International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622

www.gynaecologyjournal.com
2020; 4(5): 224-227
Received: 06-08-2020
Accepted: 09-09-2020

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Accuracy of transvaginal ultrasound in evaluation of lower uterine segment cesarean scar integrity and predicting scar dehiscence: Hospital based prospective study

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DOI: https://doi.org/10.33545/gynae.2020.v4.i5d.709

Abstract
Background: Patients with previous caesarean section now represent a relatively large proportion of the obstetric population. The main aim of the study is to evaluate the accuracy of transvaginal ultrasound in evaluation of lower uterine segment caesarean scar integrity and predicting scar dehiscence
Materials and Methods: The study included 144 patients based on the inclusion and exclusion criteria. All the patients demographic and previous delivery history was noted. Study procedure was explained to the patients in their understandable language and informed consent was obtained. All the patients were subjected to trans vaginal ultrasound to evaluate the scar integrity and dehiscence. The data was analysed by SPSS (16.0) version.
Results: Total 144 patients were analysed. Maximum patients had Fetal distress for previous LSCS indication. Based on the scar size they were divided into two groups group-I (>3/=3mm) and group-II (<3 mm). 96 were included in the group-I and 54 in group-II. Group-I maximum patients showed VBAC (38), 25 SVD and 13 AVD. 16 patients went for emergency LSCS in that 5 showed foetal distress and 11 had scar tenderness. 42 patients undergone elective LSCS in this 4 showed thinned out scar. VBAC (1) and CS (44) in group-II and 15 patients underwent emergency LSCS. 12 showed scar tenderness and 1 had foetal distress. 5 patients showed thinner out scar under gone emergency LSCS in group-II. 25 patients showed thinned out scar in group-II undergone elective surgery.
Conclusion: Previous LSCS scar evaluation by transvaginal sonography improves the labour outcome and lower the complications during the surgery.

Keywords: LSCS, trans vaginal, sonography, scar, dehiscence, elective surgery

Introduction
Attempted vaginal birth after previous caesarean delivery (VBAC) remains controversial. Although it has been reported as safe and has contributed to a reduced caesarean delivery rate, VBAC is associated with a risk of uterine rupture [1, 3]. Because the meternal and foetal consequences of uterine rupture can be serious and potentially life threatening, the proper selection of patients would be an important prerequisite. Is generally considered that among carefully selected patients who have full participation in decision making most women with one previous lower segment transverse caesarin delivery are suitable candidates for VBAC and should be offered a trail of labour [4, 5]. Although the efficacy and safety of VBAC have been shown to our knowledge there are no reliable methods to predict the risk of uterine rupture in this group of patients. Studies have shown the risks of uterine rupture in the presence of defective scar are related directly to the degree of thinning of the lower uterine segment (LUS) [6, 7]. Although LUS thickness as measured by sonography at or near term is being used by 16.0% of obstetrician in Canada to determine which women are good candidates for VBAC the value applying sonographic LUS thickness measurement in the management of VBAC remains unclear. The presence of previous scar is the one of the major cause for uterine rupture, pain and bleeding [8]. Knowing the presence of previous scar position and thickness reduce the complications in future. Currently various methods are used to evaluate the lower uterine segment cesarean scar thickness. With this background the present study aimed to accuracy of transvaginal ultrasound in evaluation of lower uterine segment cesarean scar integrity and predicting scar dehiscence.

Materials and Methods

Study settings

The study was done in department of Obstetrics and Gynaecology, SUT Academy of Medical Sciences, Vattapara, Trivandrum, Kerala. The study was done during the period of Aug2012-Sept2014. The study was approved by Institutional Human Ethics Committee (IHEC).

Inclusion criteria

- Previous LSCS
- Antenatal women with previous LSCS
- Willing to sign on informed consent form

Exclusion criteria

- Women with 2 or more previous LSCS
- Multiple pregnancy
- Abruptio placenta

Procedure

The study included a total of 144 patients based on the inclusion and exclusion criteria. All patients were explained study protocol and informed consent was obtained. Demographic and clinical data was recorded. All the patients were subjected to transvaginal sonography for the detection previous scar integrity and dehiscence.

Statistical analysis

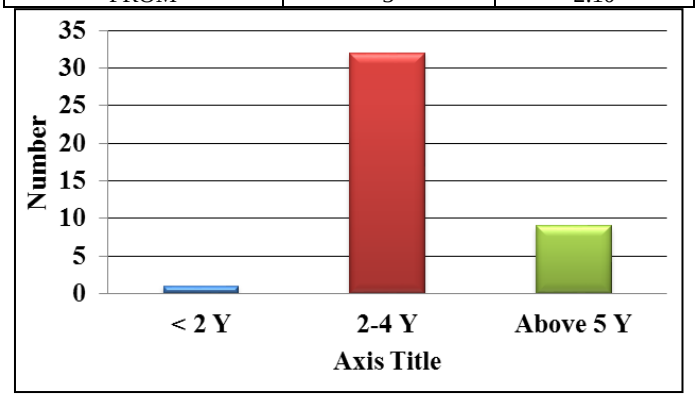
The data was expressed in number, percentage, mean and standard deviation. Statistical Package for Social Sciences (SPSS 16.0) version used for analysis. Microsoft excel 2010 used for calculation of percentage.

Results

This study included total of 144 patients. 68 patients were indicated LSCS due to FD. 21 had mal presentation subjected to LSCS (Table-1). Maximum number of patients showed 2-4 years interval between the present and past LSCS (Graph-1). Based on the thickness of the scar patients were divided into two groups. Group-I showed >3/=33mm and group-II <3mm of scar. 96 patients were in group-I and 45 in group-II. In group-I 58 had CS and 38 VBAC. Out of 96 patients 54 were given labour trial. 25 showed SVD and 13 AVD. In group-I 16 patients subjected to emergency LSCS in that 5 showed foetal distress and 11 had scar tenderness (Graph-2). Maximum number of patients showed normal scar in group-I. In group-II 44 showed CS only 1 CS. 15 patients is given labour trail in that 3 showed foetal distress and 12 scar tenderness (Table-2). In group-II maximum patients showed scar dehiscence compared to others (Graph-3). In the elective LSCS in group-I 38 showed normal scar and 4 in group-II. Maximum patients in group-II (25) showed thinned out scar (Table-3 and Image-1 and 2).

Table 1: Distribution of patients based on the previous LSCS indication

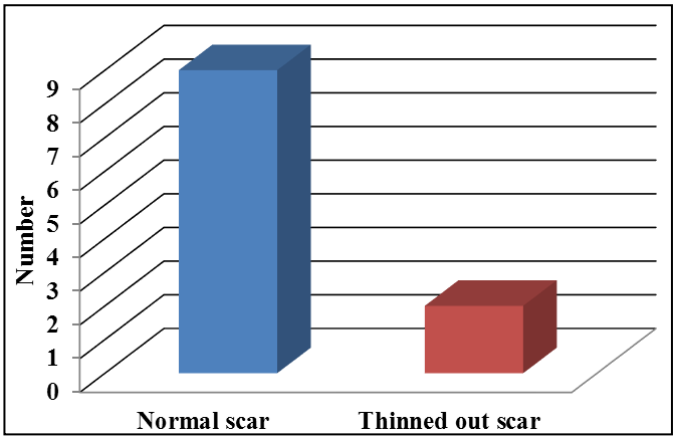
LSCS indication	Number (n=144)	Percentage (%)
CPD	13	9.09
PD	13	9.09
FD	68	47.55
Big baby	7	4.90
Severe PE	7	4.90
Mal presentation	21	14.69
Sever oligohydramnios	6	4.20
Abruption	1	0.70
BOH	2	1.40
IUGR	2	1.40
PROM	3	2.10



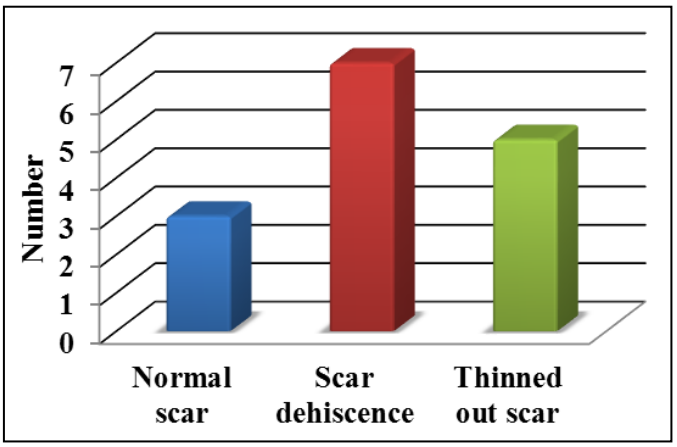
Graph 1: Distribution of patient based on interval between precious LSCS and present delivery

Table 2: Distribution of patients based on the thickness of scar

Observation	Group-I (>3 mm/=3mm) (n=96)	Group-II (<3 mm) (n=45)
VBAC	38	1
CS	58	44
Patients given a trail of labour	54	16
SVD	25	1
AVD	13	0
Emergency LSCS	16	15
Foetal distress	5	3
Scar tenderness	11	12



Graph 2: Distribution patients based on the scar tenderness patients undergone emergency LSCS [(TVS (>3 mm/=3mm)]



Graph 3: Distribution patients based on the scar tenderness patients undergone emergency LSCS [(TVS (<3 mm)]

Table 3: Distribution of patients based on the elective LSCS in both groups

Elective LSCS	Group-I (>3 mm/=3mm) (n=42)	Group-II (<3 mm) (n=45)
Normal scar	38	4
Thinned out scar	4	25

Image 1: Transvaginal Ultrasound of lower uterine segment cesarean scar thickness and integrity

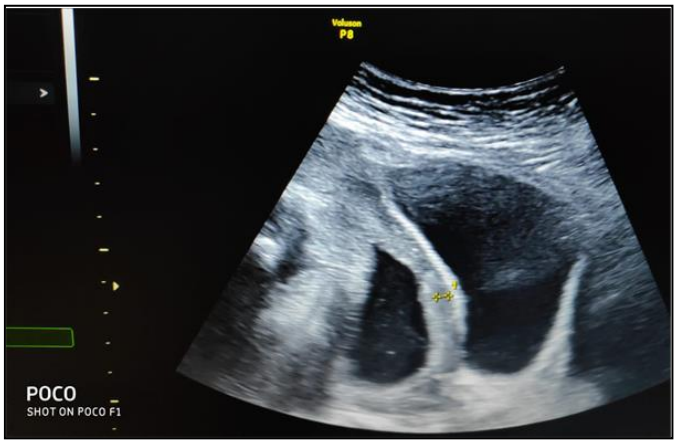


Image 2: Transvaginal Ultrasound of lower uterine segment cesarean scar thickness and dehiscence

Discussion

The main objective of the study was to determine the appearance and thickness of the previous uterine scar. 144 patients were included in the study. All the patients were subjected to transvaginal ultrasound to evaluate the thickness of scar. Based on the scar thickness they were divided into two groups. Each group further evaluated for scar dehiscence. In this study 96 had less than 3mm and 45 had more than 3mm scar thickness. Asakura H *et al*., using transvaginal ultrasound examination of previous scarred uterus at 36 to 38 weeks of gestation and its correlation with the occurrence of uterine dehiscence and rupture was examined. With the cut of value of 2mm or less as criteria for poor healing and the sensitivity and specificity of 86.70% and 100.00% respectively[9]. Prathap Kumar *et al*., study concluded that as gestational weeks increases leads to decrease in the scar thickness[10]. Another study done by Qureshi *et al*., concluded that the thickness of 2mm and more had good healing and those with less than 2 mm had poor healing[11]. In our study results also showed similar to the findings of Asakura H *et al*., and Qureshi *et al*., which is showed the thickness of 2mm and less had a poor healing. The present study suggest that sonographic uterine scar evaluation is potentially capable of identifying those patients with a thin or defective scar which could had carry a high risk of subsequent rupture when a trail of VBAC is attempted. The present study the cut of value kept 3mm. In this study 3mm and above scar considered good healing and less than 3mm as poor healing. Less than 3mm showed poor healing with sensitivity of 43.13% and specificity of 97.43% and more than 3mm showed better sensitivity and specificity. If the site of ruptured scar is confined to the lower uterine segment the rate of repeat rupture of dehiscence in labour 6%. If the scar includes upper segment the repeat rupture rate 32% hence women who had rupture of uterus should undergo repeat caesarean delivery as soon as the foetus is matured. Jastrow N *et al*. study also concluded that surgical procedure can be done based on the scar thickness and position. The study results have explained the use of transvaginal sonography is useful for the detection of integrity and scar dehiscence.

Conclusion

Transvaginal sonography was performed at term gestation to measure the thickness of the previous caesarean scar. These values are important to predict the development of intrapartum uterine rupture by using the thickness of previous uterine scar measured during pregnancy. This study results concluded that transvaginal ultrasonography is accurate methods to measure lower segment uterine scar integrity and dehiscence.

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