

A PROSPECTIVE STUDY ON UNUSUAL UTERINE HAEMORRHAGE IN CONJUNCTION WITH CAESAREAN SCAR DEFECT: A PROSPECTIVE COHORT STUDY.

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ABSTRACT

Introduction:

A long-term Cesarean section (CS) issue that is gaining increased attention globally is called niche. Not all individuals whose surgical scar from a C-section has a niche have clinical symptoms. The purpose was to evaluate uterine niche predominance in women who experienced abnormal uterine bleeding following C-section.

Method:

For one year, nonpregnant women of reproductive age who underwent an abnormal uterine bleeding diagnosis at the gynecology clinic and had a C-section performed more than six months prior were included in the study. The conventional scar measures, residual myometrial thickness, and the width and depth related to the hypoechoic niche were measured by transvaginal ultrasound.

Results:

By TVS, the C-section niche was found in 23% of females. Among women with identified niches, premenstrual syndrome was the most common prevalent clinical bleeding tendency.

Conclusion:

The CS niche and unexplained abnormal uterine bleeding, particularly postmenstrual spotting, may be related.

Recommendation:

Regarding suggestions for averting scar abnormalities from cesarean sections, more randomized controlled trials to be carried out to assess diverse surgical methods. Currently, there is no solid proof that a single technique of one hysterotomy closure is better than the other to avoid scarring from cesarean sections.

Keywords: Uterine Bleeding, C-Section, Niche

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INTRODUCTION

Globally, the number of cesarean sections performed has increased within the last 20 years [1]. The Egyptian Demographic and Health 2014 Survey states that the percentage of CS was over 60%, which is four times higher than the maximum amount that the World Health Organization (WHO) recommended (15%) [1]. This dramatic rise in CS rates has raised interest in studying the challenges associated with CS delivery. A niche is defined

as a hypo-echoic zone within the uterine lower segment myometrium, indicating the myometrium's termination at the site of a prior scar from a C-section [2, 3]. This definition mostly relates to a sonographic discovery.

Most isthmocèles are usually asymptomatic and only become apparent by accident when doing an ultrasound [4]. The primary clinical manifestation of niche is infertility, dyspareunia, and dysmenorrhea. They are known as inflammatory cells, mucus, debris, and old blood present in the cesarean scar defect. The two most reported symptoms of niche are infertility and menstrual spotting. Aberrant

bleeding is probably caused by a functional endometrium and insufficient scar contractility; also, a deficiency in drainage may result in blood clots forming in this defect, which can cause pelvic pain and intermenstrual bleeding [5]. Research revealed that women without a niche experienced a lower frequency of spotting after menstruation than patients with a cesarean scar defect [6–8]. The best technique for diagnosing and quantifying CSD is up for discussion. The most effective methods for evaluating morphological flaws in the CS scar are MRI, gel or saline infusion Sono hystero-graphy, TVS, and hysteroscopy [9–12].

When determining treatment strategies, factors such as the size of the niche, the existence of clinical signs, the desire to become pregnant, and secondary infertility are all considered [13, 14]. This study aims to prospectively examine the association between isthmocele and post-menstrual spotting within a large, unselected population.

METHODS

Study design:

A prospective cohort study was designed and conducted.

Study setting:

The study was carried out in the outpatient obstetrics and gynecology department of SNMMC Dhanbad, India from January 2022 to January 2023.

Study size:

To reach the final study cohort of 200 participants, a meticulous selection process was employed. Initially, a larger pool of women who had previously undergone cesarean section surgery and subsequently reported instances of unusual, unexplained uterine bleeding were identified. From this initial pool, rigorous inclusion and exclusion criteria were applied to ensure the utmost relevance to the study objectives. These criteria encompassed factors such as the recency of the cesarean section, the nature and persistence of uterine bleeding, and the availability of comprehensive medical records. After a thorough screening process aimed at eliminating confounding variables and ensuring homogeneity within the study group, the target sample size of 200 participants who met the specified criteria for inclusion in the study was successfully reached. This rigorous selection process ensures that the study cohort is both representative and suited for the detailed investigation of uterine bleeding following cesarean section.

Inclusion criteria:

The women in the study's cohort who have attained their reproductive age but are not pregnant, range of 20–38 years, who underwent one or more cesarean sections greater than half a year prior, and who experienced irregular uterine bleeding.

Exclusion criteria:

The patient's rejection for participation, general (coagulation problems), physiological (ovarian, uterine, cervical, and other), or hormonal (hormonal) reasons for irregular uterine bleeding were among the exclusion criteria. In addition, patients who had undergone alternative uterus surgery to a cesarean section or who used an IUD were not included.

Bias:

There was a chance that bias would arise when the study first started, but we avoided it by giving all participants identical information and hiding the group allocation from the nurses who collected the data.

Ethical considerations:

The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

Data analysis:

Detailed medical histories were provided, with particular attention to menstruation, pregnancy, and the use of contraceptives. This included a general examination, an examination of the abdomen with a focus on a scar site and associated warmth, and a local exam that included a bimanual checkup to evaluate the parameters, orientation, and any adnexal mass of the uterus as well as a speculum investigation to check for any cervical abnormalities. The postmenstrual phase was when the examination was conducted. The uterus was inspected in transverse sections and longitudinal, and information was recorded on its position, width, endometrial thickness, and presence of intracavitary collection. A cesarean scar defect was assessed in the uterus; it manifested as an anechoic area at least one millimeter deep within the area where the scar from the prior C-Section had been.

Statistical analysis:

The major outcome measure of the study was the prevalence of postmenstrual spotting, to examine to examine the association between isthmocele and abnormal uterine

bleeding (AUB). The goal of the study was to find a two-fold difference between the groups with and without isthmocele in the occurrence of postmenstrual spotting. The statistical analysis comprised women who at least once filled out the questionnaire. The exclusion of individuals who were pregnant at the time of the questionnaire, had experienced a miscarriage, or had an ectopic pregnancy during the previous two months was necessary to ensure a reliable analysis of the menstrual cycle.

SPSS version 22.0 was used for data analysis. When appropriate, Fisher's exact test or Chi-square was used to evaluate associations between categorical factors and isthmocele, with a significance level of $p < 0.05$. The study also took into account confounding variables such as age, nursing, smoking, BMI, usage of oral contraceptives (progestin plus/or combination), and use of intrauterine devices (IUDs) that release levonorgestrel (LNG) or copper (Cu). Logistic regression multivariate analysis was employed to assess the impact of these variables on the research findings.

RESULTS

Table 1: Background characteristics

Parameters	N =200
Age-years; mean	32.7 ± 4.2
Number of previous CS; median (range)	0 (0-3)
Body mass index; mean	25.6 ± 5.0
Smoking (%)	6.1
Contraception	
No hormonal contraception (%)	65.8
Oral contraception pill (%)	3.5
Progestin-only pills (%)	8.9
Hormonal IUD (%)	14.0
Copper IUD (%)	2.8
Contraceptive implants (%)	1.0
Women in amenorrhea (%)	18.2
Breastfeeding (%)	28.7

Inclusion criteria= Delivery by cesarean section (CS)

Exclusion criteria= uterine anomaly, lack of common language, age under 18

Consent to participate

Consent within 3 days of CS or prior to surgery (elective CS)

Ultrasound assessment 6 months after CS

Electronic inquiry at 12, 13 and 14 months after CS

Data analysis (n=200)

Women excluded:

- Refused to continue the study
- Pregnancy
- vulvodynia

Women excluded:

- Lost to follow-up
- Current pregnancy
- Current miscarriage

Figure 1: Flow chart of study participants.

Table 2: Study population data

Variables		N=200
Hypertension		14
Diabetes millets		10
Parity	1	42
	2	54
	3	92
	4	10
	5	2
Prior C-section	1	86
	2	62
	3	29
	4	16
	5	7

200 individuals who had previously undergone a cesarean section and who reported unusual uterine hemorrhage were included in the current investigation. Within the 24-38 age bracket, the mean age was 31.5 ± 4.1 years. In terms of medical comorbidities, the percentage of individuals with a background of high blood pressure and diabetes mellitus was 5% and 7%, respectively. In terms of parity, multipara (P3) patients accounted for 46% of all the participating women. Patients who had undergone one cesarean section (41%), followed by those who had undergone two C-sections (29%) (Table 1).

In terms of ultrasonography results, 69% of patients had AFV and 31% had RVF uteri. Of the patients, 23% had a niche. In 16% of patients, many of the niches had a triangular shape; in 4% and 3% of the study group,

semicircular and droplet shapes were present respectively (Table 2).

Regarding the irregular uterine bleeding pattern and the pain that accompanied it, there was a statistically significant difference with a significance level of $P < 0.05$. A greater proportion of the Niche group had dysmenorrhea (60.9%) and an abnormal bleeding spotting pattern (65.2%) after menstruation (Table 3).

Table 4 indicates that there was a statistically significant difference ($P > 0.05$) in patterns of aberrant uterine bleeding and related discomfort between the different types of uterine niches.

Table 3: Ultrasound outcomes

Variations		N=200
Uterine axis (N=200)	Uterine niche	46
	RVF	62
	AVF	108
Niche shape (N=46)	Droplet	6
	Semicircular	8
	Triangular	32

Table 4: unusual uterine bleeding pattern and the discomfort

Variations	N=200	P-value
Chronic pelvis pain	4	0.04
Dyspareunia	14	
Dysmenorrhea	28	
Noncyclic bleeding	12	<0.001
Prolonged menstruation	4	
Postmenstrual spotting	30	

Table 5: The form of the uterine niche and the related pain pattern

Variables		Uterine niche			P-value
		Droplet (N=6)	Semicircular (N=200)	Triangle (N=32)	
Associated pain	Chronic pelvis pain	0	2	2	0.4
	Dyspareunia	0	2	12	
	Dysmenorrhea	6	4	18	
Pattern of abnormal bleeding	Noncyclic bleeding	2	0	2	0.04
	Prolonged menstruation	0	0	4	
	Postmenstrual spotting	4	8	26	

Table 6: Difference in the depth, length, width, and RMT of niche between cases with and without postmenstrual spotting

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

Table 5 demonstrates that there was a statistically significant (P<0.05) difference in the length, depth, width, and RMT of the niche between cases with and without postmenstrual spotting. The postmenstrual spotting group had a higher percentage of cases with higher depth, length, and width and lower RMT.

DISCUSSION

A niche is defined as a hypo-echoic spot within the uterine lower segment's myometrium that reveals the myometrium's discontinuity at the site of a prior CS scar. This term mostly relates to an ultrasound discovery [2, 3]. The study's findings showed that in individuals with a niche identified by TVS based on parity (P<0.001) and age (P=0.002), there was statistical significance (P<0.05) for prior CSS (P<0.001) and the length of irregular vaginal bleeding (P<0.001).

Two hundred individuals who had prior cesarean sections and complained of AUB were included in the current investigation. TVS was used for every patient, and 23 women, or 23 percent, had the CS niche present. According to a study by Bij de Vaate *et al.* [2] on 225 individuals who had previously undergone a C-section and were evaluated for menstrual issues. The niche is referred to as an anechoic area at the CS scar's edge that is at least 1 mm deep.

An additional prospective investigation revealed a 22.4% TVS occurrence in the niche, with the assessment taking place six months following having a C-section [15]. This was by the studies' finding, which showed that 23% of the CS niche was commonly found using TVS. The disparity in the prevalence % was contingent upon varying sample sizes. In the defined C-Section every indentation or other was a niche discontinuance in the scar line. According to a report by TVS, the CS niche was 70% prevalent in research conducted by Osser *et al.* [16] on 108 individuals who had previous C-sections investigated for monthly issues related

to menstruation. This contrasted with the findings of the current investigation, which could be explained by differences in the definition of the niche, the duration of the ultrasound scan, the equipment used, the experience of the operator, and the method used to close the uterine scar during a C-section.

According to the research, a higher proportion of dysmenorrhea and irregular bleeding during the postmenstrual spotting pattern was associated with an outcome that is statistically significant ($P < 0.05$) in the form of unusual vaginal bleeding and the discomfort that accompanied it. According to Bij de Vaate *et al.*, [2] semicircular niche shapes were the most prevalent. The most prevalent shape in the study was a triangle niche, which was followed by a semicircular shape and droplet of individuals. The semicircular scar defect's form was more strongly correlated with postmenstrual spotting than it was with other shapes. The significant volume of the semicircular scar's defect could potentially explain that. Three variables- scar width, depth, and length- were found to have a strong link with the emergence of postmenstrual spotting in the investigation. It was observed that a rise in the depth, width, and length of the defect was associated with the unique group's high rate of postmenstrual spotting. Several previous research found a correlation between postmenstrual spotting and niche volume [2, 11]. In the current study, patients who experienced postmenstrual spotting were more likely to have lower RMT.

Previous research found that RMT at the C-section surgical scar was one of those primary characteristics linked with the menstrual flow. The remaining myometrium in large niches was defined as less than 50% of the thickness of the surrounding myometrium [11, 17].

CONCLUSION

TVS observed a CS niche in 23% of the female population. One of the most prevalent clinical hemorrhage patterns among women with the identified niche was postmenstrual spotting. Consequently, there might be a connection between the CS niche and strange irregular uterine hemorrhage, particularly spotting after menstruation.

LIMITATIONS

Limitations of the study are that we need more study population at different intervals to validate our findings and ascertain if these modifications are transient or permanent. It is necessary to investigate the effects of additional potential causes.

RECOMMENDATION

Following confirmation of a niche diagnosis, the patient's goals for future fertility should guide the course of treatment. Regarding suggestions for averting scar abnormalities from cesarean sections, more randomized controlled trials are to be carried out to assess diverse surgical methods. Currently, there is no solid proof that a single technique of one hysterotomy closure is better than the other to avoid scarring from cesarean sections.

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LIST OF ABBREVIATIONS

CS- Cesarean section
WHO- World Health Organization
AUB- Abnormal uterine bleeding
IUDs- Intrauterine devices
LNG- Levonorgestrel

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CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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