Correlation between Cesarean Section Niche Diagnosed by Hysteroscopy and Postmenstrual Bleeding

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Abstract

Background: High rate of cesarean section is accompanied by higher rate of complications. Niche, which is a uterine wall defect is one of these recognized complications. Our study's aim was to find out how common abnormal uterine bleeding is among women who have had caesarean sections.

Subjects and methods: 195 women who had at least one prior cesarean section and complaining of vaginal spotting after the menstrual period admitted at the cytogenetics endoscopic unit, Zagazig University Hospitals.Office hysteroscopy was used to check for the presence of a caesarean section niche in the patients.

Results: By hysteroscopy, there was a statistically significant difference between patients with and without niche regarding age (P value, 0.001), number of previous CSs (P value < 0.001), hypertension (P value <0.001), post-menstrual spotting (P value, 0.002), dysmenorrhea (P value < 0.161) and chronic pelvic pain (P value, 0.547).

Conclusion: There is an association between the number of previous CS and development of a niche.CS niche is linked to dysmenorrhea and chronic pelvic pain.

Keywords: Cesarean Section, NichePostmenstrual Bleeding, Hysteroscopy.

INTRODUCTION

The rate of caesarean sections has risen steadily over the last few decades. From 1990 to 2011, it grew in the United States from 21.1 to 32.8 percent[1].A concerning level also has been reached recently in Egypt with a steady rise in cesarean sections. This rise appears to be linked to an increase in the use of private health care facilities for delivery. CS deliveries require increased vigilance, especially from the private sector[2].

CS-related complications have increased in tandem with the rising rate of the syndrome.Isthmocele, also known as a niche, is a uterine wall defect that can occur as a result of a CS scar. It has been linked to gynecological procedure complications, poor pregnancy outcomes and clinical symptoms like post menstrual spotting[3].

Women with abnormal uterine bleeding (AUB) have a higher prevalence of niches, which is a common symptom associated with niche presence, including prolonged menstruation or postmenstrual spotting [4].

The scar of section superior edge thickness or mechanical obstruction could explain this post menstrual bleeding orcould be attributed todiverticular blood accumulation. Others think it's a result of scar tissue retracting in the lower segment dilation of the lumen,in the upper part of which growth is constrained by thickening of the myometrium and endometrium, blocking the area in several degrees. They claim that the causes of these changes are unknown, but it is possible that the healing process on either side of the incision is different [5].With hysteroscopy, the caesarean scar could be visualized in a non-pregnant uterus [1].

SUBJECTS AND METHODS

Ethical considerations

This study was given the green light by the Faculty of Medicine's Institutional Review Board (IRB). Each participant in the study had to provide signed written informed consent before the study could begin. The Declaration of Helsinki, the international medical association's code of ethics for human subjects research, was followed in this investigation.

Sampling

This prospective cross-sectional descriptive study involved 195 females who had at least one previous caesarean section and complained of vaginal spotting following their menstrual period. in the period from January 2019 to March 2020at the cytogenetics endoscopic unit, Zagazig University Hospitals.

Inclusion criteria:

who have undergone previous C-section and now have abnormal uterine bleeding that cannot be explained by any other means ; negative pregnancy test, not using drugs affecting coagulation profile, non-use of IUDs or hormonal contraceptives, as determined by ultrasonography no abnormalities in the pelvis, such as tumors, benign or malignant, evidence of pelvic inflammatory disease, no ovarian cysts or tumors, and no abnormalities in the cervical cavity as the source of bleeding on cervical smears or examination.

Exclusion criteria:

Abnormal endometrial biopsy as: endometrial hyperplasia, uterine pathology that may cause genital bleeding as: uterine polyps, fibroid or adenomyosis, contraindications of hysteroscopy as: active pelvic infection (including genital herpes infection), known cervical or uterine cancer and large uterine cavity longer than 10 cm in length.

Operational Design

All Patients were subjected to:

Personal history   including, History of menstruation (regularity, amount, duration, dysmenorrhea, and the date of the last normal menstrual period) (LNMP), History of pregnancy (Gravidity, parity, abortion, mode of delivery), Medical history, surgical history, and drug intake history, Endocrine disease in the family history.

Comprehensive blood work, liver and kidney function tests, coagulation profile checks, hepatitis B surface antigen checks, and anti-HBsAg tests were all performed.

Patients were investigated for the presence of cesarean section niche using the office hysteroscopy:

Office hysteroscopy was carried out on all patients by the same hysteroscopist to exclude bias and it was performed in the proliferative phase of menstrual period. Hysteroscopes were used in this study that had an outer sheath of 5 mm (Office hysteroscope with a 30° fore-oblique lens; Wisap, Uber CCD camera with a focal length ranging from 70-140mm) and were introduced without anesthesia or analgesia using a non-touch technique. hysteroscopic examination was performed by vaginoscopic approach without the use of tenaculum or cervical dilatation while the patients were in dorso-lithotomy position.

A single chip video was used to monitor the procedure, and the resulting image was displayed on a monitor that was clearly visible to the operator. The panoramic diagnostic hysteroscopy with better visualization and accuracy was performed using the camera fitted on the eye piece, which transmitted the hysteroscopic image that appeared on the monitor.

It began with an examination of the internal os and progressed systemically to evaluate the scar from the previous section in order to find out whether or not a niche was present and how noticeable it was. Visualizing the scar site through the stoma near the internal os began the process of detecting the presence of a caesarean scar.

Importantly, the niche appeared as a depression or diverticulum in myometrium of the scar site with the end cervical canal or above it. There was a Cesarean scar defect that could be seen to see if there was any blood or vascularized tissue within it. Cesarean scar seen by hysteroscopy as one of these types:

1-Smooth cesarean scar: Localized area where there was previously an incision for CS that was pale scarred and thickened with fibrosis.

2-Hypertrophied scar: Similar to a smooth scar, but thicker and more distinct fibrosis.

3-Hypertrophied vascularized scar: looks like a hypertrophied scar, but the surface is littered with tiny blood vessels.

4-Clear niche: Distinguishes itself as a depression or diverticulum in the myometrium at the scar site with thin or no endometrium and clear fluid.

5-Vascularized niche: Looks like a crater filled with blood vessels and capillaries

6-Blood-filled niche: As a scar site depression or isthmocele, it contains abnormal blood that is brownish in color.

The hysteroscopy results were entered. All of the collected information was tabulated and statistically analyzed. The study's primary goal was to find out if niche was common among women who had previously had caesarian section and were experiencing postmenstrual spotting.

Statistical analysis

Stata® 14.2 was used for data analysis (StataCorp LLC, College Station, TX, USA). The Shapiro-Wilk test was used to determine whether the numerical data distribution was normal. The mean and standard deviation (SD) of normally distributed numerical data were calculated

and the unpaired t test was used to compare the differences between groups. Intergroup differences were compared using Fisher's exact test or the chi-squared test for trend using categorical data presented as a percentage or number and percentage (for ordinal data). P-value <.05 was considered statistically significant.

RESULTS

Change in wrinkle degree after treatment:

Table (1) showedthat the patients' age ranged from 24 to 40years with a mean age of 31 (±4) years, multipara (p3) women were the vast majority of the patients by 50.7% of the study group, the highest percentage of patients in this study was 44.6% for patients with previous 1 C.S, followed by 28.2%, 24.1%, 3% for patients with previous 2, 3, 4 CS respectively.

Regarding medical comorbidities of patients, history of DM and hypertension were found in 9.2% and 10.2% of patients respectively

Table (2) and fig. (1)showed that duration of bleeding ranged from 3 to 10 days with a mean 5±2 days, the post menstrual spotting was found in 30.7% of patients, regarding associated gynecological complaints dysmenorrhea, dyspareunia and chronic pelvic pain were found in 51.2%, 22.5% and 26.1% of patients respectively.

Table (3) showed that regarding hysteroscopic findings we observed that: niche was observed in 48.7% of patients, cesarean section scar was found as smooth scar in (51.2%), clear niche in (13.3%), vascularized niche in (26.6%) and blood-filled niche in (8.7%).

Table (4), fig. (2) and fig. (3), showed that there was statistical significance between patients with and without niche observed by hysteroscopy regarding age (P value, 0.001), number of prior CSs (P value < 0.001), hypertension (P value < 0.001), post-menstrual spotting (P value, 0.002), dysmenorrhea (P value, 0.161) and chronic pelvic pain (P value, 0.547).

Table (1): Demographic data of the study population: -

Variable	Value n (%)
Age (years)	31 ± 4 (24 – 40)
Co morbidities	
DM	18 (9.2%)
Hypertension	20 (10.2%)
Parity	
P1	33 (16.9%)
P2	41 (21 %)
P3	99 (50.7%)
P4	17 (8.7%)
P5	5 (2.5%)
Number of CS	
1 CS	87 (44.6%)
2 CS	55 (778uy28.2%)
3 CS	47 (24.1%)
4 CS	6 (3%)

Data are mean ± SD (range) or number (%).

Table (2): Duration and form of abnormal bleeding and prevalence of associated painful disorders:

Variable	Value n (%)
☐ Duration of abnormal bleeding (days)	5 ± 2 (3 – 10)
☐ *Post menstrual spotting*	60 (30.7%)
☐ Associated pain of gynecologic origin	
- *Dysmenorrhea*	100 (51.2%)
- *Dyspareunia*	44 (22.5%)
- *Chronic pelvic pain*	51 (26.1%)

Data are mean ± SD (range) or number (%).

Table (3): Hysteroscopic findings:

Variable	Value n (%)
Niche by hysteroscopy	95 (48.7%)
Evaluation of CS scar by hysteroscopy	
- *Clear scar*	100 (51.2%)
- *Clear niche*	26 (13.3%)
- *Vascularized niche*	52 (26.6%)
- *Blood-filled niche*	17 (8.7%)

Data are number (%).

Table (4): Comparison between patients with and without niche using hysteroscopy:

Variable	No niche by hysteroscopy (n=100)	Niche by hysteroscopy (n=95)	p-value
Age (years)	29.3 ± 3.2	32.0 ± 4.5	**.001**
Parity			.129
P1	16 (16.0%)	17 (17.9%)	
P2	32 (32.0%)	9 (9.47%)	
P3	44 (44.0%)	55 (57.9%)	
P4	8 (8.0%)	9 (9.47%)	
P5	0 (0.0%)	5 (5.2%)	
Number of CS			**<.001**
1 CS	62 (62.0%)	25 (26.3%)	
2 CS	32 (32.0%)	23 (24.2%)	

3 CS	6 (6.0%)	41 (43.1%)	
4 CS	1 (1.0%)	5 (5.2%)	
Associated co-morbidities			
- *DM*	8 (8.0%)	10 (10.5%)	.542
- *Hypertension*	0 (0.0%)	20 (21%)	**<.001**
Duration of bleeding (days)	5.3 ± 1.7	4.9 ± 1.8	.275
Post menstrual spotting	17 (17.0%)	43 (45.2%)	**.002**
Associated painful disorders			
- *Dysmenorrhea*	50 (50.0%)	57 (60%)	**<.161**
- *Dyspareunia*	10 (10.0%)	15 (15.8%)	.226
- *Chronic pelvic pain*	28 (28.0%)	23 (24.2%)	**.547**
Secondary infertility	16 (16.0%)	16 (16.8%)	0.873

Data are mean ± SD or number (%).

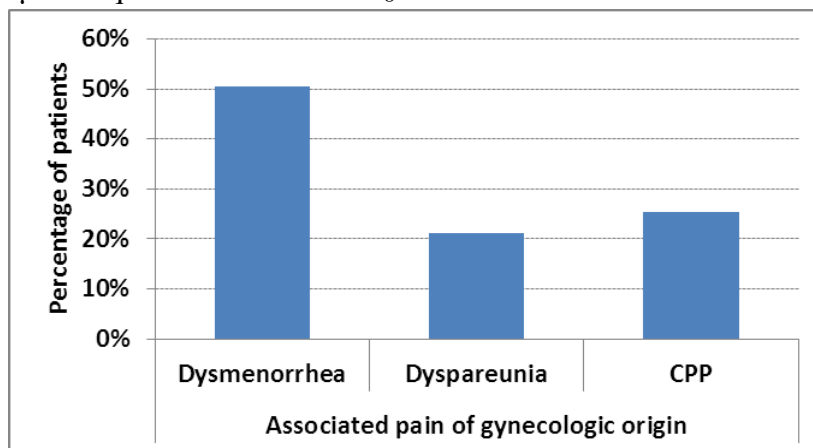†Unpaired t test. ‡ Chi-squared test for trend. § Fisher's exact test.

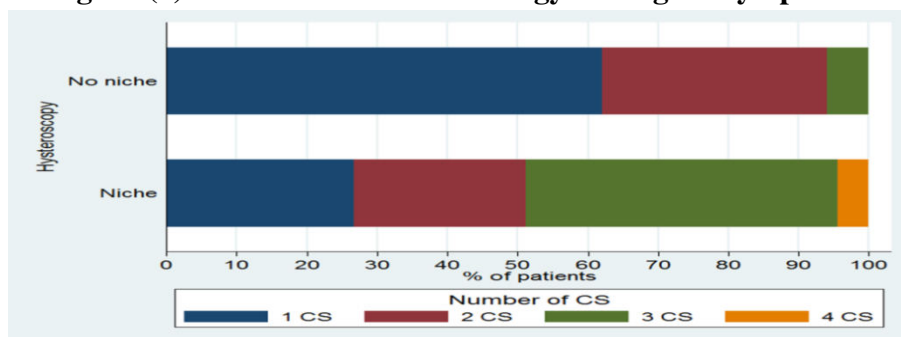**Figure (1):Prevalence of associated gynecological symptoms.**

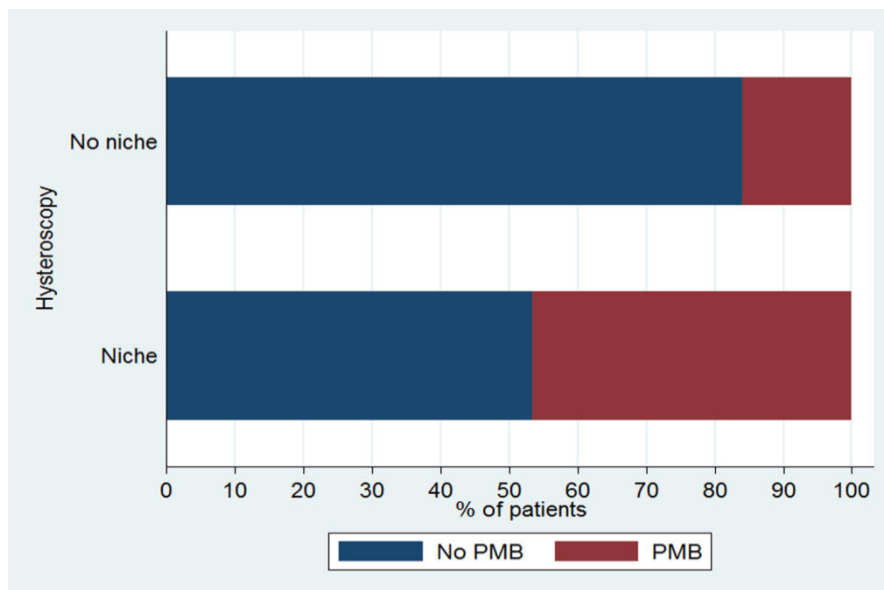**Figure (2):** Number of previous CS in patients with or without niche

Figure (3): Prevalence of Post menstrual spotting in patients with and without niche.

DISCUSSION

A common gynecological problem is abnormal uterine bleeding. This is a problem that affects up to 33% of women who visit gynecological outpatient clinics. This condition has severe social, morbidity, and clinical implications [6].

Caesarean section niche is a defect or a discontinuity in the lower uterine segment's myometrium at the location of a prior CS.As well as abnormal uterine bleeding, Niche can also be linked to symptoms of gynecological disorders like chronic pelvic pain, dyspareunia, anddysmenorrhea[7].

There have been reports of patients with abnormal uterine bleeding after previous caesarean sections, particularly postmenstrual spotting that may be attributed to scar defects left in the uterus as a result of surgery,resulting in a diverticulum, which some authors refer to as an anomaly "isthmocele", and that **Morris** [8].named "**cesarean scar syndrome**" first person to mention this ailment.

Cesarean scar defects can now be diagnosed with hysteroscopy, which also allows for surgical correction [9].

Hysteroscopy was the gold standard test for diagnosing CS niche in this study because of the high prevalence of niche (48.7%).

Regarding results of this study, there was a statistical significance between patients with and without niche observed by hysteroscopy regarding age (P value, 0.001), number of previous CSs (P value < 0.001), hypertension (P value <0.001), post-menstrual spotting (P value, 0.002), dysmenorrhea (P value < 0.161) and chronic pelvic pain (P value, 0.547).

Results of this study showed no statistical significance between patients with and without niche observed by hysteroscopy regarding parity (P value, 0.129), DM (P value, 0.542), prolonged

menstruation (P value, 0.391), dyspareunia (P value, 0.226) and secondary infertility (P value, 0.873).

In a study conducted by**El-Mazny et al.**[10] on 75 women with a previous history of CS who were tested for menstrual problems,in 23 women (31 percent) who underwent hysteroscopy, doctors found evidence of CS niche. That was in line with the findings of this study, which showed that hysteroscopy-detected CS niche prevalence was 47.4 percent. Different sample sizes are to blame for the disparity in prevalence percentages.

In a study conducted by **Borges et al.**[11]for a total of 43 women who had previously been diagnosed with CS and had complained of irregular uterine bleeding,CS niche was found to be prevalent by hysteroscopy in 88% of women. This contradicts our study's findings, which could be explained by differences in population characteristics such as sample size, age group, the number of prior caesarean sections, and other factors that exacerbate the development of CS defects. (e.g.,level of the uterine incision, uterine closure method, and wound healing factors).

In a study conducted by **Talamonte et al.**[5]they reported that postmenstrual bleeding was found in 20 women with prior CS who underwent hysteroscopic examination for this condition, most of patients with scar defect were with **two** previous CS (50%) and three previous CS (22.2 %), (P-value, 0.03). Patients with three prior CS (43.1 percent) (P-value 0.001), which was statistically significant, were more likely to have niche, according to the findings of our investigation. This emphasizes that there is an association between the number of previous CS and development of a niche.

When **Wang et al.** [12]studied 207 women who had previously undergone caesarean section delivery to find out the prevalence of clinical symptoms related to caesarean scar defects,63.8% (131/207) of patients (P = 0.001) had postmenstrual spotting as their most common clinical symptom. This was in agreement with the findings of this study, which found postmenstrual spotting in 44.2% (21/45) of niche-observed patients during hysteroscopy (P value, 0.002), to show that CS niche and PMS are linked, and this was statistically significant.

Dysmenorrhea (53.1 percent), chronic pelvic pain (369.9 percent), and dyspareunia were the most commonly reported gynecological symptoms in the study by **Wang et al.** [12](18.3 percent) (P values were 0.001, 0.001, and 0.686, respectively).According to the findings of this study, the most commonly reported gynecological symptoms were dysmenorrhea (60 percent), chronic pelvic pain (15.8 percent), and dyspareunia (24.2 percent). CS niche is linked to dysmenorrhea and chronic pelvic pain, as evidenced by this finding.

According to the findings of the **Talamonte et al.** [5]study, 13% of women with hysteroscopically detected CS defects also experienced secondary infertility (p value, 0.66).This was in agreement with the findings of this study, which found secondary infertility in 16.8% of hysteroscopy-observed niche patients, (P value, 1.0) which was not statistically significant.

CONCLUSION

There is an association between the number of previous CS and development of a niche. CS niche is linked to dysmenorrhea and chronic pelvic pain.

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