



AN OBSERVATIONAL STUDY ON COMPARISON OF PREOPERATIVE TRANSVAGINAL SONOGRAPHIC AND INTRA-OPERATIVE MEASUREMENTS OF SCAR THICKNESS IN PREVIOUS LOWER SEGMENT CAESAREAN SECTION AT TERM GESTATION

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ABSTRACT

Background: There have been different opinions regarding the preferable period of gestation when an ultrasound examination should be conducted to assess the integrity of the scar & lower uterine segment in a case of previous caesarean. So the purpose of this study is to compare the preoperative transvaginal sonographic measurements of scar thickness and intraoperative measurements of scar thickness in previous lower segment caesarean section patients at term to check the reliability of transvaginal ultrasound for measurement of scar thickness and to help in clinical decision making regarding the timing & mode of delivery. **Methods:** This prospective observation study was conducted on 67 women who had a caesarean section in previous pregnancy and were now at 37 weeks or more of gestation period and who were planned for an elective caesarean section at the Department of Obstetrics & Gynecology, Artemis Health Institute, Gurugram from the period September 2019 to June 2021. Radiological evaluation of previous caesarean section scar was done using TVS immediately prior to caesarean section and was compared with the intraoperative measurement of the scar thickness done by vernier calliper. **Results:** As per this study, mean scar thickness by TVS (2.71 ± 1.17) and intraoperatively by vernier calliper (1.94 ± 0.86) had statistically significant difference ($p < 0.001$) in 67 women with previous caesarean section. **Conclusions:** According to the statistical result in this study, we conclude that there is significant difference between preoperative scar thickness by transvaginal sonography and intraoperative scar thickness by vernier calliper (30%). So We cannot rely only on scar thickness measurement by Transvaginal USG for decision to offer TOLAC/ VBAC to the patient and also cannot predict a cut off value based on Transvaginal USG, which can designate a LUS scar to be strong or weak.

KEYWORDS : TVS, Previous LSCS, Scar thickness, Scar measurements, calliper scar measurement, TOLAC, VBAC

INTRODUCTION

Lower Segment Caesarean Section is one of the commonest surgical procedures performed worldwide in obstetric practice^{1,2}. It is creating an expanding high risk obstetric sub-population of "Women with scarred uterus"^{3,4,5,6,7}. One of the most common indications for repeat caesarean delivery is a previous caesarean section which is about 67 %^{8,9}.

Ultrasonography (USG) provides a fairly simple and non invasive method, which has been most widely studied for evaluation of the LUS to assess the critical thickness above which safe vaginal delivery is predictable¹⁰. There are two ways of measuring scar thickness by Ultrasonography-transabdominal and transvaginal. Several studies suggest that Transvaginal sonography is better than Transabdominal sonography for measuring scar thickness of LUS in previous LSCS patient. Apart from this, there has been an ongoing debate about the optimum cut-off value of the scar thickness to predict the strength & integrity of the previous caesarean section scar. So our aim to find association between preoperatively scar thickness measured by transvaginal USG route and peroperatively scar thickness measured by vernier caliper at ≥ 37 weeks. So we checked sensitivity and specificity of transvaginal ultrasound in scar thickness measurement. A reliable measurement would be helpful for clinicians to make a decision regarding the optimal mode of delivery for women eligible for VBAC.

AIM AND OBJECTIVES

AIM

To compare between preoperative transvaginal sonographic measurements of scar thickness and intra operative measurements of scar thickness in previous lower segment caesarean section patient at term pregnancy.

OBJECTIVES

- To measure the scar thickness in previous LSCS patient antenatally at term by transvaginal sonography

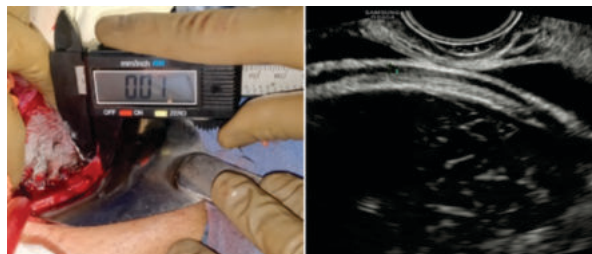
- To measure the scar thickness peroperative physically using LCD digital electronic carbon fiber vernier calliper
- To find the association between sonographic antenatal and intraoperative measurements of scar thickness.

METHODOLOGY

This cross sectional observational study was done over 20 months of duration and included 67 pregnant women coming to Artemis Hospital, Gurugram for delivery and undergoing repeat elective cesarean section. After counselling, written informed consent was taken from pregnant females participating in study. A detailed obstetric history was taken with special reference to number of previous caesarean section and indication of previous cesarean section, per operative and post operative complications including puerperal sepsis or wound infections, interconception period, period of gestation and fetal outcome. Previous records, if available, were reviewed for type of incision, single vs double layer closure, any history of post operative sepsis and whether the patient was in labour at the time of LSCS. A history of vaginal delivery before or after LSCS was specifically asked for. Comprehensive general and local (per abdomen and per vaginal) examination was carried out.

A transvaginal ultrasound scan was done at 37 weeks or onwards to evaluate the lower uterine segment scar, using SAMSUNG RS80A model with 5-9 MHz transvaginal probe. The lower segment scar was identified visually at the level of internal os. This area was magnified to the extent that any slight movement of the probe will produce a change in measurement by only 0.1 mm. The previous scar thickness measurement was taken with the cursors at the urinary bladder wall-myometrium interface and the myometrium/chorioamniotic membrane-amniotic fluid interface. At least 3 measurements were taken, one in the middle, at the angle of the previous scar and any other places where scar appears very thin and the lowest value was taken as the LUS scar thickness.

We also assessed the previous scar clinically intraoperatively -
 Grade 1- Well developed scar
 Grade 2- Thin scar but content not visible
 Grade 3- Translucent scar but content visible or well-circumscribed defect
 Grade 4- Dehiscence or rupture present in the LUS



Scar Thickness By Calliper

Scar Thickness By TVS

After opening the abdomen in layers, urinary bladder was pushed down and scar identified clinically for the above mentioned criteria. Then a small incision given preferably on the previous caesarean scar and extended bilaterally with sharp dissection taking care not to rupture the amniotic membranes. The LCD digital electronic carbon fiber vernier calliper used to measure the scar thickness. The scar thickness was measured at middle of the scar and lateral angle of the incision and any other places where scar appeared very thin before rupturing the amniotic membranes. Caesarean section completed in a routine manner. The women were followed until discharge from the hospital.

RESULTS

In our study population (N=67),

- Right sided mean scar thickness measurements preoperatively (2.65 ± 1.29) and intraoperatively (1.92 ± 0.96) had statistically significant difference ($p < 0.001$).
- Left sided mean scar thickness measurements preoperatively (2.72 ± 1.16) and intraoperatively (1.97 ± 0.93) had statistically significant difference ($p < 0.001$).
- In the middle mean scar thickness measurements preoperatively (2.75 ± 1.34) and intraoperatively (1.92 ± 1.02) had statistically significant difference ($p < 0.001$).
- Mean scar thickness in study population- preoperatively (2.71 ± 1.17) and intraoperatively (1.94 ± 0.86) had statistically significant difference ($p < 0.001$).
- Difference between mean scar thickness measured preoperatively and intraoperatively is $0.77 \text{ mm} \pm 1.13$.
- Mean Scar thickness measurements by TVS and vernier calliper show moderate positive correlation between them. It's correlation coefficient (R) is 0.54.

Table 1 show association between scar thickness measured pre operatively by transvaginal ultrasound and per operative by vernier calliper.

➤ Statistics	Pre-Operative (N=67)	Intraoperative (N=67)	p-value
Right Scar Thickness	2.65 ± 1.29	1.92 ± 0.96	$p < 0.001$
Middle Scar Thickness	2.75 ± 1.34	1.92 ± 1.02	$p < 0.001$
Left Scar Thickness	2.72 ± 1.16	1.97 ± 0.93	$p < 0.001$
Mean Scar Thickness	2.71 ± 1.17	1.94 ± 0.86	$p < 0.001$

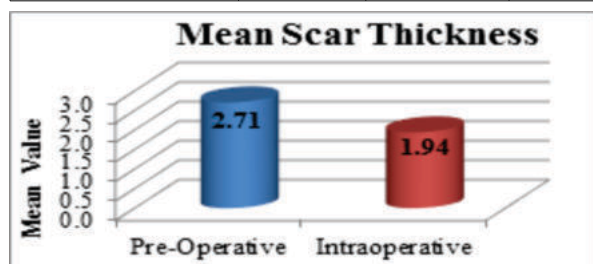


Fig.1 Graphical representation of association between

mean scar thickness measured pre operatively by transvaginal ultrasound and per operative by vernier calliper

- Intraoperative scar quality is divided into 4 grades according to our methodology and it's discussed in observation. Each grade had it's own subset of population. If we compare preoperative and intraoperative scar thickness measurement with respect to subset of grades, it shows statistically significant difference. Grade 4 (N=0) no patients.

Table 2 shows comparison between pre operative and intra operative scar thickness measurement which was evaluated intra operatively based on scar grading .

➤ Evaluation of Scar	Pre-Operatively Mean $\pm$ SD	Intraoperatively Mean $\pm$ SD	p-value
Scar Thickness: Mean			
1 (N=30)	3.18 ± 1.15	2.5 ± 0.82	< 0.001
2 (N=30)	2.31 ± 0.88	1.64 ± 0.51	< 0.001
3 (N=7)	2.39 ± 1.68	0.81 ± 0.43	0.02

- According to statistical result in our study, difference between preoperative scar thickness by TVS USG and intraoperative scar thickness by vernier calliper was significant which is about 30%. ($P < 0.001$)
- Difference between mean scar thickness measured preoperatively and intraoperatively was $0.77 \text{ mm} \pm 1.13$. Women with previous LSCS (N=27) had TVS scar thickness in range of 2-3 mm and Patient (N=31) had vernier caliper scar thickness in range of 1-2 mm.
- $\leq 0.5 \text{ mm}$ of difference in scar thickness measurement by TVS and Vernier calliper was present in 37 patients. $0.6 - 1.0 \text{ mm}$ of difference was seen in 17 patients. $1.1 - 1.5 \text{ mm}$ of scar thickness measurement difference was present in 5 patients. $1.6 - 2.0 \text{ mm}$ of scar thickness measurement difference was present only 1 patient. Whereas $> 2.0 \text{ mm}$ of difference was found in 7 patients.

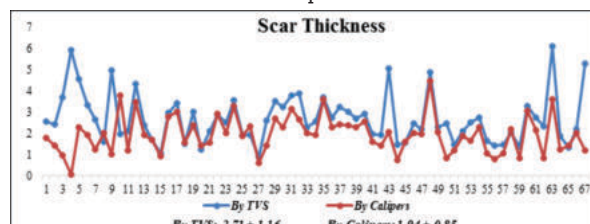


Fig.2 Show Graphical Representation Of Mean Scar Thickness By Tvs And Vernier Calliper Of Each Patient And Their Comparison

CONCLUSION

According to statistical result in our study we conclude that there is significant difference between preoperative scar thickness by transvaginal sonography and intraoperative scar thickness by vernier calliper (30%). So we can't rely only on scar thickness measurement by TVS USG for decision to offer TOLAC/ VBAC to the patient and also can't predict a cut off value based on TVS USG, which can designate a LUS scar to be strong or weak.

Scar tenderness has better predictive value in assessment of scar thinning and integrity. Other method like 3D USG is needed for the prediction of scar thickness and scar integrity before TOLAC is offered to a woman with previous caesarean section and further studies are indicated in this area.

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