

Assessment of Uterine Scar Thickness by Ultrasonography in Women with Previous Cesarean Scar

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Abstract

Objectives: To assess the uterine scar thickness by transabdominal ultrasonography among term pregnant women with previous cesarean scar.

Methodology: A descriptive cross-sectional study was done in the department of Obstetrics and Gynecology, Benazir Bhutto Hospital, Rawalpindi between June and November 2022. A total of 130 women who have previously given one birth by caesarean section between 25 to 40 years of age were included. Clinical pelvimetry and sonographic assessment of the scar was done between 37-40 weeks. The lower uterine segment thickness was measured by partial filling of the bladder to avoid interobserver variability. Measurements were taken at several points (3-4) on lower uterine, and the thinnest part was measured as scar. The complete examination of lower uterine in multiple planes was performed to find symptomless uterine dehiscence. Women underwent trial of labour was monitored by pulse, fetal heart rate via cardiotocography with progress of labour. If they had lower segment cesarean section, the status of scar noted and findings correlated with scar thickness.

Results: The patients mean age was 28.31 ± 4.34 years. Gestational age mean was 38.57 ± 0.96 weeks. Mean interpregnancy interval was 23.34 ± 11.21 months. The mean uterine scar thickness was 3.68 ± 1.47 mm. Frequency of scar dehiscence among women was found 13.1%. Frequency of dehiscence among women was found 41.5% with ≤ 2.5 mm and no woman was reported with ≥ 2.5 mm scar thickness.

Conclusion: The study concluded that the uterine scar thickness less than 2.5 mm during the labour is associated with uterine defect during a labour trial.

Keywords: Cesarean section; Scar; Skinfold thickness; Surgical wound dehiscence; Uterine.

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Introduction

Caesarean section (CS) is actually the most frequently performed obstetric operation in the world. Repeat C-section contributes significantly to the total number of cesarean deliveries, accounting for about a third. This trend underscores the importance of promoting and supporting vaginal delivery after caesarean section (VBAC) for patients.¹ The increased morbidity associated with labour trials after previous C-section and the risk of uterine rupture remains relevant and important in obstetrics.² The vaginal birth by caesarean section (VBAC) rate is measured as the number of vaginal births per 100 deliveries in women with a history of a prior C-

section.³ Typically, an obstetrician will assess the woman's chance for successful VBAC based on demographic and obstetric characteristics. Some factors (pre-vaginal birth and spontaneous labour) increase the likelihood of VBAC, while other factors (maternal age, obesity, and short gestational age) decrease the likelihood.⁴ Although known factors influencing the outcome of VBAC, cesarean delivery before and now. Interval pregnancy with low probability, sign of previous C-section, effective previous vaginal delivery, postoperatively wound sepsis. There are no typical guidelines for attempting VBAC for previous caesarean patients.⁵ Radiological evaluation of a scar from a

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previous cesarean section is not commonly used as a primary criterion for mode of delivery. However, no radiological standard criteria for evaluation of scars are widely established.⁶ The relationship of thickness of scar and delivery mode is described by the presence of previous C-section for fetal bradycardia, fetal meconium staining, and fetal-pelvic disparity.⁷ During repeat C-section, the surgeon will be commented on the presence of lower uterine segment (LUS) according to the following categories. Grade I (well-developed LUS), Grade II (LUS thin, no visible contented), Grade III (clear LUS, visible contented), and Grade IV (well-documented fault, presence or ruptured of LUS). Grade I and II are measured non-dehiscent, whereas Grade III and IV are measured dehiscent.⁸ This study was intended to investigate the value of measuring uterine thickness of scar by transabdominal ultrasound and its relationship with delivery patterns during previous C-section pregnancies.

Methodology

A descriptive cross-sectional was done in the department of Obstetrics and Gynecology, Benazir Bhutto Hospital, Rawalpindi between June and November 2022. Sequel of acquiring study IRB from hospital ethics committee and a written consent from patients to participate voluntarily in this study. Total 130 cases (according to WHO sample size calculator; taking mean uterine scar thickness in those patients who delivered vaginal birth to be 3.3 ± 0.7 , absolute precision was 0.5, and confidence interval 95%),⁹ pregnant women who had previously given one birth by caesarean section, ages of women 25-40 years, gestational age between 37-40 weeks, and adequate pelvis through non probability consecutive sampling were included. Women with placenta previa, uterine anomaly, and not willing for vaginal birth after cesarean were excluded.

Clinical pelvimetry and sonographic assessment of the scar was done between 37-40 weeks. The lower uterine segment thickness was measured by partial filling of the bladder to avoid interobserver variability. Measurements were taken at several points (3-4) on lower uterine, and the thinnest part was measured as scar. The complete examination of lower uterine in multiple planes was performed to find symptomless uterine dehiscence. Women underwent trial of labour was monitored by pulse, fetal heart rate via cardiotocography (CTG) with progress of labour. If they had LSCS the status of scar noted and findings correlated with scar thickness.

Obstetricians determined the order of delivery or done the delivery ignoring the findings of patient's wound thickness, i.e., radiological findings were not used to decide the order of delivery. The final decision of delivery mode was left to clinical evaluation. The scar thickness measurements were compared to the delivery schedule.

All the collected data was entered into SPSS v 25.0 and analyzed. The quantitative data like age, gestational age, parity, scar thickness, and birth weight were analyzed as mean and SD. The qualitative data was measured like mode of delivery and number of previous VBACs were analyzed as frequency and percentage. Interval between previous C-section and recent pregnancy (in months) were also noted. Comparison of scar thickness between vaginal delivery and C-section by independent sample t-test. Comparison of scar dehiscence between groups were analyzed by chi-square. A probability p values ≤ 0.05 was statistically considered as significant.

Results

There was total 130 pregnant women who had previously given one birth by caesarean section included. The patients mean age was 28.31 ± 4.34 years. Gestational age mean was 38.57 ± 0.96 weeks. Mean interpregnancy interval was 23.34 ± 11.21 months. Distribution of patients according to parity, patients according to mode of delivery, and number of previous VBACs were measured (Table I).

Table I: Descriptive statistics of parity status, mode of delivery, and number of previous VBACs, (n=130)

		N	%
Parity status	P ₁ -P ₄	122	93.85
	P ₅ and above	08	6.15
Mode of delivery	C-section	101	77.69
	VBACs	29	22.31
No. of previous VBACs	None	110	84.62
	1	13	10.0
	2	07	5.38

Table II: Comparison of mean uterine scar thickness between vaginal and cesarean delivery. (n=130)

Mode of delivery	Uterine scar thickness		p value
	Mean	SD	
C-section	3.82	1.93	0.598
VBAC	3.97	1.19	
Independent sample t-test			

Mean scar thickness measured by transabdominal ultrasonography among women was 3.68 ± 1.47 mm (Figure 1). Frequency of scar dehiscence was found in 17 (13.08%) women (Figure 2). Compare the mean uterine scar thickness between vaginal and cesarean delivery (Table II). Frequency of dehiscence was found

in 17 (41.46%) women with ≤ 2.5 mm and no women with ≥ 2.5 mm scar thickness. (Table III).

Table III: Comparison of frequency of dehiscence with scar thickness. (n=130)

Scar thickness	Scar dehiscence		p value
	Yes	No	
≤ 2.5 mm	17 (41.46%)	24 (58.54%)	0.0001
≥ 2.5 mm	0	89 (100%)	
Chi-square test			

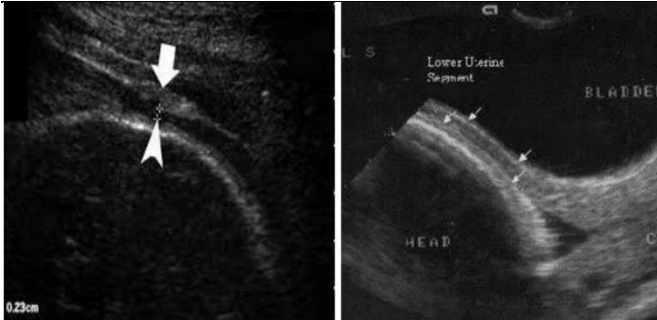


Figure 1. Ultrasound measurement of uterine scar thickness.

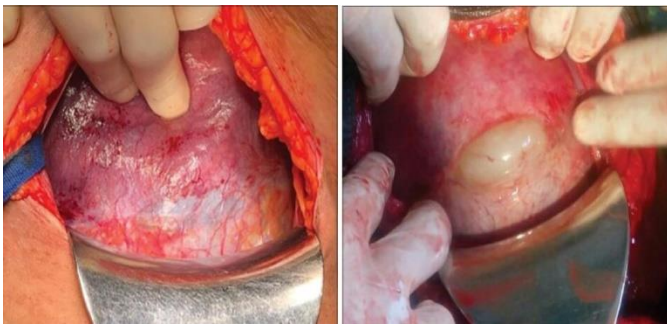


Figure 2. Scar dehiscence.

Table III: Comparison of frequency of dehiscence with scar thickness. (n=130)

Scar thickness	Scar dehiscence		p value
	Yes	No	
≤ 2.5 mm	17 (41.46%)	24 (58.54%)	0.0001
≥ 2.5 mm	0	89 (100%)	
Chi-square test			

Discussion

The aim of the current study was to assess the uterine scar thickness by transabdominal ultrasonography among term pregnant women with previous cesarean scar. In this study, mean scar thickness measured by transabdominal ultrasonography among term pregnant women with previous cesarean section underwent for VBAC and C-section was 3.68 ± 1.47 mm. Scar dehiscence among term pregnant women with previous one cesarean section was found in 13.08% women. Dehiscence among term pregnant women was found in 41.46%) women with ≤ 2.5 mm and no women with ≥ 2.5 mm scar thickness. Singh et al study showed that at 24-

28 weeks, scar thickness was less in cesarean delivery patients compared to vaginal delivery ($p = 0.043$). When measured after gestational week 36, the thickness of the scar was 3.3 ± 0.7 and 2.9 ± 0.9 mm respectively in patients who vaginal delivery and cesarean ($p = 0.003$). However, they showed that the average thickness was insignificant between cesarean delivery (1.73 ± 0.95 mm) and C-section (1.91 ± 0.96 mm). Scar dehiscence with scar thickness ≤ 2 mm is 71.4%, with 2-3mm 40% and ≥ 3 mm is 1.4%.⁹

Gotoh et al study found an average scar thickness by transvaginal ultrasound (TVS) in vaginal and C-sections at 19 weeks of gestation was 6.7 ± 2.4 and 6.8 ± 2.3 mm, respectively, which was insignificant.¹⁰ This is similar to our study which has also shown statistically no significant difference in scar thickness between cesarean and VBAC (3.82 ± 1.39 mm vs 3.97 ± 1.19 mm, respectively). Gotoh et al study reported thickness of scar by TVS at 39 weeks was 3.0 ± 0.7 mm in delivered virginally and 2.1 ± 0.7 mm during surgery. Additionally, they reported that it was thicker in repeat C-sections.¹⁰ Mazurek-Kantor et al study found a peak thickness of scar 3-4 mm was 44.6% in patients. However, they found that the bladder thickness wall and folate membrane were also taken into account, which can account for the higher thickness of the scar.¹¹

Rozenberg et al study reported a thickness lower uterine in women with labour (4.5 ± 1.4 mm) and women with elective cesarean (3.8 ± 1.5 mm). They found transabdominal ultrasound measurements of lower uterine can be used to improve the safety of labour tests.¹² The results of this study are quite similar to my study which have shown that scar is thinner in cesarean section as compared to VBAC. Another Rozenberg et al study found the uterine dehiscence risk was direct related to uterine thinning measured sonographically at 37 weeks of gestation. Researchers suggest that at week 37, a trial of labour can be done if the uterine thickness is ≥ 3.5 mm.¹³

Cheung study reported that sonography allowed assessment accurately of LUS thickness in women who underwent previous C-section, significantly smaller than normal LUS thickness (1.8 ± 1.1 mm).¹⁴ Last but not the least, these results were found to be correlate with Fukuda et al study who found that the thickness mean of scarred LUS was at least 0.8 mm less than that of intact LUS,¹⁵ and also in agreement with Michaels et al study of who found thickness mean of LUS to be significantly less for the abnormal group compared with the

controls.¹⁶ Literature has reported that the uterine rupture risk in the presence of scar defect is directly related to the LUS thinning.¹⁷ Numerous studies reported multiple methods to evaluate the association of LUS measurement and the uterine rupture risk or dehiscence relatively successfully. A few studies measured the whole LUS by transabdominal US, in some other studies middle muscle layer was measured only by using transvaginal US, and some used both approaches.¹⁸

The study recommendations are a definitive and reliable management protocol should be developed to select the appropriate patient for a trial of labor after a previous caesarean. The chances of scar dehiscence are almost negligible if scar thickness ≥ 2.5 mm.

Conclusion

The study concluded that the uterine scar thickness less than 2.5 mm during the labour is associated with uterine defect during a labour trial. This measurement, which has a practical application in determining the order of delivery in women with a previous C-section, can reduce uterine rupture.

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