

Type of the Paper (Article)

Incidence of abnormal uterine bleeding with uterine scar defect after cesarean section (uterine niche) (Isthmocele)

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Abstract

Introduction: Niche is a long-term complication of Cesarean section (CS), which has sparked growing interest worldwide. Clinical signs are not always present in patients with a niche in their Cesarean scar.

Aim of the study: The study aimed to evaluate the prevalence of uterine niche after CS in women with abnormal uterine bleeding.

Subjects and Methods: The study included nonpregnant women at the reproductive age (20:38 years) who had a CS more than six months ago, between February 2021 to February 2022, and were applied to the gynecology clinic for abnormal uterine bleeding. Transvaginal Ultrasound (TVS) was used to measure the standard scar parameters: residual myometrial thickness (RMT) and the depth and width of the hypoechoic niche.

Results: CS niche was observed by TVS in 23% of women. Postmenstrual spotting was the most common clinical pattern of bleeding found in women with observed niches.

Conclusions: There may be a correlation between CS niche and unexplained abnormal uterine bleeding, especially postmenstrual spotting.

Keywords: Isthmocele; niche; Cesarean section.

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1. Introduction

Over the past two decades, there has been an increase in the number of cesarean sections globally. The percentage of CS reported in the Egyptian Demographic and Health 2014 Survey results were over 60%, which increased by four times the highest

level suggested by the World Health Organization (WHO) (15%) [1].

The interest in researching the complications of CS delivery has increased due to this striking increase in CS rates. The definition of a niche, which mostly refers to a sonographic finding, is: Hypo-echoic

region within the myometrium of the uterine lower segment, showing the myometrium's cessation at the location of a previous CS scar [2-3].

The majority of isthmoceles are typically asymptomatic and discovered by chance during an ultrasound [4]. Dysmenorrhea, dyspareunia, and infertility are the main clinical presentation of niche. They are referred to as the mucus, debris, old blood, and inflammatory cells found in the cesarean scar defect. Infertility and menstruation spotting are the two symptoms of niche that are most frequently reported.

It's possible that the functioning endometrium and inadequate scar contractility are the reasons for abnormal bleeding, and the defective drainage leads to the formation of blood clots in this defect, leading to inter-menstrual bleeding and pelvic pain [5].

2. Subjects and methods

2.1. Subjects

The current prospective cohort study included 100 Patients, who had a previous cesarean section and complained of unexplained abnormal uterine bleeding. All patients were evaluated clinically as well as by TVs.

The study was conducted in obstetrics and gynecology outpatient at Fayoum university hospital in the period from February 2021 to February 2022.

Inclusion criteria

Non-pregnant women within the reproductive age (20:38 years), who had one or more cesarean delivery more than six

Studies found that patients with a cesarean scar defect had a higher incidence of postmenstrual spotting than women without a niche [6-8].

There is debate over the most effective method for identifying and measuring CSD. Morphological defects in the CS scar are best evaluated by TVS, gel or saline infusion sono-hysterography, hysteroscopy, and MRI [9-12].

The extent of the niche, presence of clinical symptoms, secondary infertility, and pregnancy desire are all taken into consideration, while deciding plans to treat the niche [4, 13-14].

The aim of the current study was to assess the prevalence of uterine niche with abnormal uterine bleeding in women after cesarean section.

months ago, and those suffered from abnormal uterine bleeding were included in the current study.

Exclusion criteria

Exclusion criteria included patient refusal, general causes of abnormal uterine bleeding (coagulation disorders), organic causes of abnormal uterine bleeding (uterine, ovarian, cervical, or others), or hormonal causes of abnormal uterine bleeding like hormonal contraceptive method. Besides, the usage of IUD and patients with a previous history uterine surgery, other than cesarean section, were excluded, as well.

2.2. Study design

Medical History

Full medical histories, which focused on menstrual, obstetric, and contraceptive usage were reported.

Clinical examination

That included general examination, abdominal examination with special emphasis on the presence of scar site and related tenderness, and local examination, including speculum examination for any cervical abnormalities and bimanual examination to assess the uterine size, position, and any adnexal masses.

Transvaginal sonography

The examination was performed during post menstrual period. We used (Philips Medical Systems) ultrasound machine with a 2D endovaginal probe (a frequency of 9.3 MHz) and a transabdominal probe (a frequency of 7 MHz).

The uterus was examined in longitudinal and transverse sections, and the uterus' position, width, thickness of the endometrium, and the existence of intracavitary collection were all documented. The uterus was evaluated for a cesarean scar defect, which appeared as an anechoic area within the region of the scar of previous CS with at least 1-mm depth [15].

3. Results

In the current study, 100 patients with a previous history of cesarean section and complaining of abnormal uterine

If a CSD was found, the width (the widest space along the cervicoisthmic canal), the depth of the defect (distance between the base and apex vertically), and RMT were measured.

2.3. Statistical Methods

Data was collected and coded to facilitate data manipulation and double entered into Microsoft Access, and data analysis was performed using the Statistical Package of Social Science (SPSS) software version 22 in windows 7 (SPSS Inc., Chicago, IL, USA). Simple descriptive analysis in the form of numbers and percentages of qualitative data, and arithmetic means as central tendency measurement, standard deviations as a measure of the dispersion of quantitative parametric data. Independent samples t-test was used to compare quantitative measures between two independent groups. A one-way ANOVA test was used to compare quantitative measures between more than two independent groups of quantitative data. The Chi-square test was used to compare two of more than two qualitative groups. The *P-value* <0.05 was considered statistically significant.

bleeding were recruited. The mean age was 31.5 ± 4.1 years in the range of 24-39 years.

Regarding patients' medical comorbidities, 5% and 7% had a history of diabetes mellitus and hypertension, respectively. Concerning parity, multipara

(P3) patients were the most common in the included women by 46%. Concerning the number of previous cesarean sections, patients with previous 1 CS were the most prevalent at 41%, followed by 29%, 14%, 5%, and 1% for women with previous 2, 3, 4, and 5 CS, respectively (Table 1).

Table 1: Clinical data of the study population.

Variables		Frequency (n=100)
Diabetes millets		5 (5%)
Hypertension		7 (7%)
Parity	P1	21 (21%)
	P2	27 (27%)
	P3	46 (46%)
	P4	5 (5%)
	P5	1 (1%)
Previous CS	1 CS	41 (41%)
	2 CS	29 (29%)
	3 CS	14 (14%)
	4 CS	5 (5%)
	5 CS	1 (1%)

Regarding ultrasound findings, AFV was found in 69%, while RVF uterus was found in 31% of patients. Niche was observed in 23% of patients. Most niches

had a triangular shape in 16% of patients, then semicircular and droplet shapes in 4% and 3% of the study group, respectively (Table 2, Figure 1).

Table 2: Ultrasound findings of the study group.

Variables		Frequency
Uterine axis (n=100)	AVF	69 (69%)
	RVF	31 (31%)
	Uterine niche	23 (23%)
Niche shape (n=23)	Triangle	16 (69.6%)
	Semicircular	4 (17.4%)
	Droplet	3 (13%)

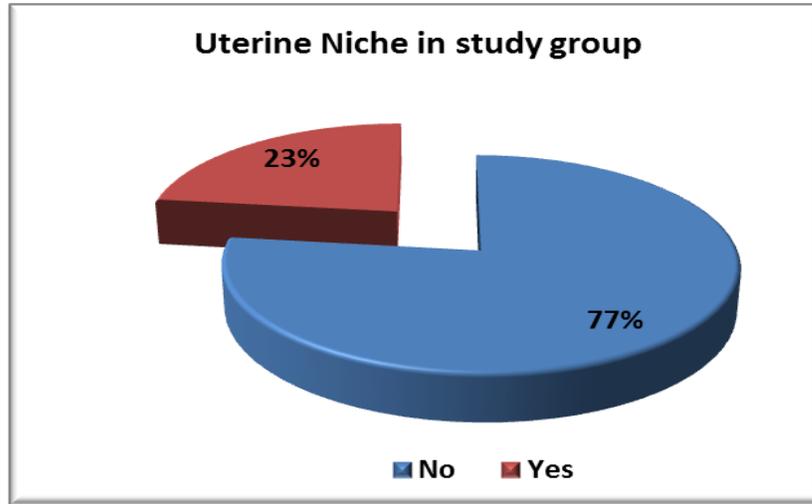


Figure 1: Frequency of uterine Niche by Ultrasound among the study group.

There was a statistically significant difference with ($P < 0.05$) as regards the pattern of abnormal uterine bleeding and associated pain, with a higher percentage of

the Niche group showing postmenstrual spotting pattern of abnormal bleeding (65.2%) and dysmenorrhea (60.9%) (Table 3).

Table 3: Pattern of abnormal uterine bleeding and the associated pain of gynecological origin in niche groups.

Variables	Frequency (n=100)	P-value
Postmenstrual spotting	15 (65.2%)	<0.001*
Prolonged menstruation	2 (8.7%)	
Noncyclic bleeding	6 (26.1%)	0.04*
Dysmenorrhea	14 (60.9%)	
Dyspareunia	7 (30.4%)	
Chronic pelvic pain	2 (8.7%)	

* Significant P- value.

As shown in Table 4, there was a statistically significant difference ($P > 0.05$) between types of uterine niches as regards

patterns of abnormal uterine bleeding and associated pain.

Table 4: Bleeding pattern and associated pain with uterine niche shape in Niche groups.

Variables	Uterine Niche			<i>P-value</i>	
	Triangle (n=16)	Semicircular (n=100)	Droplet (n=3)		
The pattern of abnormal bleeding	Postmenstrual spotting	13 (81.2%)	4 (100%)	2 (66.7%)	0.04
	Prolonged menstruation	2 (12.5%)	0	0	
	Noncyclic bleeding	1 (6.3%)	0	1 (33.3%)	
Associated pain of gynecological origin	Dysmenorrhea	9 (56.3%)	2 (50%)	3 (100%)	0.4
	Dyspareunia	6 (37.5%)	1 (25%)	0	
	Chronic pelvic pain	1 (6.3%)	1 (25%)	0	

* Significant *P- value*.

As shown in Table 5 and Figure 2, there was a statistically significant difference ($P<0.05$) between cases with postmenstrual spotting and without as regards length, depth, width, and RMT of

the niche with a higher percentage of postmenstrual spotting group showing higher length, depth, and width and lower RMT.

Table 5: Comparisons of length, width, depth, and RMT of the niche in relation to the presence of postmenstrual spotting or not among niche groups.

Variables	Postmenstrual spotting	No postmenstrual spotting	<i>P-value</i>
Length	9.21±3.2	5.31±2.3	<0.001*
Depth	6.85±2.95	3.31±1.1	<0.001*
Width	16.01±3.85	9.75±1.69	<0.001*
RMT	2.49±1.2	6.65±3.24	<0.001*

* Significant *P- value*.

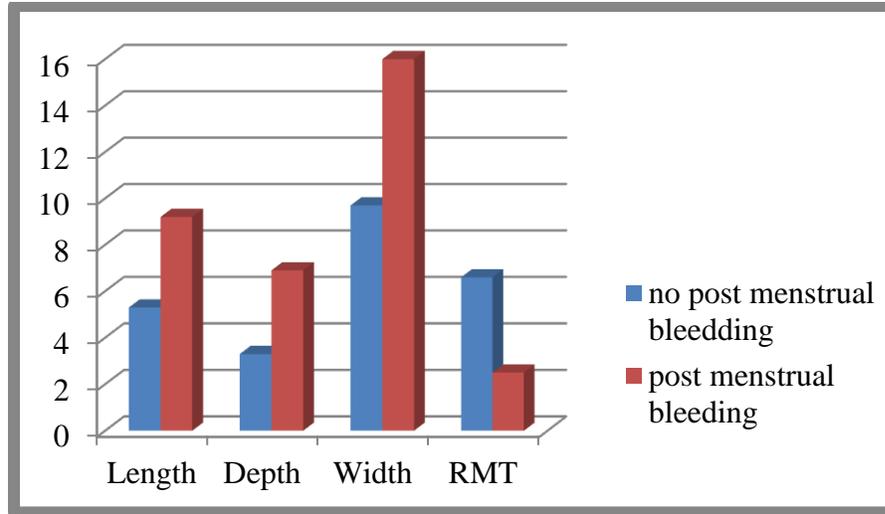


Figure 2: length, width, depth, and RMT of the niche in relation to the presence of postmenstrual spotting.

4. Discussion

The definition of a niche, which mainly refers to a finding in Ultrasound, is Hypo-echoic area within the myometrium of the uterine lower segment, revealing the myometrium's cessation at the location of a previous CS scar [2,3].

According to the results of our study, there was statistical significance ($P < 0.05$) in a study group with a niche discovered by TVS according to age ($P = 0.002$), parity ($P < 0.001$), number of previous CSS ($P < 0.001$) and duration of abnormal uterine bleeding ($P < 0.001$).

In a previous study documented by Talamonte *et al.*, 2012, on 20 patients with prior CS, most of the cases diagnosed with the presence of niche were related to a high number of prior CS ($P = 0.03$). That agreed with the results of our study as most of the women with niche were with a high number of previous CS ($P < 0.001$), which was statistically significant. That illustrated the

relation between the previous CS number and the formation of cesarean scar defect.

The current study included 100 patients with previous cesarean sections and complaining of AUB. TVS was performed for all patients and revealed the prevalence of the CS niche in 23 women (23%).

In a study conducted by Bij de Vaate *et al.*, 2011, on 225 patients with a previous history of cesarean section examined for disorders of menstruation, CS niche was detected by TVS in 54 women (24%), and the definition of the niche was an anechoic region at the line of the CS scar with at least 1mm depth [2].

Another prospective study, in which the examination was conducted six months after a cesarean section, showed the incidence of the niche of 22.4% with TVS [16]. That agreed with the results of our study, which reported the prevalence of the CS niche detected by TVS was 23%. The

difference in prevalence percentage was dependent of different sample sizes.

In a study performed by Vikhareva Osser *et al.*, 2010, on 108 patients with prior CS examined for menstrual disorders of menstruation, the reported prevalence of CS niche by TVS was 70%, and the definition of the niche was any indentation or other discontinuation in the scar line. That disagreed with the results of the current study, which might be attributed to variations in the niche definition, time of the scan by Ultrasound, ultrasound machines, operator experience, and the technique of closure of the uterine incision in cesarean section [17].

In our study, there was a statistically significant difference ($P < 0.05$) as regards the type of abnormal uterine bleeding and associated pain with a higher percentage of postmenstrual spotting pattern of abnormal bleeding (65.2%) and dysmenorrhea (60.9%).

In a previous study on 207 women with prior CS performed by Wang *et al.*, 2009, to evaluate the prevalence of clinical symptoms related to niches within the cesarean scar, the most common clinical presentation was postmenstrual spotting found in 63.8% (131/207) of patients ($P < 0.001$). That agreed with the results of our study that reported postmenstrual spotting was found in 65.2% (15/23) of patients with niche observed by TVS ($P < 0.001$), which was statistically significant and reveals an association between CS niche and postmenstrual spotting [8].

In the study performed by Wang *et al.*, 2009, the main reported gynecological symptom was dysmenorrhea (53.1%) ($P <$

0.001). That agreed with the results of our study that revealed the main gynecological symptom was dysmenorrhea (60.9%) ($P < 0.001$). That illustrated the relationship between CS niche and dysmenorrhea and chronic pelvic pain [8].

Bij de Vate *et al.*, 2011, illustrated that the most common niche shape was semicircular [2]. In our study, a triangular niche was the most common shape, followed by a semicircular shape in 69.6% and 17.4% of patients, respectively. The spotting post menstruation was more strongly associated with the shape of the semicircular scar defect than with other shapes. That might be explained by the high volume of the defect in the semicircular scar shape.

Our study considered that three parameters (scar length, depth, and width) had a high correlation with the development of postmenstrual spotting. It was noted that the high prevalence of postmenstrual spotting in the niche group was related to an increase in the defect's length, depth, and width. Postmenstrual spotting was correlated with niche volume, according to several earlier studies [2, 11]. In the current study, lower RMT was more frequent in patients with postmenstrual spotting.

Previous studies concluded that one of the main parameters that correlate with menstrual bleeding was RMT at the scar of the cesarean section. Large niches were defined as those that had residual myometrium that was less than 50% the thickness of the adjacent myometrium. Postmenstrual spotting would develop due to decreased myometrial thickness and decreased contractility caused by fibrosis within the defect [11, 18].

Conclusion

CS niche was observed by TVS in 23% of women. Postmenstrual spotting was the most common clinical pattern of

bleeding found in women with the observed niche. Therefore, there may be a correlation between CS niche and unexplained abnormal uterine bleeding, especially postmenstrual spotting.

Acknowledgment

The authors would like to acknowledge all doctors and staff of the

department of obstetrics and gynecology, Fayoum University Hospital, for their sincere support and help that was done. Also, the confidentiality of their information and their right not to participate in the study.

Ethical approval and consent to participate:

That study was reviewed by the Faculty of Medicine Research Ethical Committee. The researcher informed the participants about the objectives of the study, the examination, and the investigation

Funding: This research is not funded.

Conflicts of Interest: All authors declare no conflict of interest.

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