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RESEARCH ARTICLE

Scar Endometriosis After Cesarean Section; Our Clinical Experiences, 32 Cases of Cesarean Scar Endometriosis

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Abstract

Introductıon: Scar endometriosis is a type of rare endometriosis that develops following obstetric or gynecological surgeries. The aim of our study is to share our clinical experiences regarding scar endometriosis, which is becoming more common due to increasing cesarean operations, and to contribute to the literature on this subject.

Methods: A total of 32 patients who underwent surgery due to scar endometriosis participated in our study. The patients' demographic and clinical characteristics, size and location of the lesion determined by imaging methods and histopathological results were recorded and analyzed.

Results: The mean age of the patients was 34.81±6.52 years, with 46.9% having undergone one cesarean section and 53.1% having undergone two or more cesarean sections. Scar endometriosis involving subcutaneous and fascial tissue was determined to be 43.7% in the right corner, 28.1% in the left corner, 9.4% in the midline, and 18.8% within the rectus muscle. The time elapsed between cesarean section and the onset of symptoms was found to be statistically significantly shorter in patients who had undergone two or more cesarean sections compared to those with only one previous cesarean section (p=0.015).

Conclusion: Scar endometriosis is a painful condition for which clear success in medical treatment has not yet been demonstrated, and surgical intervention is often required. Given the higher frequency of occurrence at the corners of cesarean section incisions, we recommend the careful washing of these corners. Further immunohistochemical studies are needed to achieve success in medical treatment, and histopathological analysis should be fully elucidated.

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Introduction

Endometriosis is the presence of endometrial tissue (gland and stroma) outside the uterus.[1] It is observed in 5-10% of women of reproductive age and in 20-30% of infertile women.[2,3] Scar endometriosis (SE), on the other hand, is quite rare, developing in 0.2-0.4% of women following obstetric or gynecological surgeries.[4]

Various theories or combinations of these theories have been proposed to explain the pathogenesis of SE. The first suggests direct implantation of endometrial tissue into the scar tissue formed during surgery. The coelomic metaplasia theory proposes that a primitive pluripotent mesenchymal cell can differentiate to form endometrial cells under specific conditions. The combination of these theories suggests that under appropriate hormonal stimulation, cells that are directly implanted proliferate and can lead to scar endometriosis by inducing metaplasia in adjacent tissue.[4,5]

SE typically manifests as a nodule along the incision line and, although nonspecific, presents as a mass associated with cyclic pain related to menstruation along the incision line. Due to its lack of characteristic symptoms and its location, diagnosis may be delayed. It can often be confused with incisional hernia, abscess, or suture granuloma.[6,7] Ultrasonography (US), Computed Tomography (CT), and Magnetic Resonance Imaging (MRI) can assist clinicians, but diagnosis should be confirmed by histological examination.[6]

The aim of our study is to share our clinical experiences regarding scar endometriosis, which is becoming more common due to increasing cesarean operations, and to contribute to the literature on this subject.

Material and Methods

Our study included 32 patients who underwent surgery due to scar endometriosis at the Department of Gynecology, Ankara City Hospital, between September 2019 and September 2023. Ethics committee approval was obtained from the Clinical Research Ethics Committee of Ankara City Hospital (23/4491).

Our study is a comprehensive retrospective study in which patient records, operative notes, and pathology results were scanned from our hospital's electronic file archive. The age, parity, mode of delivery, number of previous cesarean sections, presented complaints, known history of pelvic endometriosis, physical examination findings at outpatient clinic visits, CA 125 values, size and location of the lesion determined by imaging methods, and the presence of pelvic endometriosis were recorded. The length of hospital stay after scar endometriosis surgery, postoperative complications, and histopathological results were obtained. If medical treatment was administered for scar endometriosis either before or after the operation, information on medical treatment and recurrence was noted, and all data was analyzed.

Statistical analyses were conducted using SPSS version 28. The normality of variables was examined visually (histograms and probability plots) and analytically (Kolmogorov-Smirnov/Shapiro-Wilk tests). Descriptive analyses were provided for variables showing normal distribution using mean and standard deviations. For parametric data determined to have normal distribution based on the Levene test, means were compared using the Student's t-test. The Mann-Whitney U test was used to compare non-normally distributed parametric and ordinal data. Categorical data was compared using appropriate methods such as the Chi-square or Fisher's exact test (in cases where the assumptions of the Chi-square test were not met in cell counts). Cases with a p-value less than 0.05 were considered statistically significant.

Results

All 32 patients included in the study had a history of at least one cesarean section, and their most recent surgeries were cesarean sections. Symptoms appeared after cesarean delivery in all patients. Surgical excision with clear margins was performed for all patients (including cases of recurrent scar endometriosis), and the pathological diagnosis for each excised lesion was endometriosis. The basic characteristics of the patients are summarized in Table 1. The mean age of the patients was 34.81±6.52 years, and all of them had undergone cesarean section with a Pfannenstiel incision. In all scar endometriosis lesions except those involving the rectus muscle, subcutaneous and fascial tissues were involved together. Subcutaneous and fascial involvement was found to be 43.7% in the right corner, 28.1% in the left corner, 9.4% in the midline, and 18.8% within the rectus muscle. Compared to other locations, scar endometriosis tissue located within the rectus muscle had larger dimensions, reaching 37±15.62 mm. Recurrence after surgery and resection with repeat surgery were detected in 4 patients. One patient had a concurrent history of endometrioma (Table 1).

Table 1. The demographic and clinical characteristics of patients undergoing scar endometriosis surgery

	N=32
Age (years)	34.81± 6.52
Parity	1.87± 0.79
Previous cesarean sections	5 (46.9%)
One Caesarean section	14 (43.7%)
Two Caesarean sections	3 (9.4%)
Three or more Caesarean sections	
Time from cesarean section until the onset of complaints (months)	29.4± 15.26
Time between the onset of the complaint and scar surgery (months)	16.43± 14.53
Complaint	30 (93.7%)
Pain	25 (78.1%)
Cyclic	5 (15.6%)
Continuous	2 (6.3%)
None	32 (100%)
Palpable mass	
Presence of previous or concurrent pelvic endometriosis	1 (3.1%)
Location of lesion	
Subcutaneous and Fascia Right	14 (43.7%)
Subcutaneous and Fascia Left	9 (28.1%)
Subcutaneous and Fascia Midline	3 (9.4%)
Within the rectus muscle	6 (18.8%)
Ultrasound size of the lesion (mm)	28.81± 10.25
Subcutaneous and Fascia Right	27.14± 9.23
Subcutaneous and Fascia Left	25.44± 5.02
Subcutaneous and Fascia Midline	30.33± 9.5
Within the rectus muscle	37±15.62
Duration of hospital stay (days)	2.4± 1.01
Presence of recurrence	4 (12.5%)
The pathological size of the lesion removed postoperatively (mm)	40.78± 13.97
CA 125 Values	21.09±15.25

The data is presented as mean±standard deviation and numerically (%)

The patients were divided into two groups: those who had undergone one cesarean section and those who had undergone two or more cesarean sections. The time elapsed between cesarean section and the onset of symptoms was found to be 23.13±15.82 months in patients with one previous cesarean section, while it was 10.53±10.54 months in patients who had undergone two or more cesarean sections, and it was statistically significantly shorter in patients who had undergone two or more cesarean sections (p=0.015) (Table 2).

Table 2. Comparison of scar endometriosis findings between patients who have undergone one cesarean section and those who have undergone two or more cesarean sections

	1 previous cesarean section (n= 15)	2 or more previous cesarean sections (n=17)	P value
Age	34.93±6.16	34.7±7.01	0.924
Time from cesarean section until the onset of complaint (months)	23.13±15.82	10.53±10.54	0.015*
Time between the onset of the complaint and scar surgery (months)	34.07±17.62	25.29±11.88	0.116
Complaint (Pain)			
Cyclic	12 (80%)	13 (76.5%)	
Continuous	2 (13.3%)	3 (17.6%)	0.944
None	1 (6.7%)	1 (5.9%)	
Location of lesion			
Subcutaneous and Fascia Right	5 (33.4%)	9 (53%)	
Subcutaneous and Fascia Left	6 (40%)	3 (17.6%)	0.392
Subcutaneous and Fascia	2 (13.3%)	1 (5.9%)	
Midline	2 (13.3%)	4 (23.5%)	
Within the rectus muscle			
Ultrasound size of the lesion (mm)	27.2±10.98	30.24±9.67	0.412
Duration of hospital stay (days)	2.33±0.61	2.47±1.28	0.708
The pathological size of the lesion removed postoperatively (mm)	39±10.38	42.35±16.68	0.129
CA 125 Values	25.33±20.54	17.35±7.04	0.171

The data is presented as mean±standard deviation and numerically (%). P<0.05 was considered statistically significant.

Discussion

In our clinic, all 32 patients who underwent surgery due to scar endometriosis had a history of previous cesarean section, although not statistically significant, the highest involvement was detected in the subcutaneous and fascial tissue in the right corner (43.7%). Compared to other locations, the scar endometriosis tissue located within the rectus muscle reached larger dimensions. Symptoms of scar endometriosis started statistically significantly earlier in patients with a history of 2 or more previous cesarean sections (p=0.015).

Studies have largely demonstrated the association of scar endometriosis cases with previous cesarean sections. The reason for this is best explained by the theory of direct implantation. In many patients with SE, as in our study, there is no history or evidence of pelvic endometriosis; this supports the theory that SE occurs as a result of the implantation of endometrial cells into the incision line during surgery, especially in cases with previous cesarean sections.[6] Compared to other gynecological opera-

tions, cesarean sections expose endometrial tissue more and subject it to trauma. Consequently, endometrial cells are implanted into surrounding tissues and proliferate. They are rarely detected, especially in subcutaneous and fascial tissue, and occasionally in the rectus muscle.[8] Zhang et al. presented 198 cases of cesarean scar endometriosis and found that lesions typically occurred at the corners of incision scars. They attributed this to the difficulty of removing endometrial cells from the corners of incisions during cesarean sections and suggested that corners should be more carefully cleaned during cesarean sections.[8] In our study, scar endometriosis tissue was particularly detected at a higher rate in the right corner of the incision line. While it may vary depending on which hand the surgeon uses, operations are generally performed from the patient's right side. Therefore, we believe that the incision corner on the side of the operating surgeon remains in a blind area and is not adequately cleaned due to insufficient visualization.

In scar endometriosis, patients typically present with cyclic pain and palpable mass complaints.[9] In our study, 78.1% of patients complained of cyclic pain, 15.6% of continuous pain, and all patients presented with a palpable mass complaint. Ultrasonography, computed tomography (CT), and magnetic resonance imaging (MRI) are useful for diagnostic imaging.[9] While MRI and CT are useful in clarifying the size of the lesion, fascial involvement and the depth of lesion invasion, ultrasonography may be initially preferred due to its lower cost and demonstrated sufficiency in diagnosis.[10] In our study, patients underwent ultrasonographic imaging and no significant difference was found between the lesion sizes measured ultrasonographically and those resected with a safe surgical margin. Therefore, we believe that ultrasonography is useful in evaluating the size and invasion of the lesion. Additionally, although not statistically significant in our study, we found that scar endometriosis located within the rectus muscle tended to reach slightly larger sizes compared to those located subcutaneously. We think this may be due to increased vascularity in the muscle tissue and the depth of the tissue, which may not be palpable early on.

In one study, the time until scar endometriosis symptoms appeared after cesarean section was found to be 12.0 months (range: 19.0-39.0),[11] while in another study, this period was determined to be 31.6±23.9 months8. In our study, this period was 29.4±15.26 months. When patients were divided into two groups based on whether they had undergone two or more cesarean sections or only one, we found that symptoms of scar endometriosis appeared earlier in patients who had undergone two or more cesarean sections ($p=0.015$). No significant differences were found between these two groups in terms of lesion location, lesion size, or hospitalization duration. However, Zhang et al. were unable to find a significant difference between the number of previous cesarean sections and this period.[8] This may be due to the rapid growth of a small number of endometrial cells implanted into the incision scar after one cesarean section, leading to symptoms developing more quickly during the second and subsequent cesarean sections due to increased exposure to endometrial tissue. Studies have shown that scar endometriosis occurs in reproductive-aged women after cesarean section.[12] The average age in our study was 34.81±6.52, and the patients were in the reproductive period. Therefore, it is thought that the growth of scar endometriosis tissue is hormone-dependent. However, in previous studies, it has been found that hormonal treatments do not lead to changes in lesion size.[13] In a prospective study conducted by Seckin et al., patients were given dienogest, and although there was some reduction in pain, no change in lesion size was observed.[14] Dwivedi et al. conducted immunohistochemical studies on endometriosis tissue removed from surgical incision areas and found CK7 and CD10 positivity in this tissue.[15] Another study has shown that miRNA expressions in scar endometriosis tissue are different.[16] In this case, the presence or activity of estrogen receptors in scar endometriosis tissue and the absence or passivity of progesterone receptors may be considered. Another theory is that some proteins, antigens, and miRNA expressions found in scar endometriosis tissue may reduce the response to hormonal treatment. These theories need to be supported by further pathological immunohistochemical studies for confirmation. However, according to current literature, the first choice in treatment is surgical excision instead of hormonal treatment.[17] In our clinical practice, we also prefer surgical treatment over medical treatment in cases of scar endometriosis. There are also studies reporting that ultrasound-guided and magnetic resonance-guided high-intensity focused ultrasound are effective and safe in the treatment of abdominal wall endometriosis.[18] Howe-

ver, more randomized controlled studies are needed to clearly demonstrate this new treatment method. The postoperative recurrence rate in scar endometriosis has been reported as 4.5%-11.2%.[19] In our study, recurrence was detected in 4 patients (12.5%). Additionally, there are publications indicating a slight risk of malignancy in scar endometriosis. Although the disease evolves slowly (with an average time of 19.3 years between the initial surgery and the diagnosis of endometriotic malignant transformation), scar endometriosis has been reported to have a very poor prognosis for malignant transformation, with clear cell carcinoma being the most common (66.7%).[20] Therefore, it is recommended to excise the lesion with an appropriate margin of resection according to the extent of the lesion.

The strength of our study is its comprehensive nature, demonstrating a long period in a tertiary center. However, the retrospective design and the lack of immunohistochemical studies in the tissue are limitations of our study.

Conclusion

In conclusion, scar endometriosis following cesarean sections is becoming an increasingly serious health concern with the rising incidence of cesarean deliveries. The scar endometriosis can be seen earlier and more severely in cases with multiple C/S and it is seen more frequently in the right corner, which is the side of the primary surgeon. Based on the implantation theory, we recommend careful washing of the incision corners during cesarean sections to prevent scar endometriosis formation, and the use of separate needles for closing the uterus, fascia, and abdominal wall. We emphasize the importance of complete excision of the lesion with a clean surgical margin during scar endometriosis surgery to prevent recurrence. In order for scar endometriosis treatment to be carried out with non-invasive medical therapy, further immunohistochemical studies are needed to fully elucidate the histopathology of scar endometriosis.

Statements and Declarations

Conflict of Interest: The authors have no conflicts of interest relevant to this article.

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Author contributions: All authors contributed to the study conception and design. İnci Halilzade: Conceptualization, Writing – original draft. Elçin İşlek Seçen: Data curation. Gonca Türker Ergün: Formal analysis. Ayşe Filiz Yavuz: Supervision. The first draft of the manuscript was written by [İnci Halilzade] and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

References

1. Nisolle M, Alvarez ML, Colombo M, Foidart JM. [Pathogenesis of endometriosis]. Gynecol Obstet Fertil. 2007; 35: 898-903.
2. Missmer SA, Hankinson SE, Spiegelman D, Barbieri RL, Marshall LM, Hunter DJ. Incidence of laparoscopically confirmed endometriosis by demographic, anthropometric, and lifestyle factors. Am J Epidemiol. 2004; 160: 784-796.
3. Prescott J, Farland LV, Tobias DK et al. A prospective cohort study of endometriosis and subsequent risk of infertility. Hum Reprod. 2016; 31: 1475-1482.
4. Nominato NS, Prates LF, Lauar I, Morais J, Maia L, Geber S. Caesarean section greatly increases risk of scar endometriosis. Eur J Obstet Gynecol Reprod Biol. 2010; 152: 83-85.
5. Uzuncakmak C, Guldas A, Ozcam H, Dinç K. Scar endometriosis: a case report of this uncommon entity and review of the literature. Case Rep Obstet Gynecol. 2013; 2013: 386783.
6. Buscemi S, Maiorana A, Fazzotta S et al. Scar endometriosis: not a rare cause for a painful scar. Clin Ter. 2021; 172: 129-133.
7. Horton JD, Dezee KJ, Ahnfeldt EP, Wagner M. Abdominal wall endometriosis: a surgeon's perspective and review of 445 cases. Am J Surg. 2008; 196: 207-212.
8. Zhang P, Sun Y, Zhang C et al. Cesarean scar endometriosis: presentation of 198 cases and literature review. BMC Womens Health. 2019; 19: 14.
9. Hirata T, Koga K, Osuga Y. Extra-pelvic endometriosis: A review.

Reprod Med Biol. 2020; 19: 323-333.
10. YoussefAT.Theultrasoundofsubcutaneousextrapelvicendometriosis.JUltrason.2020;20:e176-e180.
11. Pas K, Joanna SM, Renata R, Skręt A, Barnaś E. Prospective study concerning 71 cases of caesarean scar endometriosis (CSE). J Obstet Gynaecol. 2017; 37: 775-778.
12. Benedetto C, Cacozza D, de Sousa Costa D et al. Abdominal wall endometriosis: Report of 83 cases. Int J Gynaecol Obstet. 2022; 159: 530-536.
13. Durairaj A, Sivamani H, Panneerselvam M. Surgical Scar Endometriosis: An Emerging Enigma. Cureus. 2023; 15: e35089.
14. Seckin KD, Kadirogullari P. Is dienogest a convenient treatment option for cesarean scar endometriosis or should it be treated surgically? Eur J Obstet Gynecol Reprod Biol. 2023; 282: 110-115.
15. Dwivedi U, Shukla S, Anand N, Parashar C, Husain N. Scar Endometriosis: Cytological Diagnosis. JNMA J Nepal Med Assoc. 2018; 56: 550-552.
16. Szubert M, Nowak-Gluck A, Domanska-SenderowskaDetal.miR31-3pHasttheHighestExpressionin Cesarean Scar Endometriosis. Int J Mol Sci. 2022; 23.
17. Carsote M, Terzea DC, Valea A, Gheorghisan-Galateanu AA. Abdominal wall endometriosis (a narrative review). Int J Med Sci. 2020; 17: 536-542.
18. Knorren ER, de Ridder LA, Nijholt IM et al. Effectiveness and complication rates of high intensity focused ultrasound treatment for abdominal wall endometriosis: A systematic review. Eur J Obstet Gynecol Reprod Biol. 2024 Mar 26;297:15-23.
19. Marras S, Pluchino N, Petignat P et al. Abdominal wall endometriosis: An 11-year retrospective observational cohort study. Eur J Obstet Gynecol Reprod Biol X. 2019; 4: 100096.
20. Mihailovici A, Rottenstreich M, Kovel S, Wassermann I, Smorgick N, Vaknin Z. Endometriosis-associated malignant transformation in abdominal surgical scar: A PRISMA-compliant systematic review. Medicine (Baltimore). 2017; 96: e9136.