

ORIGINAL ARTICLE

The Clinical Features and Postsurgical Outcomes of Women With Cesarean Scar Endometriosis

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Abstract

Introduction: Cesarean scar endometriosis is a rare form of extra-pelvic endometriosis. The aim of the study was to investigate the clinical and surgical outcomes of patients with cesarean scar endometriosis.

Methods: We collected the clinical, surgical, and follow-up data of patients diagnosed with cesarean scar endometriosis who attended Kartal Lütfi Kırdar Research and Training Hospital, İstanbul, from April 2019 to May 2022.

Results: There were 34 patients with a median age of 32.5 (range: 26-45). All cesarean scar endometriosis was located in the corners of the Pfannenstiel incision: 18 (52.9%) on the left and 16 (47.1%) on the right corners, respectively. Follow-up examination over 32 months revealed that five patients had a recurrence. The median volume of the CSE was 2467.51 mm³ (range: 635.97-56013.3). The mean size on ultrasonography was 26.1 mm. There was a significant improvement in the postoperative VAS scores for dysmenorrhea, non-cyclic pelvic pain, and dyspareunia.

Discussion and Conclusion: This study indicates that surgical excision is the preferred and effective treatment. Postoperative VAS scores for dyspareunia, dysmenorrhea, and non-cyclic pelvic pain were dramatically decreased after surgical treatment.

Keywords: Cesarean scar endometriosis; Cesarean section; Pfannenstiel incision.

Cesarean scar endometriosis (CSE) is defined as the occurrence of iatrogenic endometrial glands and stroma outside the uterus following the cesarean section^[1]. The estimated incidence of CSE varies between 0.03 to 0.45^[2-5]. Different theories and hypotheses have been postulated regarding the pathophysiology of CSE in the literature. The most recognized theory of CSE emerged in 1958 with Ridley and Edwards^[6].

The researchers suggested an explanatory theory (implantation theory) for CSE, where endometrial tissue is inoculated during the surgical procedures on the cesarean incision^[7]. Subsequently, factors such as hormonal, immunologic, environmental, demographic, or menstrual factors lead to high endometrial cellular replication and primitive pluripotent mesenchymal cell metaplasia to form CSE^[8-11].

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The common symptoms of CSE are cyclic pelvic pain, dysmenorrhea, dyspareunia, dysuria, dyschezia, or pain at an incisional location, which worsens during menstrual cycles; however, there may be chronic symptoms^[12]. The clinical diagnosis may be difficult due to the nature of the disease.

To date, there are few studies that have addressed cesarean scar endometriosis, most of which were derived from case reports or case series. In recent years, there has been an increasing interest in this area. Therefore, this study provides an important opportunity to advance the understanding of cesarean scar endometriosis and makes a major contribution to research on CSE by investigating the clinical, surgical, pre-and postoperative (Visual Analogue Scale) VAS scores of patients with cesarean scar endometriosis.

Materials and Methods

The present study was conducted on patients who underwent surgery for cesarean scar endometriosis between April 2019 and May 2022 in the Department of Obstetrics and Gynecology at the Kartal Lütfi Kırdar Research and Training Hospital, a tertiary hospital that also serves as a referral center. Ethical approval was obtained from the Research Ethics Committee of the hospital (Approval number: 2022/514/219/5, 09.02.2022). Written and verbal informed consent was taken from all study participants. The study design conforms to the ethical norms and standards as laid down in the 1964 Declaration of Helsinki and its later amendments.

Abstracted data included patients' demographic characteristics, clinical features, size of the mass, preoperative treatments, operative findings, latency period, length of hospital stay, pre-and postoperative hemoglobin levels, and VAS scores for endometriosis-related symptoms. Inclusion criteria were as follows: (1) patients with a history of cesarean section and the symptoms developed after the operation (2) surgical excision of the mass located at the cesarean scar (Fig. 1), which was confirmed as endometriosis by histopathology. The exclusion criteria were patients with incomplete data.

Ultrasound was performed in all patients suspected of endometriosis in the cesarean scar, while MRI was used in those with cyclical pain or intra-abdominal pathology (Fig. 2).

A detailed questionnaire was used as a data collection tool. All patients received the VAS questionnaire to assess the degree of pain symptoms. All patients who completed the preoperative questionnaire were invited to complete the same questionnaire 3, 6, 12, and 24 months after surgery.



Figure 1. Complete excision of the endometrioid nodule.

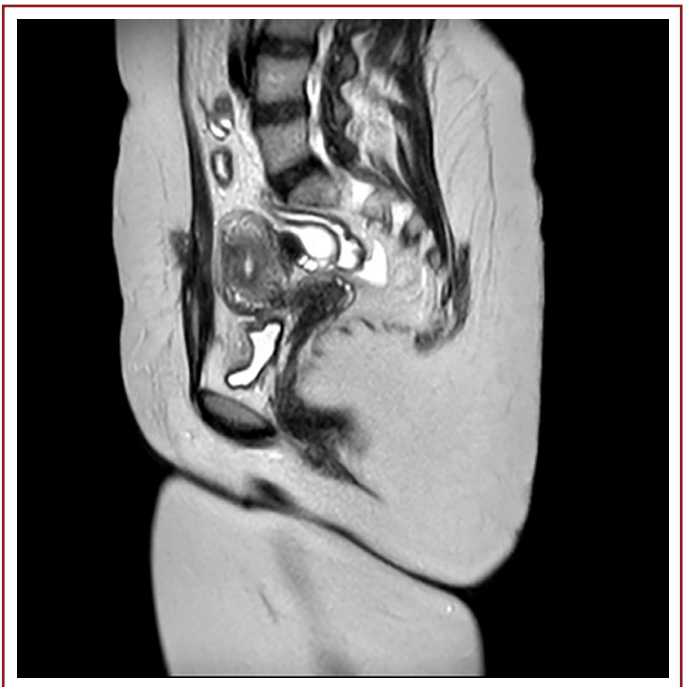


Figure 2. T2-weighted sagittal MRI image demonstrates a lesion located in the cesarean section scar in the anterior abdominal wall.

MRI: Magnetic resonance imaging.

The statistical analysis was performed using SPSS Statistics for Windows, Version 23.0 (IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp). Descriptive data were presented as percentages, numbers, median, maximum, and minimum values. Categorical data were compared using χ^2 or Fisher's exact test, where appropriate. A p-value of less than 0.05 is considered statistically significant.

Results

A total of 34 patients with a median age of 32.5 (range: 26-45) were included in the study. All the patients had undergone cesarean section and had a nodular mass in or adjacent to the Pfannenstiel incision scar. The gravity of patients was 2 (range: 1-5). The length of hospital stay ranged from one to four days. The interval between the surgery and the onset of symptoms was 5.3 years. All CSEs were located in the corners of the Pfannenstiel incision: 18 (52.9%) on the left and 16 (47.1%) on the right corners, respectively. Follow-up examinations over 32 months revealed that five patients had a recurrence. All patients underwent surgical excision of endometriosis with approximately 1 cm of the peripheral tissue. Additionally, dual mesh repair was performed in 3 (8.8%) patients, hernia repair in 1 (2.9%) patient, and left salpingectomy in 1 (2.9%) patient, respectively. The median volume of the CSE was 2467.51 mm³ (range: 635.97-56013.3). The mean size on ultrasonography was 26.1 mm. Baseline characteristics of the patients are shown in Table 1. There was no significant difference in the comparison of the patients' characteristics according to the scar endometriosis side (Table 2). There was also no significant difference in the VAS scores of the endometriosis-related symptoms in terms of the side of scar endometriosis (Table 3). There was a significant improvement in the postoperative VAS scores for dysmenorrhea, non-cyclic pelvic pain, and dyspareunia (Table 4).

Discussion

CSE is a rare gynecological condition due to iatrogenic endometrial seeding in the incision during cesarean section intervention. The present study found no significant differences in any demographic or clinical parameters among the sides of the cesarean site endometriosis. Postoperative VAS scores for dysmenorrhea, non-cyclic pelvic pain, and dyspareunia significantly decreased after surgical removal of the endometriosis.

The pathophysiological mechanism of CSE is not fully understood. So far, various theories have been put forward, including "implantation theory, the coelomic metaplasia theory, cell immunity change theory, and the lymphatic

Table 1. Baseline characteristics of the patients

Characteristics	n	Median (min-max)	%
Marital status			
Married	30		88.2
Single	4		11.8
Comorbidity			
None	23		67.6
Hypothyroidism	4		11.8
Hepatitis B	2		5.9
Rheumatoid arthritis	1		2.9
Panic attack	1		2.9
Coagulation disorders	1		2.9
Chronic renal failure	1		2.9
Asthma	1		2.9
Education status			
Primary+secondary	11		32.4
High School	14		41.2
University	9		26.5
Surgical procedure			
Excision	29		85.3
Excision+dual mesh	3		8.8
Excision+Hernia repair	1		2.9
Excision+left salpingectomy	1		2.9
Drain			
No	31		91.2
Yes	3		8.8
Location of scar endometriosis			
Left	18		52.9
Right	16		47.1
Age (years)		32.5 (26-45)	
BMI (kg/m ²)		27.45 (18.42-46.61)	
Gravity		2 (1-5)	
Parity		2 (1-4)	
Volume of the lesion (mm ³)		2467.51 (635.97-56013.3)	
Length of hospital stay (day)		1 (1-4)	
Hemoglobin			
Preoperative		12.3 (9.5-15.3)	
Postoperative		11.4 (8.6-13.7)	

Values are given as median (minimum-maximum) or as number (percentage). BMI: body mass index.

or hematogenic dissemination theory"^[13,14]. The widely recognized theory was the direct implantation theory; live endometrial cells are seeded into the scar of previous c-sections, especially corners of the Pfannenstiel incision. It is difficult to explain the pathophysiology with the implantation theory alone, given the low incidence of CSE, reports on cases of male patients with this disease, and patients with no history of previous surgery^[15,16]. Although contamination of endometrial cells to the incision during cesarean deliveries is common, CSE is a rare entity. Multiple

Table 2. Comparison of patients' characteristics according to the side of scar endometriosis

	Left		Right		p
	n	%	n	%	
Age (years)	34.5 (26-45)		31 (26-42)		0.088
BMI (kg/m ²)	27.6149 (18.42-38.29)		26.6693 (18.65-46.61)		0.506
Gravity	2 (1-5)		2 (1-5)		0.463
Parity	2 (1-4)		2 (1-3)		0.878
Volume of the lesion (mm ³)	2460.192 (636-11480.9)		2474.9 (836.8-56013.3)		1.000
Length of hospital stay (day)	1 (1-3)		1 (1-4)		0.347
Drain placement	0	0	3	18.8	0.094
Infertility	1	5.6	3	18.8	0.323
Marital status					
Married	15	83.3	15	93.8	0.604
Single	3	16.7	1	6.3	
Education status					
Primary+secondary	6	33.3	5	31.3	1.000
High School	7	38.9	7	43.8	
University	5	27.8	4	25	
Comorbidity					
None	13	72.2	10	62.5	0.884
Hypothyroidism	2	11.1	2	12.5	
Hepatitis B	1	5.6	1	6.3	
Rheumatoid arthritis	0	0	1	6.3	
Panic attack	0	0	1	6.3	
Coagulation disorders	0	0	1	6.3	
Chronic renal failure	1	5.6	0	0	
Asthma	1	5.6	0	0	
Symptoms					
Dysmenorrhea	16	88.9	15	93.8	1.000
Noncyclic pelvic pain	13	72.2	13	81.3	0.693
Chronic pelvic pain	7	38.9	5	31.3	0.729
Dyspareunia	11	61.1	8	50	0.730
Cyclic dysuria	4	22.2	7	43.8	0.274
Cyclic dyschezia	7	38.9	7	43.8	1.000
Constipation	6	33.3	4	25	0.715
Diarrhea	3	17.6	1	6.3	0.601
Surgical procedure					
Excision	16	88.9	13	81.3	0.576
Excision+dual mesh	1	5.6	2	12.5	
Excision+hernia repair	0	0	1	6.3	
Excision+left salpingectomy	1	5.6	0	0	
Endometrioma					
No	17	94.4	16	100	1.000
Yes	1	5.6	0	0	
Preoperative treatment					
NSAII	7 (1-36)		11 (1-36)		0.696
Visanne	1 (1-12)		1 (1-2)		0.857

Values are given as median (minimum-maximum). BMI: body mass index; NSAII: Non-steroidal anti-inflammatory drug.

Table 3. Comparison of endometriosis-related symptoms according to laterality

	Left	Right	p
Duration of symptoms (months)			
Dysmenorrhea	12 (3-180)	24 (3-132)	0.021
Noncyclic pelvic pain	12 (2-180)	18 (3-132)	0.223
Chronic pelvic pain	12 (3-180)	10 (3-18)	0.876
Dyspareunia	12 (2-84)	21 (1-132)	0.545
Cyclic dysuria	6 (2-12)	12 (3-60)	0.315
Cyclic dyschezia	8 (1-24)	12 (4-60)	0.209
Constipation	8.5 (5-24)	12 (4-60)	0.610
Diarrhea	12 (5-12)	12 (12-12)	1.000
Preoperative VAS scores			
Dysmenorrhea	9 (0-10)	9 (0-10)	0.528
Noncyclic pelvic pain	7.5 (0-10)	9 (0-10)	0.297
Chronic pelvic pain	0 (0-10)	0 (0-10)	0.905
Dyspareunia	4.5 (0-10)	1.5 (0-10)	0.506
Cyclic dysuria	0 (0-8)	0 (0-10)	0.224
Cyclic dyschezia	0 (0-8)	0 (0-10)	0.621
Postoperative VAS scores			
Dysmenorrhea	2 (0-7)	0 (0-9)	0.175
Noncyclic pelvic pain	0 (0-4)	0 (0-9)	0.621
Chronic pelvic pain	0 (0-4)	0 (0-0)	0.798
Dyspareunia	0 (0-10)	0 (0-4)	0.878
Cyclic dysuria	0 (0-2)	0 (0-9)	0.721
Cyclic dyschezia	0 (0-2)	0 (0-3)	0.574

Values are given as median (minimum-maximum). NSAII: Non-steroidal anti-inflammatory drug; VAS: Visual analogue scale.

Table 4. Assessment of symptoms by questionnaire before and 6 months after surgery

	Preoperative	Postoperative	p
Dysmenorrhea. VAS score	9 (0-10)	0 (0-9)	<0.001
Noncyclic pelvic pain. VAS score	8 (0-10)	0 (0-9)	<0.001
Chronic pelvic pain. VAS score	0 (0-10)	0 (0-4)	0.002
Dyspareunia. VAS score	3.5 (0-10)	0 (0-10)	0.001
Cyclic dysuria. VAS score	0 (0-10)	0 (0-9)	0.005
Cyclic dyschezia. VAS score	0 (0-10)	0 (0-3)	0.001

Values are given as median (minimum-maximum). VAS: Visual analogue scale.

other predisposing factors may be considered for the development of CSE^[15,16]. The findings observed in this study corroborate the implantation theory, since all the patients had a history of previous cesarean section.

Cesarean scar endometriosis often affects young women of reproductive age and multipara between 25 and 35^[13,14]. The majority of patients were multipara with a median age of 32.5 years (range: 26-45), which is in agreement with the study conducted by Erdoğan et al.^[17] in 2021, recording a mean age of 31.6±5.9 years and Bektaş et al.'s^[14] study which reported a mean age of 32 years.

Several lines of evidence suggest that the duration between surgery and onset of symptoms ranges from three months to ten years^[18]. In our series, the mean postsurgical period was 61 months. Similarly, in a study conducted by Demiral et al.^[19], it ranged between eight months to five years.

Little is known about recurrence, and it is not clear what factors play a role in the recurrence of CSE. Debate continues about the best strategies for the prevention of possible contamination of endometrial cells in the wound during cesarean section, such as intra-operative irrigation, repairing the uterus outside the abdomen, not using

the same suturing material that was used for the uterine incision to close the abdominal incision site, and the use of a wound edge protector^[20,21]. It is interesting to note that all five recurrence cases of this study had scar endometriosis greater than 30 mm in diameter.

The treatment options for CSE consist of medical treatment and surgical excision of the lesion^[22,23]. In cases where medical treatment fails to reduce the symptoms, surgical intervention, which is curative and effective, may be required^[24]. In our study, almost all patients did not benefit from the medical treatment and were treated surgically. A possible explanation for this might be that the mean size of the CSE was 26.1 mm. This finding broadly supports evidence from previous observations, which showed that medical treatment yielded no benefit for incisional endometriomas over 2 cm^[25].

The definite treatment is surgical excision with clear margins at least 1 cm in the surrounding tissue^[26]. In the event of a large excision, the mesh can be used to prevent incisional hernia^[27,28]. Several studies reported that repairing large post-excisional deficits with mesh is useful in women who desire pregnancy^[29]. In our study, in three cases, the scar endometriosis was repaired with mesh due to extensive wound defects.

One of the more significant findings to emerge from this study was the assessment of pre-and postoperative VAS pain scores. Postoperative VAS scores for dyspareunia, dysmenorrhea, and non-cyclic pelvic pain were dramatically decreased after surgical treatment. Consistent with the literature, this research also confirms that surgical excision is the gold standard treatment approach for scar endometriosis. The present study has several limitations that should be acknowledged. Firstly, it is a small sample-sized single-center experience. Secondly, it is unfortunate that the study is limited by the lack of information on the type of suturing material used in the previous surgeries, layers of closure, and duration of the cesarean section. Further studies, which take these variables into account, need to be undertaken using larger sample sizes to confirm our findings. Notwithstanding these limitations, this work is one of the most comprehensive investigations so far documenting CSE.

Conclusion

This study indicates that surgical excision is the preferred and effective treatment. Postoperative VAS scores for dyspareunia, dysmenorrhea, and non-cyclic pelvic pain were dramatically decreased after surgical treatment. The data provided in this study may guide clinicians in the early diagnosis, prevention, and treatment of the disease.

Ethics Committee Approval: The study was approved the Kartal Dr. Lütfi Kırdar City Hospital Clinical Research Ethics Committee (no: 2022/514/219/5, date: 09/02/2022).

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