Endometriosis is characterized by ectopic endometrial tissue, which responds to ovarian stimulation. Endometrioma is the term given to extra-pelvic endometriosis that forms a discrete mass surrounded by a connective tissue capsule. We present a retrospective review of five patients diagnosed with abdominal wall endometrioma in our institution within the last three years. We review symptoms, diagnostic methods, and surgical management, as well as current literature regarding this patient population.

Endometrioma is an unusual disease process that must be included in the differential diagnosis of chronic abdominal pain associated with a mass in the incisional area of a patient with a previous Cesarean section. The development, cell biology, complex biochemical and endocrine features of its pathogenesis, and obvious intricate interaction with musculofascial elements relative to other abdominal wall layers are intriguing and merit further investigation.

Key words: endometriosis, endometrial tumor, endometrioma

Endometriosis is defined as ectopic endometrial tissue that responds to ovarian stimulation. Endometrioma is the term given to extra-pelvic endometriosis which forms a discrete mass surrounded by a connective tissue capsule. Endometriomas have been described as occurring in numerous body cavities and organs, including the kidney, lung, gall-bladder, small and large bowel, extremities, perineum and central nervous system (1, 2). Endometrioma formation has also been reported to occur in surgical scars after pelvic operations and Cesarean-section scars are the most common sites of abdominal wall endometriomas. In published series, the incidence of endometriomas in Cesarean-section incisions has been reported to range from 0.03% to 0.4% (3, 4).

The most common symptoms of abdominal wall endometriomas are chronic or cyclical abdominal pain (5), often intensified by coughing and abdominal muscle contractions, menstrual period irregularity, and infertility. The most common signs of abdominal wall endometriomas include a palpable mass in the area of the incisional scar, which is often painful and varies in size synchronously with menstrual periods.

The hospital records of patients treated for abdominal wall endometriomas between June 1999 and June 2002 were reviewed, retrospectively. Information concerning age, previous surgical history, presenting signs and symptoms, means of diagnosis and treatment were obtained.

RESULTS

During the three year period, five patients with abdominal wall endometriomas were identified. The clinically relevant data are summarized in tab. 1. The mean age of the patients was 30 years and all patients had a history of previous Cesarean section. The mean interval between Cesarean section and diagnosis of endometrioma was 2.6 years, with a range of six
months to six years. One patient had a previous history of endometriosis. All patients presented with pain and a palpable abdominal mass. Three patients complained of menstrual irregularity, one patient was treated for infertility prior to diagnosis, and two patients had a CT scan prior to diagnosis. All patients underwent exploration of the surgical scars with excision of the mass. In all cases, the mass was intimately incorporated into the abdominal wall musculofascia, requiring a margin of fascia for complete excision. Four fascial defects were closed primarily and one defect required a mesh repair. Pathology examination confirmed the diagnosis in all cases. To date, no cases of recurrence have been identified.

DISCUSSION

The differential diagnosis of patients presenting with a palpable mass in a surgical scar includes hernia, seroma, hematoma, abscess, neuroma, foreign body granuloma and malignant tumor. For premenopausal female patients with a prior history of pelvic surgery, endometrioma of the surgical scar must be included in the differential diagnosis. Although endometriomas occurring in surgical scars are reported most commonly after Cesarean-sections and other gynecological procedures, they also have been reported to occur after appendectomy (6), inguinal herniorrhaphy (1, 7) amniocentesis (8) and laparoscopy (9). Patients usually present with a typical history of chronic abdominal pain and a tender or painful mass associated with a previous incisional scar. Some patients have complained more specifically of cycles of pain synchronous with their menstrual periods. Furthermore, cyclic bleeding or drainage from the painful mass has been reported in the literature (10). Patients have also presented with simultaneous symptoms of endometriosis, including chronic abdominal and pelvic pain, menstrual irregularity, and infertility. In one series, 26% of patients with abdominal wall endometrioma had concurrent pelvic endometriosis (11).

The diagnosis of endometrioma should be suspected in patients with suggestive history and physical examination findings. Imaging studies, which can be helpful in establishing the diagnosis, include computer tomography (CT) and ultrasound. Ultrasound can determine whether the mass is solid or cystic and can help distinguish the mass from other intra-abdominal pathologic conditions (12). CT is used to document the extent of disease (13, 14). MRI can establish the presence of hematoma and differentiate the mass from a lipoma (15, 16). Fine needle aspiration has also been proposed as a diagnostic modality if the surgeon suspects a malignant lesion (17), but results can often be inconclusive (2). Pathologic examination of the specimen should include at least two of three features characteristic for endometrioma: 1) endometrial hypercellular stroma, 2) endometrial-like glands, 3) hemosiderin pigment (intracellular and/or extracellular).

To date, three cases of endometrial carcinoma developing in scar endometriomas have been reported (18, 19, 20). Radical surgical re-

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Table 1. Patients data and treatment

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age (years)</th>
<th>Interval between cesarean-section and diagnosis of endometrioma (years)</th>
<th>Previous history of endometriosis</th>
<th>Symptoms on admission</th>
<th>Type of surgery</th>
<th>Size of excised mass (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>33</td>
<td>2</td>
<td>no</td>
<td>pain and menstrual irregularity</td>
<td>complete excision,</td>
<td>2x2</td>
</tr>
<tr>
<td>2</td>
<td>37</td>
<td>3.5</td>
<td>no</td>
<td>pain and menstrual irregularity, infertility</td>
<td>complete excision</td>
<td>3.5x3</td>
</tr>
<tr>
<td>3</td>
<td>32</td>
<td>0.5</td>
<td>yes</td>
<td>pain</td>
<td>complete excision</td>
<td>2.5x3,2</td>
</tr>
<tr>
<td>4</td>
<td>26</td>
<td>1</td>
<td>no</td>
<td>pain</td>
<td>complete excision, mesh implantation</td>
<td>2x3,5</td>
</tr>
<tr>
<td>5</td>
<td>28</td>
<td>6</td>
<td>no</td>
<td>pain and menstrual irregularity</td>
<td>complete excision</td>
<td>2.5x3</td>
</tr>
</tbody>
</table>
section is the treatment of choice and adequate fascial excision must be performed to achieve clear margins and prevent recurrence. In some cases, the use of synthetic mesh has been indicated for an adequate tension-free closure (2, 21). Medical treatment with leuprolide and danazol is often used adjunctively to treat patients with pain and menstrual irregularity (22).

**SUMMARY**

Endometrioma is a rare disease process that must be included in the differential diagnosis of chronic abdominal pain associated with a mass in the incisional area of a patient with a previous Cesarean section. Diagnosis is established by typical history, physical findings and imaging studies. Surgical resection is the treatment of choice, and fascial excision must be performed with an adequate margin to allow complete removal of the endometrioma. The development, cell biology, complex biochemical and endocrine features of its pathogenesis, and obvious intricate interaction with musculofascial elements relative to other abdominal wall layers are intriguing and merit further investigation.

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