ORIGINAL ARTICLE

Abdominal wall endometriosis in Ukraine: A multicenter study

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ABSTRACT

Aim: To estimate the incidence of abdominal walls endometriosis in Ukraine and review the clinical findings, imaging results, and histopathology of patients who have had cesarean scar endometriosis.

Materials and Methods: We performed multicentre retrospective cohort study from January 2020 to December 2024. The study involved 27 hospitals from 10 regions of Ukraine and included 9,157 reproductive women who had a painful mass in their previous abdominal surgery scar area. Definitions of endometriosis were adapted from the WHO.

Results: Among 9,157 patients, 387 (4.2%) abdominal walls endometriosis (AWE) were observed.

Of all cases 82.2% women had cesarean scar endometriosis and 17.8% had scar endometriosis related to gynecologic surgical procedure. The incidence of AWE associated with history of cesarean section, gynecological abdominal hysterectomy and laparoscopic procedures was 6.3%, 2.3%, and 1.2%, respectively. The main symptoms of scar endometriosis were palpable abdominal mass (100%) and cyclic pain (86.8%). The latency period between cesarean section procedure and of cesarean scar endometriosis (CSE) symptom onset was 31.8 ± 23.6 months. The duration between the onset of symptoms of CSE and this surgery was 28.7 ± 25.4 months. The diagnosis of CSE was made through a histopathological examination.

Conclusions: In Ukraine abdominal wall endometriosis (AWE), is a relatively uncommon entity that usually develops at the site of a surgical scar that occurs after obstetric or gynecologic surgeries. In our study the most frequently of all AWE cases was cesarean scar endometriosis.

KEY WORDS: incidence, scar endometriosis, abdominal walls endometriosis, cesarean section, cesarean scar endometriosis, Ukraine

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INTRODUCTION

Endometriosis is a common disease among women worldwide. This disease negatively affects women's reproductive health, leads to a loss of productivity at work and causes significant socio-economic damage. Due to its nonspecific symptoms of endometriosis, misdiagnosis or delayed diagnosis are usually happened which can lead to adverse outcomes including infertility, ectopic pregnancy, and chronic pelvic pain. Despite heightened attention from the scientific community in world, the causes of endometriosis and the pathogenesis of endometriosis has not been fully elucidated to date.

Previous studies have shown that the most common of endometriosis include ovarian endometriomas, superficial peritoneal disease, and deep infiltrating endometriosis [1, 2]. Less frequently, the disease may extend beyond the pelvis (extra-pelvic endometriosis). The extra-pelvic sites of endometriosis include the gastrointestinal tract, urinary tract, upper and lower respiratory tract, umbilicus, inguinal region, and surgical scars of the abdominal wall, and brain [3-6].

According to the literature, in women who had obstetric, gynecological (abdominal hysterectomy or laparoscope) and other abdominal surgical procedures may cause endometriosis [7-10]. Robert Meyer reported that postoperative scar endometriosis, can be caused by the dissemination of endometrial tissue to the wound at time of surgery [11]. According to the literature, abdominal wall endometriosis in women can occur after cesarean section, hysterectomy, salpingostomy, episiotomy, amniocentesis, laparoscopy and other surgeries. The endometrial tissue can be found at the abdominal wall musculature, or most commonly in the subcutaneous tissue [5].

The reason why some women develop postoperative scar endometriosis after surgical procedure do not is not fully understood. According to the literature, the risk factors for scar endometriosis (abdominal wall endometriosis) are not well known, it has been shown that previous cesarean section, is the most common risk factor for this condition [7, 12, 13]. The reported that, the occurrence of scar endometriosis has been increasing together with the increase of cesarean section incidence [14].

Cesarean section is one of the most common obstetric surgical procedures performed on women in Ukraine. However, studies focused on cesarean scar endometriosis have not been conducted in Ukraine. A previous study has focused on the prevalence of surgical site infection associated with Obstetric and gynecological surgical procedures, and surgical site infections as risk for the development of endometriosis [10, 15, 16].

AIM

The aim of this study was to estimate the incidence of abdominal walls endometriosis in Ukraine and review the clinical findings, imaging results, and histopathology of patients who have had cesarean scar endometriosis.

MATERIALS AND METHODS

STUDY DESIGN, SETTING AND PATIENTS

We performed multicentre retrospective cohort study based of surveillance data on endometriosis in 2020-2024. This study was included women with abdominal wall endometriosis. The study involved 27 hospitals from 10 regions (Kharkiv, Kherson, Zaporizhzhia, Odessa, Kyiv, Poltava, Vinnytsya, Lviv, Ternopil, Lutsk) of Ukraine. Inclusion criteria: women who had obstetric, gynecological (abdominal hysterectomy or laparoscope) and other abdominal surgical procedures, and had suggestive symptoms during anamnesis and the presence of abdominal wall close to the surgical scar should raise suspicions of endometriosis. Exclusion criteria: hernia (inguinal or incisional), abdominal wall tumours of other causes, lipomas, haematomas, granulomas, metastases from distant tumours, and desmoid tumours, and women who refused to sign the informed consent form.

DEFINITION

Scar endometriosis, also referred to as abdominal wall endometriosis (AWE) is a disease in which tissue similar to the lining of the uterus (endometrium) grows on the abdominal wall close to the surgical scar. In this study the scar endometriosis was defined as visible evidence of postsurgical residual of unresectable endometriotic lesions. Asymptomatic or latent period was defined as the time interval between the previous surgery and the onset of the symptoms. Cesarean section scar endometriosis is a one form of extra-pelvic endometriosis where endometrial tissue implants in the surgical incision. Endometriosis was identified using Abdominal ultrasonography (USG), computed tomography (CT), magnetic resonance imaging (MRI), and fine-needle aspiration (FNA) biopsy.

DATA COLLECTION

We analyzed the inpatient data medical records patients with scar endometriosis, also referred to as abdominal wall endometriosis (AWE) to identify and describe demographic characteristics, clinical features, types of previous obstetric (cesarean section), gynecological (abdominal hysterectomy or laparoscope) and other abdominal surgical procedures, symptoms at the time of presentation, imaging methods used for diagnosis, including both USG, CT and MRI, and pathology reports, and type of surgery for endometriosis.

ETHICS

The protocol for the study project has been approved by a suitably constituted Ethics Committee of the Shupyk national healthcare university of Ukraine (Kyiv, Ukraine) and that it conforms to the provisions of the Declaration of Helsinki.

Table 1. Characteristics, symptoms, diagnostic tolls, and cesarean scar endometriosis sites of the patients (n=387) in Ukraine (2020-2024)

Variable	CSE	
	n	%
Age of the patients (years), mean ± SD (range)	32.2 ± 3.4 (21.2-43.1)	
Age at cesarean section (years), mean ± SD (range)	27.3 ± 3.1 (19.4-37.1)	
Latency period (months), mean ± SD (range)	31.8 ± 23.6 (3–118)	
Duration between symptoms and surgery (months), mean ± SD (range)	28.7 ± 25.4 (1.5–176)	
Body mass index		
≥ 25	238	61.5
< 25	149	38.5
Parity		
1	346	89.4
2	41	10.6
Number of cesarean section		
1	358	92.5
2	29	7.5
Main complant (symptoms)		
Paniful abdominal mass	387	100.0
Cyclic pain	336	86.8
Noncyclic pain	51	13.2
Swelling	101	26.1
Dysmenorrhea	112	28.9
Onset of complaints		
1 year after the cesarean section	82	21.2
2 years after the cesarean section	204	52.7
3 years after the cesarean section	81	20.9
4 years after the cesarean section	20	5.2
Incision type		
Pfannenstiel	320	82.7
Vertical midline	67	17.3
Scar endometriosis site		
Right side of the scar	205	53.0
Left side of the scar	139	35.9
Middle line of the scar	43	11.1
Prediagnosis		
AWE	332	85.8
Incisional hernia	55	14.2
Radiology diagnostic tools		
USG	387	100.0
CT	92	23.8
MRI	48	12.4
USG-guided needle biopsies	45	11.6
Admission		
Ginecilogy	177	45.7
General surgery	210	54.3
Treatment		
Surgical resection	387	100.0

CSE, Cesarean scar endometriosis USG, Ultrasonography, CT, Computed tomography, MRI, Magnetic resonance imaging
Source: compiled by the authors of this study

STATISTICAL ANALYSIS

In present study, statistical analyses were performed using SPSS Statistics for Windows, Version 20.0. (IBM Corp., Armonk, NY, USA). The demographic and clinical characteristics of women were analyzed using descriptive methods (means, ±). All data are presented as numbers and percentages. $\chi 2$ test was performed to compare the differences between groups for categorical variables. The Cox model calculated 95% confidence interval (CI) of scar endometriosis (abdominal wall endometriosis) in women undergoing obstetric and gynecological, and other abdominal surgical procedures compared to the comparison group. In this study p value <0.05 was considered statistically significant.

RESULTS

The study included 9,157 reproductive women who had a painful mass in their previous abdominal surgery scar area. These patients had 5,047 obstetric (cesarean section), 1,857 hysterectomy and 2,253 laparoscopic procedures. Among 9,157 patients, 387 (4.2%) abdominal walls endometriosis (AWE) were observed. Of all AWE cases 318 (82.2%) women had cesarean scar endometriosis and 69 (17.8%) women had AWE related to gynecologic surgical procedure. The incidence of AWE associated with history of cesarean section, gynecological abdominal hysterectomy and laparoscopic procedures was 6.3% [95% confidence interval (CI), 6.1-6.6], 2.3% (95% CI, 2.1-2.5), and 1.2% (95% CI, 1.1-1.3), respectively. In this study all patients had a history of at least one endometriotic nodule of the abdominal wall, and a histological diagnosis of endometriosis.

The most AWE cases (82.2%, 318/387) was diagnosed in cesarean section scar area. The mean age of the patients with AWE was 32.2 ± 3.4 years (range 21.2-43.1). All patients with AWE had a history of at least one cesarean section procedure. The mean age at cesarean section was 27.3 ± 3.1 years (range 19.4-37.1). The body mass indexes (BMI, kg/m^2) of 61.5% patients with cesarean scar endometriosis were ≥ 25, and those of 38.5% < 25. The mean BMI was 26.95 ± 3.59 kg/m^2 (range from 22.3 to 33.5 kg/m^2). The common complaint of the patients with cesarean scar endometriosis was a palpable mass (100%) under the incision scar and cyclical pain (86.8%). Noncyclic pain was 13.2% patients. Swelling in the incision scar area and dysmenorrhea had 26.1% and 28.9% patients, respectively. In present study the latency period of cesarean scar endometriosis in women ranged from 3 to 118 months, with a mean of 31.8 ± 23.6 months. The duration between the onset of main symptoms of cesarean scar endometriosis and surgery was 1.5–176 (mean 28.7 ± 25.4) months (Table 1).

In this study, a majority (82.7%) of the patients had undergone a Pfannenstiel incision. The vertical midline incision was 17.3% patients. In total, 387 abdominal wall endometriomas associates with cesarean section were excised. A majority of the endometriomas were located in corner sites, including right side of the scar (53%) and left side of the scar (35.9%). Endometrioma in middle line of the scar was 11.1% patients. Table 1 presents the main characteristics, symptoms, diagnostic tolls, and cesarean scar endometriosis sites of the patients.

The latency period between cesarean section procedure and symptom onset was 31.8 ± 23.6 (range 3–118). Latency period based on patients' characteristics, symptoms, and cesarean scar endometriosis sites showed in Table 2.

In present study, of the 387 endometriomas, 89.9% were located between the adipose layer and the fascia layer, and 8.3% were located between the adipose layer and the muscular layer. Only 1.8% of all endometriomas were located between the muscular layer in cesarean section area. All patients who had a painful mass in their previous abdominal surgery scar area underwent preoperative abdominal ultrasound (USG), 23.8% underwent computed tomography (CT), 12.4% magnetic resonance imaging (MRI), and 11.6% received ultrasound-guided needle biopsies (Table 1). In this study, the diagnosis of cesarean scar endometriosis was made through a histopathological examination. All of the patients with cesarean scar endometriosis were treated surgically and endometriomas were excised easily.

DISCUSSION

The aim of this study was to estimate the incidence of abdominal walls endometriosis (AWE) in Ukraine and review the clinical findings, imaging results, and histopathology of patients who have had cesarean scar endometriosis. This study expands upon the previous reports on endometriosis [2, 10] and is the first study to publish incidence of cesarean scar endometriosis (CSE) in Ukraine. In present study, among 9,157 patients, 387 (4.2%) AWE were observed. Of all cases 82.2% women had cesarean scar endometriosis and 17.8% had AWE related to gynecologic surgical procedure. The incidence of AWE associated with history of cesarean section, gynecological abdominal hysterectomy and laparoscopic procedures was 6.3%, 2.3%, and 1.2%, respectively. The main symptoms of AWE were palpable abdominal mass (100%) and cyclic pain (86.8%). The latency period between cesarean section procedure and of cesarean scar endometriosis (CSE) symptom onset was 31.8 ± 23.6 months. The duration between the onset of symptoms of CSE and this surgery was

Table 2. Latency period based on patients' characteristics, symptoms, and cesarean scar endometriosis sites in Ukraine (2020-2024)

Variable	CSE		Latency period	
	n	%	months	median (quartiles)
Age at cesarean section (years)				
≤ 24	99	25.6	24	12–48
25–34	271	70.0	24	12–40
≥ 35	17	4.4	30	10–48
Parity				
Nulliparous	326	84.2	24	12–36
Multiparous	61	15.8	21	6–48
One previous cesarean section				
Yes	53	13.7	24	6–48
No	334	86.3	24	12–36
Dysmenorrhea				
Yes	112	28.9	19	12–36
No	275	71.1	24	12–36
Incision type				
Pfannenstiel	320	82.7	24	12–36
Vertical midline	67	17.3	33	24–60
Location of the scar endometriosis				
Right side of the scar	205	53.0	24	12–36
Left side of the scar	139	35.9	24	12–48
Middle line of the scar	43	11.1	30	24–38
Bound of the endometriomas				
Adipose layer	348	89.9	24	12–39
Fascia layer	32	8.3	24	18–49.5
Muscular layer	7	1.8	48	48–56

CSE, Cesarean scar endometriosis
Source: compiled by the authors of this study

28.7 ± 25.4 months. The diagnosis of CSE was made through a histopathological examination.

According to the literature, pelvic endometriosis in women involves organs or tissues in the located on the outer walls of the uterus, the ovaries, the pelvic peritoneum, and the uterosacral ligaments cavity [1, 2, 10] and extra-pelvic endometriosis involves organs or tissues located outside the pelvic cavity [4-9, 11,12]. Case reports in the literature include findings of extra-pelvic endometriosis in virtually every organ system and tissue in the body, including the CNS, lungs, pleura, heart, diaphragm, gallbladder, liver, small bowel, appendix, colon, rectum, kidney, bladder, ureter, the umbilicus, episiotomy scars, abdominal wall incisions, biceps muscle, bone, and peripheral nerve are other reported sites in the literature. The true prevalence or incidence of extra-pelvic endometriosis is unknown. The literature reports that although endometriosis predominantly involving pelvic structures, extra-pelvic manifestations of endometriosis account for 1–12% of all form (pelvic and extra-pelvic) endometriosis cases, with the abdominal wall representing the most frequent extra-pelvic site [18].

Scar endometriosis, also referred to as abdominal wall endometriosis (AWE) is a disease in which tissue similar to the lining of the uterus (endometrium) grows on the abdominal wall close to the surgical scar. Scar endometriosis is estimated to represent 0.03%-2% of extra-pelvic forms of the disease [19, 20]. In present study, among 9,157 patients, 387 (4.2%) scar endometriosis were observed.

According to the literature, scar endometriosis most commonly arises in or adjacent to surgical scars following obstetric or gynecologic surgery involving laparotomy or laparoscopy [10, 21]. Incidence of scar endometriosis has a very low and varied from 0.03-0.45% [6] to 3.5% [22]. This can be explained due to inconsistent epidemiological data reports and due to

diagnostic difficulties. Kaplanoglu M., et al reported that the incidence of scar endometriosis of 0.03–0.4% following cesarean sections, 1.08–2% after hysterectomies, and 0.06–0.7% post-episiotomy [23]. However, Mishin I, et al [24] and Thanasa A, et al [25] reported that in approximately 20% of cases without a history of abdominal surgery. In our study of all cases 82.2% women had cesarean scar endometriosis and 17.8% had AWE related to gynecologic surgical procedure. The incidence of scar endometriosis associated with history of cesarean section, gynecological abdominal hysterectomy and laparoscopic procedures was 6.3%, 2.3%, and 1.2%, respectively.

According to the literature, scar endometriosis associated with cesarean section in women manifests as a firm, painful lump near the scar that may cause cyclic pain with the menstrual cycle and this symptoms onset usually occurs within three months to 9-10 years after surgery [7, 8, 11,12].

In our study the main symptoms of cesarean scar endometriosis (CSE) were palpable abdominal mass (100%) and cyclic pain (86.8%). The latency period between cesarean section procedure and of CSE symptom onset was 31.8 ± 23.6 months. The duration between the onset of symptoms of CSE and this surgery was 28.7 ± 25.4 months. The diagnosis of CSE was made through a histopathological examination.

STRENGTHS AND LIMITATION

Our report is the first on the diagnosis of extrauterine endometriotic lesions and the prevalence of abdominal wall endometriosis associated with cesarean section in Ukraine. The strengths of our study lay in having included a highly patients who had obstetric and gynecological surgical procedures association with abdominal scar endometriosis. A limitation our study is that the mostly ultrasound (USG) was used of diagnosis. However, using USG alone without a subsequent computed tomography (CT) or magnetic resonance imaging (MRI) would not produce a definitive diagnosis of abdominal scar endometriosis and would involve the risk of missing out other pathologies. Despite the abovementioned limitations, our report contributes to the search for the best approach for pathology of AWE. Further studies be valuable in contributing to findings this study.

CONCLUSIONS

Our study showed that in Ukraine scar endometriosis, also referred to as abdominal wall endometriosis (AWE), is a relatively uncommon entity that usually develops in the skin, subcutaneous tissues, and abdominal wall musculature at the site of a surgical scar that occurs after various obstetric or gynecologic surgeries. Despite its association with prior cesarean section, scar endometriosis in women remains under-recognized. In our study the most frequently of all abdominal endometriosis cases was cesarean scar endometriosis. Abdominal wall endometriosis should be suspected in all women with a history of cesarean section who had palpable, painful abdominal mass associated with the menstrual cycle. Ultrasound (transabdominal) imaging in the clinical setting is a valuable tool to identify endometriotic foci inside the superficial tissues of the abdominal wall. The subcutaneous and intramuscular endometrioses of the abdominal wall are not rare gynecological conditions. The clinically diagnose of cesarean section scar are quite difficult to clinically diagnose if the mass is not easily palpable. The use of computed tomography, magnetic resonance imaging, and fine-needle aspiration biopsy (FNA) may improve the timely diagnosis of ectopic endometriotic lesions associated with cesarean section. Multimodal imaging (USG, MRI, and CT) aids differentiation of scar endometriosis, but histopathology remains definitive. Early diagnosis of scar endometriosis and intervention are paramount to prevent complications, including malignancy. Future studies are needed on the features of endometriotic masses, using with all methods (USG, CT, MRI, and FNA) for screening of the abdominal wall, in the neighboring sites, underlying the cesarean section scar to highlight small non-palpable endometriotic foci.

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CONFLICT OF INTEREST

The Authors declare no conflict of interest

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