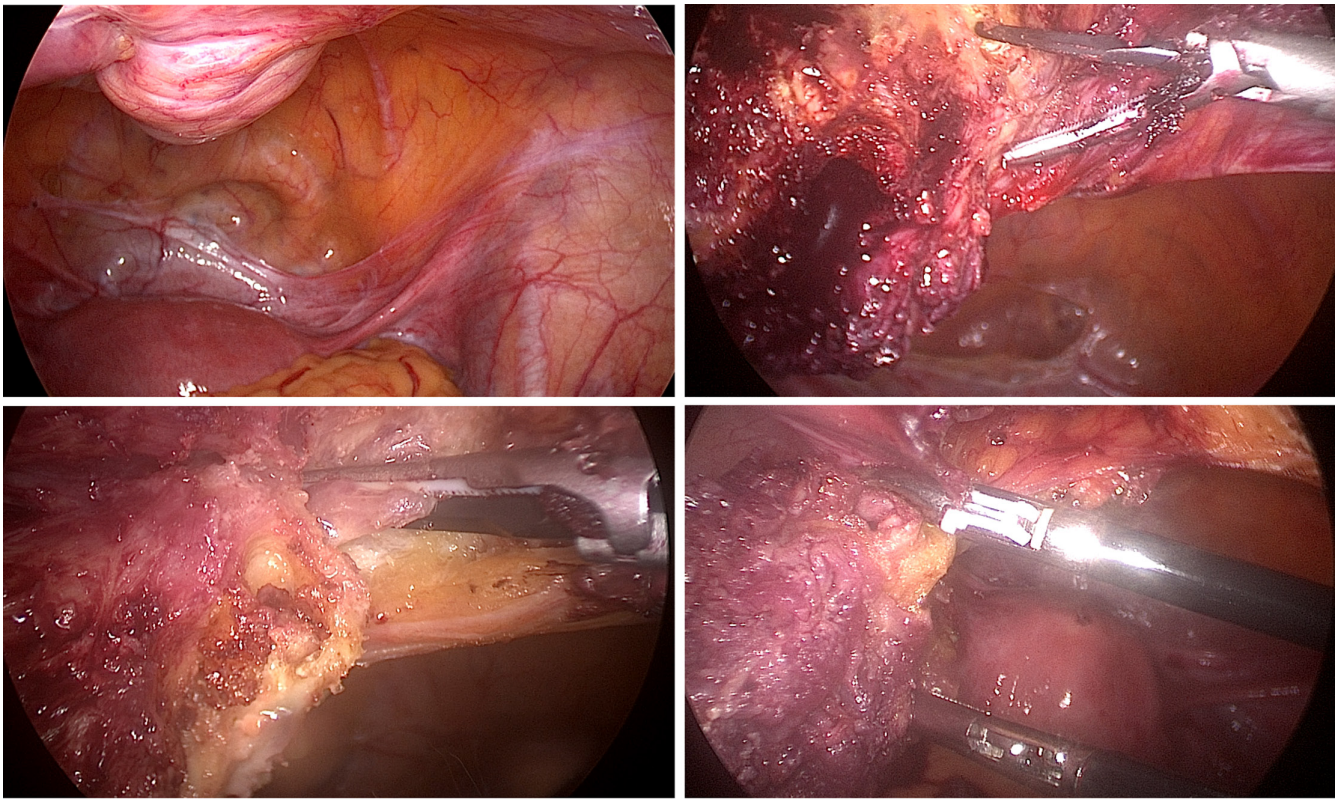

FIGURE 5 AWE nodule visible by laparoscopic approach. The nodule was completely excised by laparoscopy, including peritoneum, posterior aponeurosis, and abdominis rectum muscle. The aponeurosis was free from endometriosis and was not resected

Umbilical scar endometriosis was found in 26 patients (31.3%), being primary in 20 cases (76.9%) and secondary to a laparoscopic procedure in 6 cases (23.1%). Two patients had secondary implants outside the umbilicus after laparoscopic surgery. One patient (1.2%) had a cystic lesion at the left lower quadrant, where the 5 mm trocar was placed in a previous laparoscopic procedure. Another patient (1.2%) had a nodule at the inguinal area, in the lateral border of a Pfannenstiel incision, performed for bowel extraction during a laparoscopic segmental bowel resection. Secondary implant after cesarean section was the most common presentation of AWE, occurring in 55 patients (66.3%) in our series.

Diagnosis was made by ultrasound in 65 patients (78.3%) and by MRI in the remaining 18 patients (21.7%). The mean size of the nodule was 26.8 mm.

The mean elapsed time between previous surgery and diagnosis of AWE was 5.2 years.

Of the total of 83 patients, five of them (6%) had already been submitted to a previous AWE resection in another service and recurred.

Umbilical nodules were not big enough to require reconstruction with meshes. In all cases the aponeurosis was closed using interrupted sutures of zero polyglactin 910 suture or zero polydioxanone suture. Only one patient required complete excision of the whole umbilical scar and reconstruction using a skin graft.

One patient had a left lower quadrant cystic implant, arising exactly at the site of placement of the 5 mm ancillary port during the previous laparoscopic procedure.

Seventeen nodules were bigger than or equal to 30 mm of diameter. In five cases of nodules bigger than 50 mm reconstruction using mesh was performed.

In one case, a large nodule measuring around 100 mm was identified by MRI and seemed to infiltrate the peritoneum and the abdominis rectus muscle, without infiltration of the aponeurosis. This was the only patient operated by laparoscopy (Figure 5). In this case there was no need for mesh placement. In the remaining 11 cases of nodules between 30 mm and 49 mm, no mesh was placed.

Mean time of hospitalization was 16 h, ranging from 3 to 36 h.

Nine patients (10.8%) developed postoperative surgical site hematoma/seroma, corresponding to 35.3% (6 out of 17) of patients with nodules ≥30 mm and only 4.5% (3 out of 66) of patients with nodules <30 mm.

TABLE 1 Baseline characteristics of the patients with abdominal wall endometriosis[a]

Characteristics	
Age (y)	39.5 ± 5.5 (range 27–51)
Body mass index[b]	25.2 ± 3.8 (range 19–40)
Gravidity	1.4 ± 1.1 (range 0–7)
Parity	1.1 ± 1.1 (range 0–7)

[a]Values are presented as mean ± standard deviation (range).

[b]Body mass index is calculated as weight in kilograms divided by the square of height in meters.

In the group of 11 patients with nodules between 30 mm and 49 mm in whom mesh was not placed during abdominal wall reconstruction, two of them (18.2%) developed incisional hernia in the postoperative follow-up.

Routinely, an abdominal ultrasound was performed to evaluate the results of the surgery and check for any persistence of the disease 6 months after surgery. In the case of a negative imaging exam, abdominal ultrasound was performed annually to detect recurrence. We did not find any persistence or recurrence of the disease in our series up to now.

5 | DISCUSSION

In this paper the authors report a series of 83 patients undergoing surgery for abdominal wall endometriosis. Primary AWE occurs at the umbilicus and corresponded to 24.1% of the cases in the series. The remaining cases (75.9%) were secondary implants of AWE developing after cesarean section or laparoscopic procedures.

It has been reported in the literature that 57 to 92% of the cases develop secondary to cesarean section.[7,11] Recently, Marras et al. observed a high prevalence (65.7%) of previous cesarian section in their series of cases of AWE.[8]

Andolf et al. showed that the risk for developing endometriosis after cesarean section is 1.8%.[1] This seems to be the main risk factor for AWE, followed by other abdominal and pelvic surgical procedures, either by laparoscopy or laparotomy. In our series, eight patients (9.6%) presented secondary AWE after laparoscopic surgery. Six of them developed umbilical scar endometriosis (75%), one developed (12.5%) an implant at the site of placement of the

TABLE 2 Data according to the main clinical characteristics and previous surgical history of the patients with AWE

Clinical characteristics	
Cyclical pain at the abdominal wall	60 (72.3%)
Mild to intermediate (visual analog scale 1–6)	51 (61.4%)
Intense (visual analog scale ≥7)	9 (10.8%)
Abdominal wall mass (palpable nodule)	27 (32.5%)
Previous abdominal surgical history	66 (79.5%)
Laparoscopy	8 (9.6%)
Location: At the umbilical scar	6 (7.2%)
At the left lower quadrant[a]	1 (1.2%)
At the inguinal area[b]	1 (1.2%)
Cesarean section	58 (69.9%)
Location: At The Cesarean Section Scar	55 (66.3%)
At the umbilical scar	3 (3.6%)
No prior surgery	17 (20.5%)
Location: At the umbilical scar	17 (20.5%)

[a]Topography of 5 mm trocar in the left lower quadrant.

[b]Close to the Pfannenstiel incision performed for bowel extraction during segmental bowel resection.

secondary trocar at the left iliac fossa, and one developed (12.5%) an implant at the Pfannenstiel incision performed for bowel extraction during segmental bowel resection.

Clinical presentation of AWE is variable. Some women experience severe painful symptoms, while others may not have any noticeable symptoms. Common complaints of the patients include painful mass, local discomfort, swelling, bruising or bleeding of the infiltrated area. Cyclical pelvic pain and subfertility may also be present.[17–19]

In a study including 198 patients with cesarean scar endometriosis, Zhang et al. (2019) showed that the main symptom of the patients was abdominal tumor identification (98.5%), followed by cyclic pain (86.9%).[6] In our series, 60 patients (78.3%) reported pain during menses and only 27 patients (21.7%) had a palpable nodule.

AWE is probably underdiagnosed, not only because of the wide range of clinical presentation but also because women are sometimes reluctant to report the severity of their symptoms and clinicians often under-respond to the patient's report symptoms. Also, the rarity of the pathology makes doctors forget about this possible differential diagnosis.[20]

Ultrasound imaging of the abdomen, including the abdominal wall, can assist in determining the extension of the endometriotic implants, and is considered the first imaging modality in the preoperative work-up for AWE.[20] The use of MRI is necessary when ultrasonography is inconclusive. This imaging exam may provide more accurate data about the penetration, extension, and type of content of the nodule [30]. In our series, diagnosis was made by ultrasound imaging in 65 patients (78.3%) and by resonance in the remaining 18 patients (21.7%).

AWE generally affects women in the reproductive age group. In the literature, the average age of individuals diagnosed with AWE range from 33.2 to 35 years.[10,11] AWE is diagnosed approximately 5–8.6 years later than other types of endometriosis.[21] In our study, the elapsed time between the previous surgery and the diagnosis of secondary AWE was 5.2 years.

There seems to be an association between the occurrence of AWE and the presence of raised body weight (BMI ≥25 kg/m^2). In our series, the mean BMI was 25.2 kg/m^2. Some authors have already showed a predominance of raised body mass in patients diagnosed with AWE (25.5 to 29.2 kg/m^2) and have justified this relationship due to the technical difficulties in operating obese patients, probably related to inadequate hysterorrhaphy.[22,23]

Differential diagnoses include sarcomas, metastatic malignant tumors, granulomas, abscess, sediment, incisional hernia, hematoma, desmoid fibromatosis and lipoma. The histological examination of the tumor can state the precise diagnosis and exclude malignancy.[12,17]

The treatment of choice is the complete excision of the endometriotic nodule. Some authors recommend a 5 to 10 mm margin-free excision to prevent recurrence.[7,21] In cases of a non palpable nodule, the demarcation of the lesion guided by ultrasound in the preoperative setting can help to determine the exact location of the nodule during surgery.

In cases affecting the aponeurosis, when there may be tension in the suture line or in cases of nodules larger than 50 mm, extensive mobilization of the aponeurosis and placement of a polypropylene prosthesis may be recommended. It may be essential for successful tension-free closure of the abdominal wall.[12,24] In our series, we used mesh for abdominal wall reconstruction only for nodules bigger than 50 mm infiltrating the aponeurosis. However, two out of eleven (18.2%) patients with AWE nodules ranging from 30 mm to 50 mm who were not reconstructed using mesh developed incisional hernia in the postoperative follow-up.

Surgical site complications (hematoma and/or seroma) occur more frequently in nodules ≥30 mm when compared to those <30 mm (35.3% vs. 4.5%, respectively).

Medical treatment using substances that inhibit ovarian function, such as progestogens and GnRH analogues, associated with non-steroidal anti-inflammatory drugs, may be an option if the patient does not desire surgery.[1,10] Hormonal therapy can be used post-operatively to reduce the risk of recurrence [33].

The risk of AWE recurrence varies between 12.5% and 28.6%.[25] In our study 5 patients (6%) were operated due to a recurrent AWE nodule. All of them had their first surgical procedure in another service. In our experience, the main issue during surgery is to remove completely the nodule and the fibrotic tissue around it. Similar to pelvic endometriosis, the fibrotic tissue around the nodule may contain endometrial tissue and may be the place from where recurrence of the nodule starts.

During gynecological/obstetric surgical procedures, some practices can be useful to avoid implantation of endometriosis in the abdominal wall. We suggest the use of wound protectors/retractors in all cesarean sections, which seems to be the main risk factor for the development of AWE. Also, it must be considered in patients undergoing segmental bowel resection, because it reduces the rate of surgical site infection and avoid abdominal wall contamination with endometriosis cells. If the use of retractors/protectors is not possible, the abdominal wall wound should be vigorously irrigated and completely cleaned with saline solution. For all laparoscopic surgeries, especially in endometriosis, we recommend the use of an endobag to remove surgical specimens. Finally, for those procedures that require both suturing of the uterus and the abdominal wall, it is worth emphasizing the use of a new needle/suture to close the abdominal wall planes (different from that used to close the uterus) in an attempt to prevent iatrogenic implantation of endometriosis in the abdominal wall.

This study has some strengths, including the high number of cases, the fact that all the procedures were performed by the same surgeon, and the apparent good surgical technique with no recurrences. The main limitation of the study was the retrospective nature of data collection and some missing data.

6 | CONCLUSION

In conclusion, abdominal wall endometriosis is a rare and uncommon pathologic condition, with higher risk in women with a previous history of cesarean section. AWE should be considered as an important differential diagnosis in women suffering from a cyclical painful

nodule or mass close to or at the site of the surgical incision. Wide surgical excision including the surrounding fibrotic tissue should be performed and histological examination of the tumor confirms the diagnosis.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest.

AUTHOR CONTRIBUTIONS

Study design: WK. Planning: WK, MTZ, CHT, TCSC. Data Analysis: DSC, DC, CB, AC, CHT. Manuscript writing: CB, DC, AC, WK, MTZ, SC, CARG. All authors contribuited to the revision of the manuscript and approved the final version of the manuscript.

DATA AVAILABILITY STATEMENT

Research data are not shared.

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REFERENCES

1. Carsote M, Tarzea DC, Valea A, Gheorghisan-Galateanu AAG. Abdominal wall endometriosis (a narrative review). *Int Med Sci*. 2020;17:536-542.
2. Grigore M, Sacolov D, Pavaleanu I, et al. Abdominal wall endometriosis: na update in clinical, imagistic features, and management options. *Med Ultrason*. 2017;19:430-437.
3. Morales Martínez C, Tejuca SS. Abdominal wall endometriosis. *Am J Obstet Gynecol*. 2017;217:701-702.
4. Koninckx PR, Ussia A, Wttiez A, et al. Risk factors, clinical presentention, and outcomes for abdominal wall endometriosis. *J Minim Invasive Gynecol*. 2018;25:342-343.
5. Kumar RR. Spontaneous abdominal wall endometrioma: a case report. *Int J Surg Case Rep*. 2021;78:180-183.
6. Zhang P, Sun Y, Zhang C, et al. Cesarean scar endometriosis: presentation of 198 cases and literature review. *BMC Womens Health*. 2019;19:14.
7. Ao X, Xiong W, Tan S. Laparoscopic umbilical trocar port site endometriosis: a case report. *World J Clin Cases*. 2020;8:1532-1537.
8. Marras S, Pluchino N, Petignat P, et al. Abdominal wall endometriosis: an 11 – year retrospective observational cohort study. *Eur J Obstet Gynecol Reprod Biol*. 2019;4:100096.
9. Hagi T, Nakamura T, Hasegawa T, Asanuma K, Sudo A. Cases of abdominal wall endometriosis distinguished from tissue tumor: a report of three cases. *Med Red*. 2020;13:64.
10. Mao A, Rana HN, Steffler B, Figarola S. Post-cesarean section abdominal wall endometrioma. *Cureus*. 2020;12:e10088.
11. Slaiki S, Jamor J. Endometriosis of the rectus abdominis muscles: a rare case of dual location. *J Surg Case Rep*. 2020;9:1-3.
12. Costa JEFR, Acceta I, Maia FJS, et al. Abdominal wall endometriosis: experience of the general Surgey Service of the Antônio Pedro University Hospital of the Universidade Federal Fluminense. *Rev Col Bras Cir*. 2020;47:e20202544.
13. Akbarzadeh-Jahromi M, Motavas M, Fazelzadeh A. Recurrent abdominal wall endometriosis at the trocar site of laparoscopy: a rare case. *Int J Reprod BioMed*. 2018;16:653-656.
14. Tatli F, Gozeneli O, Uyanikogli H, et al. The clinical charecteristics and surgical approach oh scar endometriosis: a case of 14 women. *Bosn J Basic Med Sci*. 2018;18:275-278.
15. Youseef AT. The ultrassound of subcutaneous extrapelvic endometriosis. *J Ultrason*. 2020;20:e 176-e 180.
16. Alnafisah F, Dawa SK, Alalfy S. Skin endometriosis at the cesarean section scar: a case report and review of the literature. *Cureus*. 2018;10:e2063.
17. Doroftei B, Armeanu T, Maftei R, Ilie OD, Dabuleanu AM, Condac C. Abdominal Wall endometriosis: two case reports and literature review. *Medicina*. 2020;56:727.
18. Xiao-Ying Z, Hua D, Jin-Juan W, et al. Clinical analysis of high-intensity focussed ultrassound ablation for abdominal wall endometriosis: a 4-year esperience at a specialty gynecological institution. *Int J Hyperthermia*. 2019;36:87-94.
19. Hasan A, Deyab A, Monazea K, et al. Clinico-pathological assessment of surgically removed abdominal wall endometriomas following cesarean section. *Ann Med Surg*. 2021;62:219-224.
20. Barbieri RL. Why are there delays in the diagnosis of endometriosis? As leaders in women's health care, we can do much more to improve the timely diagnosis of endometriosis in women with pelvic pain. *OBG Manag*. 2017;29:10-11.
21. Alkatout İ, Meinhold-Heerlein I, Keckstein J, Mettler L. Endometriosis: A concise practical guide to current diagnosis and treatment. *J Turk Ger Gynecol Assoc*. 2018;19:173-175.
22. Khan Z, Zanfagnin V, El-Nashar SA, et al. Risk factors, clinical presentation, and outcomes for abdominal wall endometriosis. *J Minim Invasive Gynecol*. 2017;24:478-484.
23. Celik HG, Karacan T, Kaya C, et al. Abdominal wall endometriosis: a monocentric continuous series and review of the literature. *J Endometriosis Pelvic Pain Disorders*. 2019;11:95-101.
24. Mettler L, Alkatout I, Keckstein J, et al. Endometriosis: concise practical guide to current diagnosis and treatment. *Endo Press*. 2017;3:257-262.
25. Fatnassi R, Mkhinini I, Kaabia O, et al. Parietal endometriosis a Cesarian section complication. *EC Gynaecol*. 2015;1:7-13.