The Egyptian Journal of Hospital Medicine (April 2018) Vol. 71 (2), Page 2530-2534

Impact of Parity on Early Cesarean Scar Healing

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ABSTRACT

Background: with increasing cesarean delivery rate the cesarean scar defects and related consequences should be evaluated. **Aim of the work**: this study aimed to assess impact of parity on cesarean scar wound healing.

Methods: a prospective observational study was conducted on 51 females with singleton term pregnancy that underwent uncomplicated prelabor primary cesarean section. 6 weeks later they underwent saline hystrosalpingography. Females with medical diseases that can affect the healing process or received medications can affect wound healing as corticosteroids or anticoagulant were excluded. Women used intrauterine device as a contraceptive method inserted during CS, women with any structural uterine abnormality as cervical stenosis or fibroid uterus or with pelvic infection at the time of saline hystrosalpingography were excluded from this study. **Results**: 75% of the primiparous had CS niche, while, 82.9% of the multiparous group had CS defect (p=0.512). The most prevalent shape of CS defect in the participants was the triangular shape (45.1%) followed by irregular defect (31.4%). The anterior myometrial thickness and the residual myometrial thickness were significantly higher among primiparous women with negative correlation between parity, anterior and residual myometrial thickness (rho = - 0.917 and -0.753 respectively). **Conclusion:** parity was associated with significant reduction of both the anterior and residual myometrial thickness.

Keywords: scar niche, parity, cesarean scar.

INTRODUCTION

Cesarean delivery rate is increasing dramatically; the percentage of cesarean births in the United States increased from 20.7% in 1996 to 32% in 2007. Cesarean deliveries increased in all ages, races, ethnic groups and gestational ages [(1)]. With increasing CS rate, the long-term morbidity of CS scars was questioned [(2)].

Uterine rupture, abnormal placental implantation, uterine scar dehiscence in subsequent pregnancies and scar ectopic pregnancy are common complications related to repeated cesarean sections[(3)]. Moreover, the association between abnormal uterine bleeding presented as post menstrual spotting and cesarean scar defect was reported [(4)].

The incidence of cesarean scar defect ranged between 24 and 84 %. This wide range may be due to absence of unified detection method and diagnostic criteria for scar niche [(5)].Few studies assessed clinical factors related to the present and past obstetric history that can influence the healing of a uterine cesarean wound and scar niche size [(6-9)]. Conflicting data exists regarding potential contributions of clinical variables on the integrity of lower uterine segment and scar defects. Two studies examined the importance of single-layer versus double-layer uterine closure with contradictory results [(6,7)]. The risk of large scar defect increased if the duration of labor is ≥5 hours or cervical dilatation is ≥5 cm[(8)]. According to **Hayakawa *et al*.** [(9)] wedge defects 1 month after cesarean sections were found to be related to myometrium closure technique, gestational age, multiple pregnancies and premature rupture of membranes.

The current study aimed to assess the parity as a factor that can impair CS uterine wound healing.

METHODS

Study population

A prospective observational study was conducted on 51 females between 18 and 35 years with singleton term pregnancy underwent uncomplicated prelabor primary CS through transverse lower uterine segment incision in Ain Shams University Maternity Hospital, while, females with medical diseases that can affect the healing process as diabetes mellitus, anemia, chronic renal disease, hepatic disease, coagulopathy or who received medications can affect wound healing as corticosteroids or anticoagulant, women used intrauterine device as a contraceptive method inserted during CS, women with any structural uterine abnormality as cervical stenosis or fibroid uterus or with pelvic infection at the time of saline hystrosalpingography were excluded from this study .

All participants were subjected to a detailed clinical assessment including: a detailed history, general, abdominal, pelvic examinations, routine obstetric

Received:4 / 1 /2018 DOI**: 10.12816/0045652**
Accepted:14 / 1/2018

ultrasonography, preoperative and postoperative complete blood count, Rhesus factor and blood grouping.

After 6 weeks of cesarean section the participants were reassessed for any contraindication to perform SSCSH which was performed using Samsung H60 EV~ 4-9 MH vaginal probe.

The following measurements were recorded; thickness of the myometrium bordering the scar, depth and length of the niche, intrauterine adhesions related to the scar and the healing ratio.

Operational definitions

Anterior myometrial thickness: was measured where the myometrium bordering the scar.

Residual myometrial thickness was defined as the shortest distance from the endometrium to the serosal surface at the level of the CS scar.

The healing ratio: was calculated as the thickness of residual myometrium divided by the sum of the thickness of residual myometrium and the height of the niche.

Ethical considerations

Informed consent was taken from every woman participating in this study. The study methodology was reviewed and approved by the Research Review Board of the Obstetric and Gynecology Department, Faculty of Medicine, Ain Shams University.

Statistical analysis

The collected data were coded, tabulated, revised and statistical analyzed using SPSS program (version 16). Quantitative variables were presented in the form of means and standard deviation. Qualitative variables were presented in form of frequency tables (number and percent).The comparison between quantitative variables was done using t-test or ANOVA as indicated. Comparison between qualitative variables was done using Pearson's Chi square test. Spearman's correlation coefficient was used for nonparametric correlations. P value is considered significant if equal to or less than 0.05

Table 1: clinical characteristics of the studied sample:

variable	Primiparous N(16)	Multiparous N(35)	P value
age	21±4.96	27±4.48	0.000*
weight	63.5±6.34	71.8±8.9	0.002*
BMI	25.5±1.8	26.5±2.8	0.239
Anterior myometrial thickness	14.7±0.9	11.2±1.4	0.000*
Residual myometrial thickness	11±1.93	7.5±1.96	0.000*
Depth of scar niche	3.75±2.3	3.74±1.8	0.991
Width of scar niche	3.60±2.2	3.66±1.78	0.927
Healing ratio	75±15.4	69.9±16.3	0.102

*statistical significance

Table 2: indications of cesarean section in both groups

Indications of Cs	Primipara N(%)	Multipara N(%)
breech	7(43.8)	3(8.6)
Transverse lie	0(0)	1(2.9)
Placenta previa	0(0)	3(8.6)
Placental abruption	0(0)	5(14.3)
1ry infertility +ICSI	2(12.5)	0(0)
2ry infertility +ICSI	0(0)	1(2.9)
Thick meconium	1(6.2)	1(2.9)
Pathological NST	1(6.2)	6(17.1)
Macrosomia	0(0)	7(20)
FGR	1(6.2)	2(5.7)
Cord presentation	0(0)	1(2.9)
1ry HSV infection	0(0)	1(2.9)
Severe preeclampsia	4(25)	4(11.4)

Table 3: different shapes of scar niche in both groups

Shapes of niche	Primipara N(%)	Multipara N(%)	P value
triangular	6(37.5)	17(48.6)	0.512
irregular	5(31.2)	11(31.4)	
Thin linear	1(6.2)	1(2.9)	
No niche	4(25)	6(17.1)	

Table 4: the mean anterior myometrial thickness and thickness of residual myometrium among women with different parity

Variable	Primigravida N= 16	Para 1 N= 9	Para 2 N=10	Para 3 N= 9	Para 4 N= 7	P value
anterior myometrial thickness	14.75 ±0.93	12.77 ± 0.833	11.70±1.05	10.66±0.70	9.57±0.78	0.001
Thickness of residual myometrium	11.00±1.93	8.77±1.56	8.5±1.95	6.42± 1.90	6.11±0.78	0.001

Table 5: correlation between parity and anterior myometrial thickness, thickness of residual myometrium

	Spearman's rho	P value
Anterior myometrial thickness	- 0.917	0.001
Thickness of residual myometrium	-0.753	0.001

RESULTS

The clinical characteristics of the participants were shown in **table 1**; there was a significant difference between primiparous and multiparous women regarding age, weight, anterior myometrial thickness and the thickness of residual myometrium.The most common indication for primary CS among primiparous women was breech presentation (43.8%), while among multiparous women fetal macrosomia was the most common indication (20%) **[Table 2].**

Cesarean scar defect was detected in 80.4% of the whole study population, 75% of the primiparous had CS niche, while 82.9% of the multiparous group had CS defect (p=0.512). The most prevalent shape of CS defect in the participants was the triangular shape (45.1%) followed by irregular defect (31.4%)[**Table 3].**There was no significant difference between the two groups regarding depth, and the width of the niche P value was 0.991 &0.927 respectively, but the anterior myometrial thickness and the residual myometrial thickness were significantly higher among primiparous women with negative correlation between parity and anterior myometrial thickness and residual myometrial thickness with Spearman's rho (- 0.917 and -0.753 respectively) [**Tables 4,5].**

DISCUSSION

The current study was conducted on 51 pregnant female underwent prelabor primary CS in Ain Shams University Maternity Hospital. Sixteen of the participants were PG (31.37%) and 35 were MG (68.63%).

The effect of parity on primary CS rates was extensively studied with conflicting results. **Qublan *et al.*** reported that elective CS in PG accounted for only 8.00% [(10)]. According to **Abu-Heija *et al.*** [(11)] caesarean section rates in the primiparous women were higher in all age groups when compared to multiparous women. These controversial findings can be explained by sample size or geography of selected cohort and institutional guidelines regarding clinical indications for primary CS.In the current study, the mean age in the primprarous group was 21±4.96 y, while in the multiparous group it was 27±4.48 y.

The pre-pregnancy weight in the primprarous group was 63.5±6.34 kg compared to 71.8±8.9 kg among multiparous women. Similarly, **Boyle and his colleagues** [12] reported that primiparous women were younger and thinner compared to multiparous women. However all our participants were between age of 18 and 35 years.

In this study, the main indication for CS was breech presentation (19.6%), followed by severe preeclampsia (15.7), fetal macrosomia and pathological non stress test(7%). The most common indication for primary CS among primiparous women was breech presentation (43.8%), while among multiparous women fetal macrosomia was the most common indication (20%)

In a previous study, among primiparous women, arrest of labor was the most common indication (41.3%), followed by pathological non stress test (23.4%) and fetal malpresentation (15.8%). For multiparous women, the most common indication was fetal malpresentation (25.8%), followed by pathological non stress test (24.6%) and failure to progress (19.5%)[12]. In our study we included only prelabor primary CS because cervical dilatation can impair CS scar healing.

In accordance with this study The National Collaborating Centre for Women and Children Health in the UK listed malpresentations, contracted pelvis and acute fetal compromise as main indications for CS [13].

Cesarean scar defect was detected in 80.4% of the current study population, only 75% of the primiparous had CS niche, while 82.9% of the multiparous group had CS defect, this is more than the detection rate in a study by **van der Voet and colleagues** who found that CS niche present in 64.5% of women 6–12 weeks after caesarean section, when examined by gel instillation sonography [4].The prevalence of a niche was 56.0% when performed 6 to 12 month after CS in women with postmenstrual spotting when examined by gel instillation sonography [5].

The higher incidence encountered in our study can be attributed to the early assessment. We performed the scan 6 weeks post CS because early assessment may facilitate the recognition of the location of the caesarean section scar in the uterine wall due to incomplete scar healing, allowing the detection of small niches.

Moreover, thin endometrium resulting from breastfeeding improves niche recognition and measurement. The exact significance of different scar niche shapes is yet to be determined, the most prevalent shape of CS defect in our participants was the triangular shape (45.1%) followed by irregular defect (31.4%). While in a previous study most niches were semicircular (50.4%) or triangular shape (31.6%)[5].In the current study the anterior myometrial thickness adjacent to the scar was 14.7±0.9 and 11.2±1.4 in the primipara and multipara respectively, while the residual myometrial thickness was 11±1.93 and 7.5±1.96.

There was negative correlation between parity and anterior myometrial thickness and residual myometrial thickness with Spearman's rho (- 0.917 and -0.753 respectively).

There is no previous data regarding the effect of parity on the anterior myometrial thickness and the residual myometrial thickness in nonpregnant women. However, we found only one study showing that parity had a significant negative correlation with mean residual myometrial thickness (P<0.001), lower uterine segment (LUS) thickness (P=0.012) during pregnancy [14]. According to **Baranov and colleagues** [15] the median of anterior myometrial thickness was 8.9 (4.7–18.0) and for residual myometrium was 5.6 (0–13.3), in 55 women with previous one CS. In another study, the thickness of myometrium bordering the scar was 10.0 ±2.3; range was 6.8–14.9 mm, whereas, the residual myometrium was 7.5 ± 2.7; range was 0–13.9 mm [16].

The clinical significance of myometrial thickness was related to the risk of scar dehiscence and uterine rupture in subsequent pregnancy following one previous cesarean delivery. Indeed, the lower uterine segment thickness in the third trimester of pregnancy was considered a clinical predictor of uterine rupture, although different cut-offs to indicate an increased risk is debatable[17-18].

Various studies have suggested that the thinner lower uterine segment (LUS) is associated with increased risk of uterine rupture during attempted VBAC [19-20]. However, a previous report suggested that previous vaginal deliveries may offer protection against uterine rupture during a trial of labor after cesarean. A study conducted to assess the outcome of trial of labor after cesarean reported that the rate of uterine rupture was 1.1% among women without previous vaginal delivery and 0.2% among pregnant women with prior vaginal delivery (P =.01) [21].

In conclusion, the parity was not associated with significant impact of presence of scar niche after primary CS, however; it was associated with significant reduction of both the anterior and residual

myometrial thickness. The clinical significance of these findings needs to be explored on future pregnancy outcomes.

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