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Reconstructive

Endometriosis in Patients Undergoing Plastic Surgical Procedures: A Case Report and Review of the Literature

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Background: Endometriosis is a common gynecological disorder described as the presence of functional endometrial tissue outside the uterus, which can also be found in extrapelvic locations. Although patients seeking treatment for endometriosis usually present to gynecologists, there are rare cases of endometriosis encountered by plastic surgeons in routine practice, either incidentally or as a concomitant finding.

Methods: We present a rare case of a 36-year-old woman with symptoms of panniculitis desiring panniculectomy. During surgery, an abdominal mass was excised and confirmed by pathological analysis to be endometriosis. A comprehensive literature review was conducted using the PubMed search engine of the National Institutes of Health to identify cases of endometriosis in plastic surgery. Following screening of the results, 14 articles were included in this analysis that fit the criteria of our search.

Results: Of the 14 articles reviewed, cutaneous endometriosis was the most common subtype found in plastic surgery. None of the studies described findings of endometriosis in routine panniculectomies. Several identified endometriosis discovered during cosmetic abdominoplasties.

Conclusions: Endometriosis encountered in plastic surgery is a rare but clinically important occurrence, with the cutaneous subtype representing the majority of cases. Endometriosis should always be on the differential diagnosis when an abdominal mass is found in a patient with a history of abdominal surgery. Abdominal masses found during routine aesthetic or reconstructive surgery should be submitted for tissue analysis to guide possible secondary treatments. *(Plast Reconstr Surg Glob Open 2024; 12:e5904; doi: 10.1097/GOX.0000000000005904; Published online 17 June 2024.)*

INTRODUCTION

Endometriosis is a common gynecological disorder described as the presence of functional endometrial tissue outside the uterine cavity, with the ovary being the most commonly involved organ (55%).[1] Risk factors for endometriosis include a positive family history, early menarche, menorrhagia, infertility, and low body fat.[2] Endometriosis presents with symptoms of dysmenorrhea, dyspareunia, cyclical bowel or bladder symptoms, and infertility.[2,3] It often goes undiagnosed for lengthy periods of time because presenting symptoms are highly variable among patients.[3] Laparoscopy is recommended to make the diagnosis.[4,5] Hormone therapies such as gonadotropin releasing hormone agonists and antagonists are typically first-line treatment for endometriosis, with surgery being reserved for medical nonresponders or in patients with severe symptoms.[5] For patients with child-bearing goals, advanced laparoscopic ablation of deposits is the treatment of choice, whereas patients without future pregnancy plans frequently elect to undergo total hysterectomy.[1,4,5]

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Although endometriosis is usually diagnosed and treated by specialists in gynecology or gastrointestinal surgery, there are rare cases of endometriosis encountered by plastic surgeons. Despite comprising only 1% of cases, cutaneous endometriosis is the most common subtype encountered by plastic surgeons, usually during open abdominal wall surgery.[6,7]

The most common site for extrapelvic endometriosis is the abdominal wall associated with seeding of endometrial tissue ectopically during prior surgical procedures such as cesarean section, hysterotomy, or myomectomy.[8,9] Abdominal wall endometriosis often has a difficult and delayed diagnoses because it does not present with the classic symptoms of endometriosis.[9] Fat necrosis, desmoid tumor, and malignancy should be included in the differential diagnosis of abdominal wall endometriosis.[8,9] We present a rare case of abdominal wall endometriosis in plastic surgery discovered during a panniculectomy, as well as a review of the literature.

Takeaways

Question: How can incidental findings of abdominal wall endometriosis during plastic surgery procedures be managed?

Findings: Endometriosis should always be on the differential diagnosis when a mass involving the abdominal wall is discovered in a patient with a history of abdominal surgery.

Meaning: Abdominal wall masses incidentally discovered during routine aesthetic or reconstructive surgery should be biopsied and, if possible, excised, and the abdominal wall reconstructed. Biopsy results can be used to provide a tissue diagnosis, rule out a malignant lesion, and guide adjuvant treatments such as hormonal or gynecological surgical therapy.

CASE PRESENTATION

The patient was a 36-year-old premenopausal G3P3003 woman who presented with significant abdominal wall laxity following massive weight loss, resulting in recurrent rashes and skin infections. She endorsed that the redundant skin folds made it difficult to maintain personal hygiene, leading to skin breakdown, increased bacterial proliferation, and localized infection. The patient had a history of trauma to her left lower abdomen from a motor vehicle collision 2 years prior, after which she noticed a residual hard lump at the site. This was diagnosed by her primary care provider in the past as traumatic fat necrosis secondary to seat belt injury. Previous procedures included multiple cesarean sections and a laparoscopic cholecystectomy. No preoperative imaging was performed because our patient seemed to be at a low risk for a problematic lesion other than fat necrosis of the abdominal wall due to her history of blunt trauma. She proceeded with an abdominal panniculectomy, which was expected to also remove the abdominal wall lesion.

PROCEDURE

The infraumbilical panniculectomy was performed via a standard low-transverse incision marked 5 cm above the labial cleft extending bilaterally to the premarked skin folds. The skin flap was then raised from inferior to superior, without exposing the umbilical stalk, while preserving the Scarpa fascia around the anterior superior iliac spines to protect the lateral femoral cutaneous nerves.

During the dissection, a solid mass was observed protruding through the anterior rectus sheath. The mass was dissected from the surrounding anterior rectus sheath and off the posterior rectus sheath, which seemed to be intact. The intrarectus mass measuring 6 cm × 4 cm was found to be hard and partially calcified, raising the possibility of fat necrosis or a desmoid tumor. The excised mass was submitted for pathological evaluation. The resulting anterior rectus sheath defect was reconstructed with prolene mesh (size 11 cm × 8 cm) placed in underlay fashion. The panniculectomy was then completed with 2986 g of full thickness skin being excised. She had an uneventful postoperative recovery. At 3-months follow-up, the anterior abdominal wall defect had healed as expected with no clinical signs of a hernia or a bulge, and she was satisfied that her abdominal wall laxity had been addressed.

HISTOLOGY

Microscopic examination of the left lower quadrant mass postoperatively showed endometriosis with dense fibroconnective tissue and subcutis. At low power, there were large glandular spaces surrounded by basophilic cells in a background of eosinophilic tissue (Fig. 1A). At high power, the glands were composed of low columnar to cuboidal epithelial cells consistent with endometrial cells. The basophilic cells surrounding the glands were ovoid to spindle-shaped with uniform, bland nuclei consistent with endometrial stromal cells. Other areas showed hemosiderin deposition within the soft tissue (Fig. 1B). Together, the microscopic findings were diagnostic of endometriosis.

LITERATURE REVIEW

A comprehensive literature review was conducted using the PubMed search engine of the National Institutes of Health to identify cases of endometriosis in plastic surgery that have been published in the last 23 years. The terms "plastic surgery" OR "panniculectomy" OR "abdominoplasty" AND "Endometriosis" were used in the search. Of the total 114 articles that were produced by the search, 14 were selected in this analysis that fit our inclusion criteria (Fig. 2). For inclusion in our review, we selected only cases of extrapelvic endometriosis being treated or found in plastic surgery related procedures. Non-English articles were excluded.

Of the 14, none were associated with findings during a panniculectomy. However, several were associated with findings of endometriosis during abdominoplasties. To the authors' knowledge, our patient is the first described case in the literature of abdominal wall endometriosis found during a panniculectomy. Ostric et al[10] described findings of endometriosis involving the anterior rectus

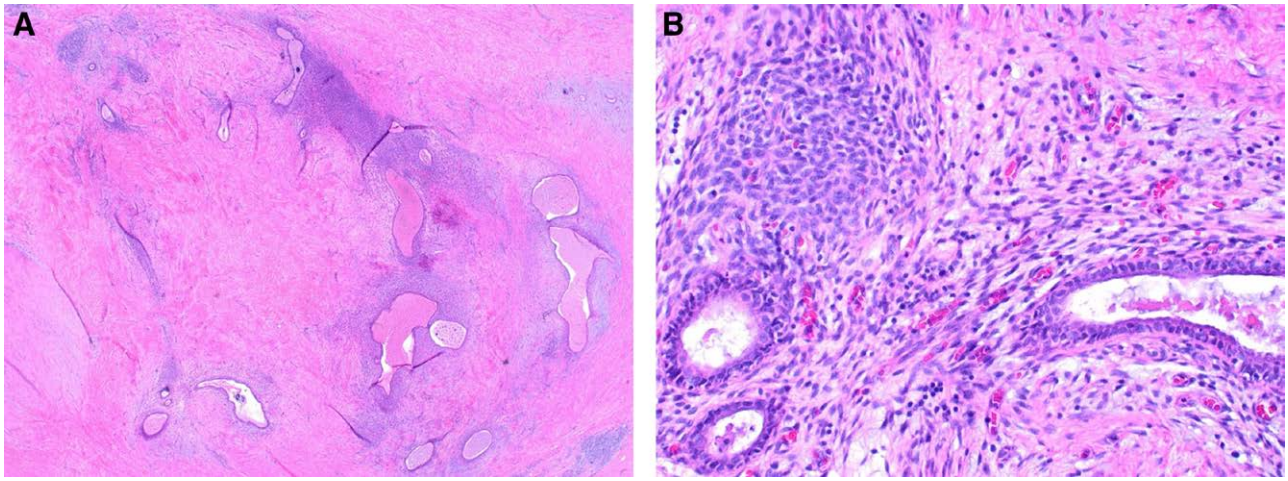

Fig. 1. Pictograms (H & E stains) of the abdominal mass showing histologic characteristics of endometriosis. A, 20× magnification. B, 200× magnification.

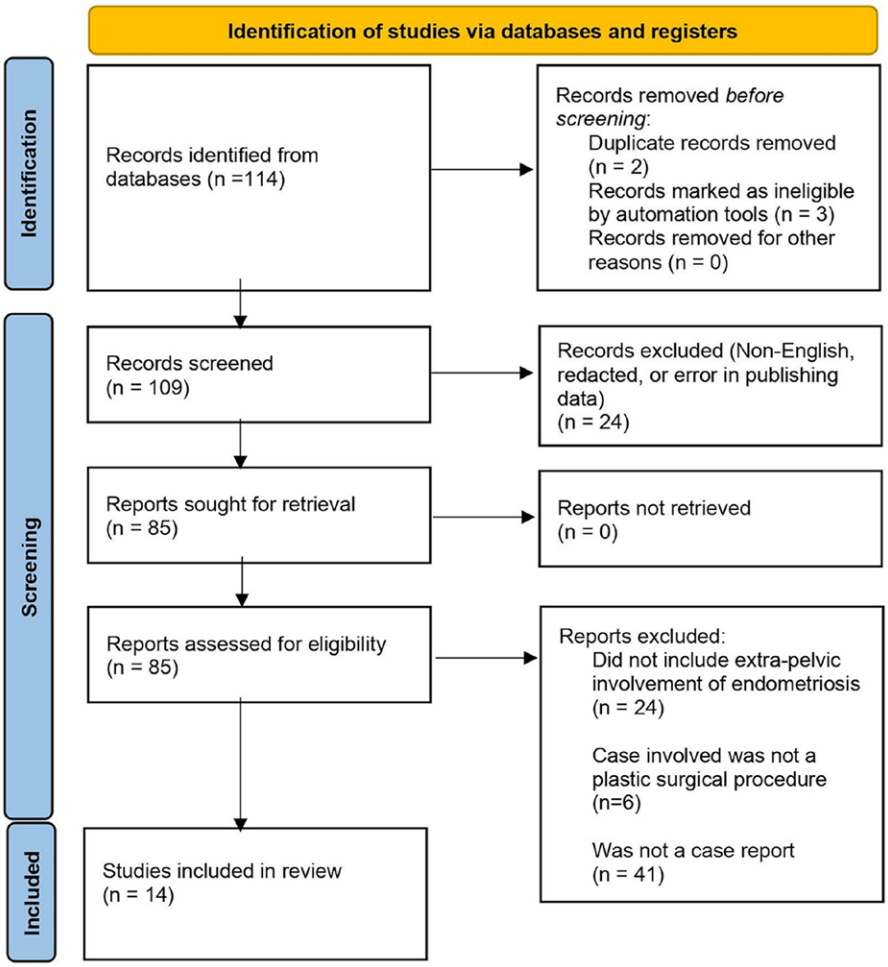

Fig. 2. PRISMA workflow illustrating process of article inclusion.

sheath during abdominoplasty, with appropriate excision of the mass. Perry et al[11] reported a case of an abdominoplasty for a patient with a history of polycystic ovarian syndrome and hypothyroidism, in which the patient had no complaints of local pain or a palpable abdominal mass. Hamouie et al[12] described a notable case of primary

cutaneous endometriosis, with referral to plastic surgery for an umbilicoplasty. A thorough analysis of all 14 articles included in this review is provided in Supplemental Digital Content 1. [**See table, Supplemental Digital Content 1**, which shows detailed analysis (patient population, management, and outcome) of each article included in the literature review,[6,7,10–21] **http://links.lww.com/PRSGO/D287**.]

DISCUSSION

Although abdominal wall endometriosis is rare, affected patients are most commonly asymptomatic. Diagnosis of abdominal wall lesions is difficult and often delayed because it usually does not present with the classic symptoms of endometriosis.[8] In a case control study of 25 patients with abdominal wall endometriosis, Ferjaoui et al[22] found that the only common symptom in all patients was cyclic pelvic pain. Marras et al[23] concluded the same in an 11-year retrospective study of endometriosis patients with involvement of the abdominal wall, highlighting the nonspecific nature of symptoms in this disease. Our patient presented with a pertinent history of cesarean section and abdominal trauma following a motor vehicle collision 2 years before, subsequently developing a mass in the left side of the anterior abdominal wall. She endorsed discomfort associated with the mass with her main complaint more related to symptoms of abdominal wall laxity and panniculitis after massive weight loss.

With a history of trauma localized to the area, the most likely diagnosis was fat necrosis secondary to compressive seat belt injury.[24] When addressing the likely risk factors for our patient developing an abdominal endometrial lesion, a history of cesarean section is also pertinent. The process by which previous cesarean section, and any open abdominal surgery, contribute to endometrial gland formation outside of the uterine cavity is still not totally understood. The most likely etiology is by way of endometrial gland and stroma formation around abdominal scar tissue, leading to tissue proliferation into the scar tissue epithelium.[6,25] Endometrial tissue found in skin and scar tissue, such as this, is known as cutaneous endometriosis, which is a rarer form of endometriosis with only 108 cases having been documented as of 2018.[25] Our patient's formation of abdominal wall endometriosis may not have occurred through these mentioned mechanisms. The abdominal wall endometrial mass was observed at a location higher than the cesarean scar with no umbilical or cutaneous endometrial gland formation, making this a rare instance of abdominal wall endometriosis in a patient with previous cesarean section with no involvement of the scar or umbilicus. It is therefore more likely that her previous trauma resulted in a rectus hematoma that was seeded with endometriotic cells from retrograde menstrual flow, later walling off as a rectus mass.

Although endometriosis can present without pain, the most common symptoms in patients with endometriosis involve pain that increases with pressure in the abdominal or pelvic cavity, localizing to the position of endometrial deposits.[26] The most significant difference between abdominal wall or pelvic fat necrosis and endometriosis is the severity and cyclical nature of pain, more likely to be worse in the latter.[24] Other potential conditions in the differential diagnosis for an abdominal wall mass include lipoma, hernia, desmoid tumor, and primary or metastatic malignancy.[25,27]

In situations with higher clinical suspicion for alternate pathology, imaging studies are warranted. Such situations include an abnormal finding on preoperative physical examination, conditions obscuring a good quality physical examination such as obesity or anatomical variations, heightened risk factors for a malignant condition, or invasive surgery in the past which may be an inciting factor for ectopic endometrial deposition, such as uterine surgery or major trauma.[28] Abdominal computed tomography often fails to diagnose endometriosis but, in some patients, may demonstrate the "gorgon" sign, mass homogeneity as well as ill-defined blurred outer borders and the presence of a hyperechoic ring.[29] Magnetic resonance imaging may also be useful to characterize these soft tissue lesions. Depending on the findings of these imaging modalities, the original surgical plan may need to be altered and, in some cases, may prompt an image-guided biopsy to rule out malignancies before performing plastic surgery.[30]

Common methods for excision of abdominal wall endometrial tissue include access through a transabdominal incision with additional trans-rectus exploration if deposits are deep to the anterior rectus sheath. Excision margins of 1 cm are recommended to reduce the risk of local recurrence.[6,9,25] Frozen sections were not used for this patient, but are frequently used in gynecological cases for treatment of endometriosis and can be useful for suspicious masses found in plastic surgical cases.[31]

Surgical reconstruction following excision of abdominal wall endometriosis is essential in complex cases. Due to the rare occurrence of abdominal wall endometriosis, there is a lack of literature on effective techniques for tissue reconstruction following similar cases. Bartłomiej et al[13] described a case of a large abdominal wall endometriosis mass radically resected with a transabdominal incision and retrorectus mesh placement. Reconstruction of the soft tissue deficit was described as a partial abdominoplasty to create a large skin advancement flap, highlighting the extent of endometrial invasion before surgery, and the need to consider the implications following resection of compromised tissue. Our surgical technique of closure for this case parallels that of several similar abdominal wall reconstruction methods, such as that highlighted by Garvey et al,[32] which describes abdominal wall reconstruction techniques following desmoid tumor removal. Cases of large abdominal wall endometriosis mass resections involving the rectus abdominis fascia with mesh reconstruction and added separation of components have been noted in the literaure.[18,33] Large abdominal wall defects can be closed through a variety of ways, including unilateral or bilateral component separation with supportive mesh placed as an overlay, underlay, retrorectus or bridging mesh repair, whereas small defects such as our patient's may be reconstructed with mesh repair alone.[17] Although, beyond the scope of this review, it is worth mentioning

that the mesh may be composed of various synthetic or biological materials, selection of which would depend on the needs of the case.

In cases of umbilical endometriosis, resection must be followed with umbilical reconstruction. Hamouie et al[12] reported a case of chronic abdominal wall endometriosis with invasion of the umbilicus and surrounding cutaneous tissue, in which they performed a novel four-flap umbilicoplasty technique to reconstruct the umbilicus as well as to add support to the inferior abdominal wall repair. Takaya et al[34] described a case of cutaneous endometriosis secondary to a cesarean section, in which they performed resection of the endometrial tissue and placement of synthetic mesh.

Findings of abdominal wall endometriosis during abdominal surgery are rare, and even rarer when only evaluating cases involving plastic surgery. There are no previously reported cases of endometriosis discovered in a panniculectomy. There are, however, multiple cases of abdominal wall endometriosis found during routine abdominoplasty.[11,21] This is an interesting distinction that has not been reported in the literature. Differences in patient population and indication for surgery may be factors influencing this trend.[35] Another may be simply that an abdominoplasty creates a larger surgical field with more abdominal tissue exposed, resulting in a higher frequency of abdominal masses being discovered.[35,36] However, this literature review is based on case reports and small volume case series that met the criteria for inclusion, studies that by design are not powered to examine causal relationships or the significance of the findings. Therefore, the difference in the incidence of abdominal wall endometriosis lesions found during abdominoplasties and panniculectomies may be a random occurrence.

Incidental masses discovered during cosmetic abdominal surgery pose a further challenge besides excision and reconstruction of the abdominal wall: the prospect for incurring additional cost for surgical care. This includes potential for increased billing for any mesh materials used, management of the iatrogenic hernia, and pathology services for tissue analysis. It is very unlikely that most plastic surgeons would include a detailed preoperative discussion with their patients on management of incidental masses given that it is such a rare event. In this scenario, it is important to have an intraoperative discussion with the patient's family about the finding, obtain consent for the additional surgery, and advise on extra costs, which may vary widely depending on the size of the mass and reconstructive adjuncts that might be needed. It is not clear if insurance carriers would agree to pay for the reconstructive parts of the surgery without preauthorization, and this may vary case-by-case and by region in the United States.

The use of mesh for reconstructing the abdominal wall after mass excision may also be affected by logistical constraints, surgeon experience with their use, and availability of these products, especially in rural or outpatient centers that may not stock these items. If mesh cannot be used at the index operation, the patient needs to be advised on the higher risk for developing a bulge or hernia, which may need to be addressed with surgery in the future.

It is reasonable to conclude that the presence of extrapelvic endometriosis suggests similar disease in the pelvis. Once a diagnosis of extrapelvic endometriosis is obtained from pathological examination of an excised mass, patients should be referred to a gynecologist for workup of synchronous pelvic endometriosis and further treatment if needed.

CONCLUSIONS

Endometriosis in plastic surgery is a rare but clinically important disease process, presenting most commonly with the cutaneous subtype in the setting of previous trauma or surgery. For the patient presented, her prior history of blunt abdominal trauma was the likely inciting event with translocation and seeding of the rectus space with endometriotic cells, later walling off as a rectus mass. When reviewing the literature, most instances of endometriosis encountered in plastic surgical cases were during abdominoplasties, with no previous record of abdominal wall endometriosis being observed during a panniculectomy such as in the case presented. When encountered during plastic surgery, the authors recommend excision and pathological examination of these masses to confirm the nature and guide further treatment. This might require addition of a reconstructive procedure to address iatrogenic defects of the anterior abdominal wall. For endometriotic masses, referral to gynecology for further evaluation and treatment may also be appropriate.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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