



REPRODUCTIVE CONSEQUENCES FOLLOWING LAPAROSCOPIC REMOVAL OF SYMPTOMATIC NICHES IN UTERINE CAESAREAN SCARS

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Abstract

Background: Caesarean section rates had raised recognition of related problems, including the development of a caesarean scar niche. Niches could be related to subfertility and poor reproductive results. Laparoscopic resection of niches is widely accepted.

Purpose: To assess reproductive results 2 years following laparoscopic niche resections on females with an intention to become pregnant.

Methods: This prospective cohort study included (80) women with an intention for pregnancy who underwent a laparoscopic niche resection from July 2018 to July 2021 were involved. A laparoscopic niche resection has been carried out with hysteroscopic instructions. The ongoing pregnancy rate was the 1ry result. Secondary outcomes included live birth rate, miscarriage rate, and ectopic pregnancy

Results: The majority (72.5%) of the females surveyed stated postmenstrual spotting, while 31.25% revealed dysmenorrheal. There were statistically significant variances between women with and without infertility regarding parity, previous failed ART ($p < 0.001$), and the existence of intrauterine fluid ($p = 0.03$). At the 2-year follow-up, 47/80 (58.75%) of the women were pregnant, 38/80 (47.5%) of the women had live births. The total group's mean RMT increased from 2.74 ± 1.3 at baseline to 6.64 ± 0.28 ($p < 0.01$). The average depth of the niche lowered from 14.14 ± 12.25 to 8.42 ± 1.13 ($p < 0.01$).

Conclusions: The reproductive results in females with and without prior infertility issues who go through resection of a large niche are very announcing and comparable in both populations.

Keywords: Caesarean scar, Infertility, Laparoscopic resection, Niche

Introduction

The most common consequence of caesarean sections (CSs) is a caesarean scar defect. This defect, additionally known as "isthmocoele," develops after the myometrium fails to heal (Antila-Långsjö et al., 2018).

Uterine niche is an accidental pouch-like defect that develops at the location of an older caesarean scar because of poor tissue healing. Other phrases utilized include uterine isthmocoele, uterine dehiscence, caesarean scar defect, and diverticulum. The niche can be described radiologically as a hypoechoic, triangular or anechoic area at the scar location. It was additionally characterized as a minimum two mm-deep grooves in the myometrium (Kulshrestha et al., 2020). Postmenstrual spotting and prolonged menstruation are among the less well-documented long-term gynecological

symptoms of caesarean scar niche (van der Voet et al., 2014). Niches may lead to 2ry infertility, endometriosis, and difficulties of gynecological operations such as embryo transfer (Vissers et al., 2020).

Several hypotheses had been proposed to clarify the negative impact of a niche on the results of reproduction. Poor spermatozoa penetration and embryo implantation can occur because of accumulation of fluid in the uterus or disrupted subendometrial peristalsis in a specific niche (Vissers et al., 2020b).

Multiple choices for management, such as laparoscopic and hysteroscopic ablation, vaginal repair, combined oral contraceptives (COCs), and levonorgestrel intrauterine system, have been examined, suggesting efficiency in shortening the menstrual cycle in symptomatic cases, with the exception of levonorgestrel intrauterine system (Zhang et al., 2016).

In most women, a laparoscopic niche resection decreased postmenstrual spotting, spotting-related discomfort, dysmenorrhea, and the existence of intrauterine fluid while increasing residual myometrium (Vervoort et al., 2018).

The present research aimed to assess reproductive results 2 years following laparoscopic niche resections on females with an intention to become pregnant. Results were presented distinctly for those who had or did not have infertility at baseline.

Patients and methods:

This prospective cohort research has been conducted at Omomah center for laparoscopic surgery. Women with an intention for pregnancy who had a laparoscopic niche resection from July 2018 to July 2021 were involved.

Women with a niche, residual myometrium less than 3 mm determined by sonohysterography, and any or all of the next difficulties were eligible for the study. Referrals to our clinic may include postmenstrual spotting, midcycle intrauterine fluid collection throughout the fertility analysis, or challenges with an earlier embryo transfer and preference for surgical treatment due to accessibility of the uterine cavity for an embryo transfer catheter, especially in excessive retroflected uteri. Patients were excluded if they were under 18 years old, pregnant, with restrictions for general anesthesia, assumed tumors, uterine or submucosal fibroids, cervical polyps, cervical dysplasia, unusual endometrial cells, pelvic or cervical infection, or hydrosalpinx. Females have been made aware about the exploratory nature of the procedure before surgical treatment and provided informed consent.

Intervention

A laparoscopic niche resection has been carried out with hysteroscopic instructions. Following bladder dissection, the niche has been created at the the lightest location of the residual myometrium. The niche has been cut to eliminate all scar tissue and accomplish equal thickness on the uterine wound surfaces. The uterine wound has been sealed in 2 layers with single multifilament, resorbable intracorporal knotted sutures. An adhesive barrier (Hyalobarrier©, Nordic Pharma) was put on to the uterine wound. If the uterus remained in a broad retroflected location following closure, the round ligaments were shortened.

Ultrasound assessment

Sonographers with experience in niche assessment examined uterine scar integrity, location, fluid existence, and niche characteristics at baseline and 3 months following laparoscopic niche resection via transvaginal ultrasound. The niche has additionally been determined in the transverse plane, at its widest point. Niche assessment was done at the exact same time as regular postoperative visit at a three-month monitoring.

Post-operative instructions

All women, regardless of earlier reproduction situation, were informed to utilise contraception for the initial 6 months after niche resection to provide time for uterine recovery and following

pregnancy. Following surgical procedures, individuals have been described their local hospital for instructions on treatment for fertility, pregnancy, and delivery options. The local hospital individualized both the indication and kind of fertility management. In the lack of information regarding safety on vaginal delivery following laparoscopic niche resection, we suggested every patient to have an elective repeat caesarean section at term.

Outcome measures

The ongoing pregnancy rate was the 1st result in the present research. The ongoing pregnancy rate refers to an intrauterine pregnancy with a positive heartbeat throughout an ultrasound scan within ten and twelve weeks of pregnancy (Visser et al., 2020). Secondary outcomes involved miscarriage rate, live birth rate, and ectopic pregnancy rate soon following 2 years, surgery-related complications, ultrasound results at 3 months, and gynecologic signs at one-year monitoring. Registered gynecologic symptoms involved postmenstrual spotting and dysmenorrhea.

Postmenstrual spotting has been described as a minimum of 2 days of intermenstrual spotting or two or more days of brownish discharge that followed the final day of the menstrual period if the menstrual bleeding lasted more than 7 days (Bij de Vaate et al., 2011).

Statistical analysis

Recorded information has been examined utilizing the Statistical Package for the Social Sciences, version 23.0 (SPSS Inc., Chicago, Illinois, United States of America). Quantitative information has been expressed as mean $\pm$ standard deviation and ranges for parametric (normal), whereas non-parametric parameters have been expressed as median with inter-quartile range (IQR). Qualitative parameters have additionally been provided as number and percentages. The information has been explored for normality with the Shapiro-Wilk and Kolmogorov-Smirnov tests.

Results:

Overall, (250) women with a large niche have been found during the inclusion duration, with (175) undergoing laparoscopic niche resection and (75) being excluded because they did not meet the inclusion criteria. At baseline, (80) of the (175) females expressed a desire to become pregnant and participated in the study.

The results of the current study are displayed in the following tables and figures:

The baseline characteristics are shown in Table 1. The majority (72.5%) of the females surveyed stated postmenstrual spotting, while 31.25% revealed dysmenorrhea. An insignificant variance has been observed in baseline characteristics among females with and without infertility, except for parity, previous failed ART ($p < 0.001$), and the existence of intrauterine fluid ($p = 0.03$).

Table (1): Baseline characteristics of females desired to become pregnant (number=160)

	Total group (n= 80)	Women with infertility (n= 45)	Women without infertility (n= 35)	p-value
Age (years)	35.64 $\pm$ 3.71	35.35 $\pm$ 2.97	35.76 $\pm$ 1.89	0.161
BMI (kg/m ²)				
<25(kg/m ²)	58(72.5%)	33(73.3%)	25(71.4%)	0.824
$\geq$ 25 (kg/m ²)	22(27.5%)	12(26.7%)	10(28.6%)	
Smoking	14(17.5%)	9(20.0%)	5(14.3%)	0.144
Parity	1(1-2)	1(1-2)	2(1-2)	<0.001
No. of previous CS	1(1-2)	1(1-2)	1(1-2)	0.624
Time since last CS (months)	41.46 $\pm$ 9.15	40.29 $\pm$ 11.57	40.86 $\pm$ 11.17	0.647
Postmenstrual spotting	58(72.5%)	33(73.3%)	25(71.42%)	0.807
Dysmenorrhea	25(31.25%)	14(31.11%)	11(31.42%)	0.981

Prior ART after last CS	37(46.25%)	37(82.22%)	-	<0.001
Prior IUI after last CS	12(15.0%)	12(26.60%)	-	
Prior IVF after last CS	25(31.25%)	25(55.55%)	-	
Troubles with prior treatment for fertility				
In conjunction with catheter issues throughout ET.	15(18.75%)	15(33.33%)	NA	NA
In conjunction with intra-uterine fluid	25(31.25%)	25(55.55%)	NA	NA
Niche and ultrasound characteristics				
Intrauterine fluid at baseline	60(75.0%)	37(82.2%)	23(65.71%)	0.03
Uterine position				
AVF	12(15.0%)	6(13.3%)	6(17.14%)	0.375
Stretched	16 (20.0%)	8(17.8%)	8(22.86%)	
RVF	47(58.75%)	27(60.0%)	20(57.14%)	
Extreme RVF	5(6.25%)	4(8.9%)	1(2.86%)	
Mean niche depth (mm)	14.14 ± 12.25	13.28 ± 11.27	14.23 ± 13.10	0.466
Mean residual myometrial thickness(RMT)	2.74 ± 1.3	2.80 ± 1.05	2.68 ± 1.08	0.004

Table (2) shows the various reproductive outcomes. At the 2-year follow-up, 47/80 (58.75%) of the women were pregnant, 26/45 (57.7%) in the infertility group and 21/35 (60.0%) in the non-infertility group. In the total group, 38/80 (47.5%) of the females had live births, 20/45 (44.4%) in the infertility group, and 18/35 (51.42%) in the non-infertility group. There were no significant differences in reproductive outcomes between women with and without infertility, with the exception of receiving ART after surgery ($p=0.01$).

Table (2): Reproductive outcomes at two years' follow-up

	Total group (n= 80)	Women with infertility (n= 45)	Women without infertility (n= 35)	p-value
Primary outcome				
Ongoing pregnancy	47(58.75%)	26(57.7%)	21(60.0%)	0.72
Secondary outcome				
Live birth	38(47.5%)	20(44.4%)	18(51.42%)	0.75
Miscarriages	7(8.75%)	4(8.8%)	3(8.5%)	0.375
Ectopic pregnancy	1(0.8)	0	1(2.2)	
2 nd or 3 rd trimester fetal loss	2(1.5)	2(2.2)	0	
Placenta previa	0	0	0	
Placenta accrete spectrum	0	0	0	
Received ART following surgery	16(20.0%)	12(26.6%)	4(11.4%)	0.01
IUI	5(6.25%)	5(11.1%)	0	
IVF	11(13.75%)	7(15.5%)	4(11.4%)	
Unknown	5(6.25%)	5(11.1%)	0	
Attempting to conceive naturally	37(46.25%)	15(33.33%)	22(62.8%)	

At the 3-month follow-up, 73/80 women (91.25%) received ultrasound evaluations (Table 3). Intrauterine fluid accumulation has been found in 60 (75.0%) females at baseline and 5 (6.84%) (p equal 0.01) at 3-month monitoring. The total group's mean RMT increased from 2.74 ± 1.3 at baseline to 6.64 ± 0.28 ($p<0.01$). The average depth of the niche lowered from 14.14 ± 12.25 to 8.42

± 1.13 ($p < 0.01$). A statistically insignificant variance has been observed in uterine position (p equal 0.704).

Table (3): Uterus and niche characters on transvaginal ultrasound

	Baseline	Three months after repair	p-value
Number of females	80(100.0%)	73(91.25%)	
Intrauterine fluid	60(75.0%)	5(6.84%)	0.01
Uterine position			
AVF	12(15.0%)	39(53.42%)	0.704
Stretched	16(20.0%)	10(13.69%)	
RVF	47(58.75%)	18(24.65%)	
Extreme RVF	5(6.25%)	0	
Mean niche depth (mm)	14.14 ± 12.25	8.42 ± 1.13	<0.01
Mean residual myometrial thickness (RMT)	2.74 ± 1.3	6.64 ± 0.28	<0.01

Discussion:

Large uterine niche defects ($RMT \geq$ three millimeters) in symptomatic females who wish to become pregnant in the future can be repaired laparoscopically by removing scar tissue from the niche edges and sealing the defect with two-layer sutures (Kremer et al., 2019). Management of the niche ought to be suited according to manifestations, residual myometrial thickness (RMT), and assumptions about fertility in the future (Nezhat et al., 2017).

This study showed that (72.5%) of the included women had postmenstrual spotting, while 31.25% revealed dysmenorrhea. This result was consistent with that of Vervoort et al., (2018) who stated that 84.2% of the women showed postmenstrual spotting and 40.6% dysmenorrhoea.

The current study results revealed that the total group's mean RMT increased from 2.74 ± 1.3 at baseline to 6.64 ± 0.28 ($p < 0.01$). The average depth of the niche lowered from 14.14 ± 12.25 to 8.42 ± 1.13 (p below 0.01). These results are supported with that of Vervoort et al., (2018) who reported that the median residual myometrial thickness increased from 1.2 millimeters to 5.3 millimeters at follow up (P not more than 0.01). The median depth of the niche diminished from 9.9 millimeters to 4.2 millimeters (P not more than 0.01).

At the 2-year monitoring, (58.75%) of the women were pregnant, 26/45 (57.7%) in the infertility group and (60.0%) in the non-infertility group. In the total group, (47.5%) of the women had live births. These results are consistent with that of Nezhat et al., (2023) who discovered that the pregnancy rate following repair was seventy-three percent with sixty percent resulting in live birth. Multiple cohort studies have shown announcing fertility results following a surgical niche treatment. In a cohort study of 159 females with large niches who went through laparoscopic niche repair due to symptoms, intrauterine fluid has initially been detected in forty percent of subjects, nevertheless this figure dropped to 7.5 percent six months later. This indicated that the niche was the cause of fluid accumulation. Pregnancy rates were additionally extremely encouraging where 40.2% of subjects were unsuccessful in earlier IVF therapy; at two years of monitoring, fifty-two percent conceived naturally, with a median time to pregnancy of three months following discontinuing contraception (Vissers et al., 2020). 2 other cohort investigations on laparoscopic niche repair in twenty-two and thirty-eight subfertile cases revealed substantial rates of pregnancy (55.6% and 44.0%, respectively) in the majority of patients following over twelve months following up (Tanimura et al., 2015; Donnez et al., 2017)

In conclusion,

At the two years' follow-up, laparoscopic resection of symptomatic niches in uterine caesarean scars led to an ongoing pregnancy rate of (58.75%) % and live births of (47.5%). Niche must be regarded as a differential diagnosis for cases who have had a prior CS and are experiencing fertility problems, pain of the pelvis, postmenstrual spotting, or hemorrhaging. The laparoscopic approach to the niche enables the regaining of normal anatomy, in addition to the management of endometriosis and adhesive illness, which are frequently associated with the niche. The results of

laparoscopic niche resection are positive as well as successful in managing symptoms. Additional studies should examine ongoing monitoring of critiques, niche features, and fertility outcomes, as well as detect forecasting factors of clinical failing.

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