RESEARCH ARTICLE

Endometriosis-Associated Malignant Transformation Arising in a Laparotomy Scar: A Case Report and Literature Review

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Abstract

Background:

Endometriosis is a common estrogen-dependent condition, affecting approximately 10% of women of reproductive age. It is characterized by the presence of endometrial-like tissue outside the uterine cavity. While malignant transformation of endometriosis typically occurs in ovarian tissue, such transformation at extraovarian sites—particularly within abdominal wall scars—is exceedingly rare.

Case Summary:

Fewer than 50 cases of malignancies arising from abdominal wall scar endometriosis have been reported globally. The most commonly observed histological types include clear cell carcinoma and endometrioid adenocarcinoma. Diagnosis requires comprehensive histopathological and immunohistochemical analysis.

Conclusion:

Patients with such transformations often present with nonspecific symptoms, which can mimic benign postoperative complications or soft tissue tumors, thereby contributing to diagnostic delays. Given the aggressive behavior and potential for recurrence, early recognition and intervention are crucial.

This report describes a rare case of endometrioid adenocarcinoma arising from endometriosis in a laparotomy scar, underscoring the importance of timely diagnosis and a multidisciplinary approach to optimize clinical outcomes.

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Introduction

Endometriosis is a common gynecologic disorder characterized by the presence of functional endometrial tissue outside the uterine cavity. It predominantly affects pelvic organs and is frequently associated with chronic pelvic pain, dysmenorrhea, and infertility. While typically localized within the pelvis, endometrial implants may also appear in extrapelvic locations, including surgical scars on the abdominal wall—most often following gynecologic procedures such as cesarean sections or laparotomies.

Scar endometriosis is believed to result from the direct implantation of endometrial cells into the surgical wound during operative procedures. Although generally benign, these ectopic endometrial lesions can, on rare occasions, undergo malignant transformation. Such transformations are most commonly reported in ovarian endometriosis, while involvement of scar tissue is exceedingly rare.

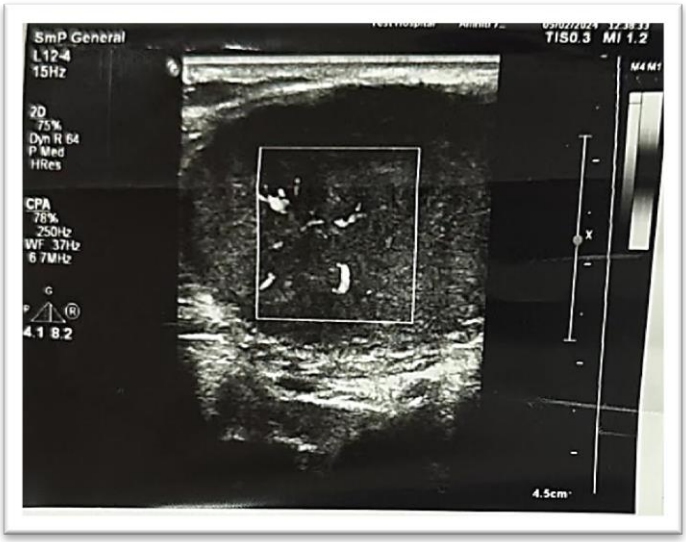
Malignancies arising from scar endometriosis are frequently misdiagnosed as benign postoperative changes, hernias, or soft tissue tumors, leading to delays in accurate diagnosis and treatment. Histopathological evaluation, supplemented by immunohistochemical staining, remains essential for definitive diagnosis and therapeutic planning. Given the rarity of these malignancies and the absence of standardized management guidelines, individualized treatment approaches utilizing a multidisciplinary team are critical.

This report presents a rare case of endometrioid adenocarcinoma developing within a laparotomy scar, highlighting the importance of early recognition, appropriate diagnostic workup, and collaborative care to improve patient outcomes.

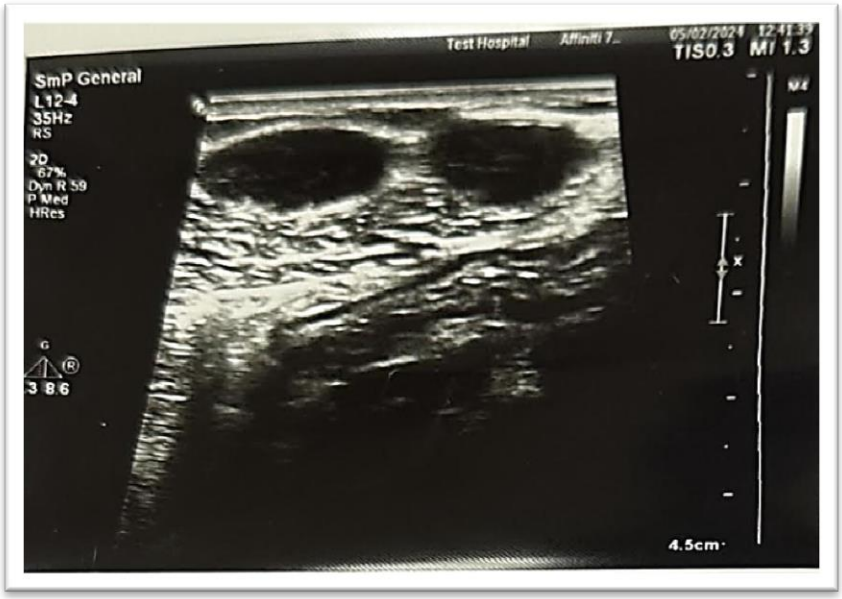
Case Presentation

A 30-year-old nulligravid woman (G0P0) presented in January 2024 with a six-month history of progressively worsening lower abdominal pain, particularly during menstruation. She also noted the gradual development of a firm, tender mass beneath a prior surgical scar. Her medical history was significant for a left oophorectomy performed in 2021 via a low transverse (Pfannenstiel) incision.

On physical examination, a palpable, poorly mobile mass was identified in the right lower quadrant, in the vicinity of the previous incision. Pelvic ultrasonography demonstrated a heterogeneous, hypoechoic lesion measuring approximately 10 × 7 × 5 cm within the right rectus abdominis muscle. The mass displayed irregular margins and increased internal vascularity, raising suspicion for neoplastic transformation. *(See Figures 1.1 and 1.2)*

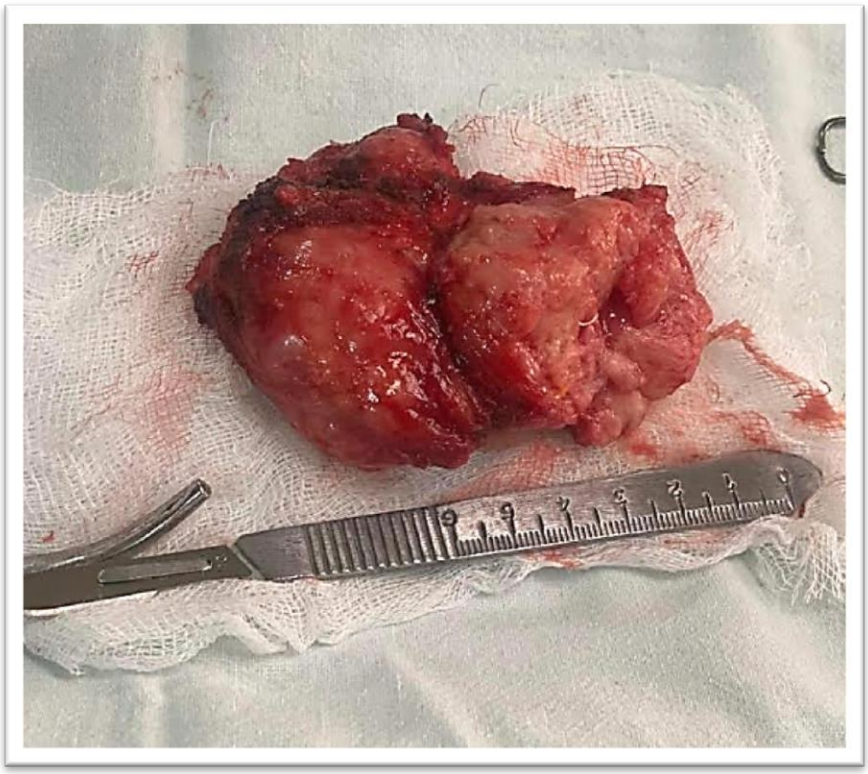


Picture 1.1



Picture 1.2

Surgical exploration and wide excision of the mass were performed. Intraoperatively, the lesion was found between the aponeurosis and rectus abdominis, with dense nodular infiltration. Reconstruction of the abdominal wall followed the excision. *(Picture 2)*



Picture 2

Histopathological and Imaging Findings

Histopathological examination of the excised mass revealed fibrotic stroma infiltrated by atypical glandular structures composed of tumor cells with polymorphic nuclei and areas of squamous metaplasia. The tumor was primarily confined to the striated muscle but extended to resection margins in several foci. Clusters of tumor cells were observed within lymphatic channels, suggesting lymphovascular invasion.

Immunohistochemical staining demonstrated tumor cell positivity for cytokeratin 7 (CK7), paired box gene 8 (PAX8), estrogen receptor (ER), progesterone receptor (PR), and vimentin, supporting Müllerian origin. CD10 expression was noted in scattered individual cells, although the typical CD10-positive endometrial stromal component was absent. CA-125 expression was focally positive. Markers including GATA3, CK20, TTF-1, Napsin A, and CDX2 were negative, ruling out urothelial, gastrointestinal, pulmonary, or renal origins. The Ki-67 proliferation index was approximately 10%, indicating a moderately proliferative tumor.

A PET/CT scan revealed increased metabolic activity in the abdominal wall mass (SUVmax = 3.5) and a higher uptake in the uterine cavity (SUVmax = 6.09). Subsequent endometrial biopsy following curettage demonstrated endometrial intraepithelial neoplasia (EIN) characterized by architectural complexity, epithelial hyperplasia, and squamous metaplasia.

Based on these findings, a multidisciplinary tumor board recommended comprehensive surgical staging, including total hysterectomy, and consideration of adjuvant chemotherapy.

Discussion

This case contributes to the limited body of literature documenting malignancies arising from endometriosis in abdominal wall surgical scars. Although rare, these cases provide important insights into the clinical presentation, diagnostic challenges, and potential pathophysiological mechanisms underlying malignant transformation in ectopic endometrial tissue.

Scar endometriosis is believed to result from the iatrogenic implantation of endometrial cells into surgical wounds, most commonly following uterine surgeries such as cesarean sections or laparotomies. The subsequent hormonal stimulation of these cells in an aberrant microenvironment may, over time, induce neoplastic changes. This theory is supported by the spatial and temporal association between gynecologic surgeries and the development of endometriotic implants at incision sites.

Malignant transformation of endometriosis is rare, occurring in fewer than 1% of cases. Extraovarian transformation—particularly within the anterior abdominal wall—is exceedingly uncommon due to the atypical location and unfavorable conditions for endometrial cell survival. Nonetheless, when it occurs, it is most frequently associated with a history of uterine surgery and long-standing endometriotic lesions.

A systematic review of reported cases indicates a mean age of diagnosis around 46 years, with a significant number of patients having undergone prior cesarean delivery—further reinforcing the role of iatrogenic implantation as a pathogenic mechanism. In most series, clear cell carcinoma is the predominant histological type (66.7%), followed by endometrioid adenocarcinoma (14.6%), suggesting a shared pathogenesis with ovarian endometriosis-associated cancers, possibly driven by chronic inflammation and oxidative stress.

The present case is notable for several reasons: the patient's relatively young age (30 years), the short latency period (three years post-surgery), and the diagnosis of endometrioid carcinoma rather than the more common clear cell histology. These deviations may reflect unique biological behavior, genetic predisposition, or local factors accelerating malignant transformation.

Tumor sizes in the literature range from 2.5 to 22 cm; the lesion in this case measured 10 cm, consistent with the average size. While larger tumors may correlate with prolonged lesion growth and more aggressive behavior, no definitive prognostic markers have been established due to the rarity of such cases.

Surgical excision with negative margins remains the cornerstone of treatment, often supplemented by adjuvant chemotherapy or radiotherapy depending on tumor grade, invasion, and margin status. Immunohistochemistry plays a pivotal role in tumor characterization and origin identification, with markers such as PAX8, CK7, and ER/PR confirming Müllerian differentiation, and negative markers helping to exclude metastasis from other primaries.

Given the absence of standardized treatment protocols, a multidisciplinary approach is essential. Collaboration among gynecologic oncologists, pathologists, radiologists, and surgical oncologists allows for precise diagnosis and personalized treatment planning.

Early detection and complete surgical resection offer the best prognosis. Outcomes are significantly improved when malignancy is identified before lymphatic or distant spread, emphasizing the need for clinical vigilance in evaluating scar-associated masses, particularly in women with a history of gynecologic surgery.

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No specific funding was received for this work.

Conflict of Interest

The authors declare no conflicts of interest.

Ethical Approval

Informed consent was obtained from the patient for publication of this case and accompanying images.

Conclusion

This case of endometrioid adenocarcinoma arising within a laparotomy scar highlights a rare but clinically important complication of endometriosis. It reinforces the critical need for heightened clinical vigilance in women with a history of gynecologic surgery who present with new or progressively enlarging abdominal wall masses. Although scar endometriosis is typically benign, the possibility of malignant transformation—particularly when lesions exhibit atypical imaging features, cyclic pain, or accelerated growth—must be considered in the differential diagnosis.

Definitive diagnosis hinges on histopathological and immunohistochemical evaluation to distinguish primary malignancies from metastatic disease or benign mimickers. Given the absence of standardized management protocols, early identification and complete surgical excision with negative margins are paramount for optimizing patient outcomes.

This case also emphasizes the importance of a multidisciplinary approach in guiding individualized treatment strategies, especially when concurrent intra-abdominal pathology, such as endometrial intraepithelial neoplasia, is identified. As additional cases are reported, a deeper understanding of risk factors, surveillance strategies, and long-term outcomes will be instrumental in shaping evidence-based clinical guidelines for this rare but aggressive manifestation of endometriosis.

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