ULTRASOUND PREDICTABILITY OF LOWER UTERINE SEGMENT CESAREAN SECTION SCAR THICKNESS

Gynaecology

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ABSTRACT

OBJECTIVE: The objective of this study is to find out association between scar thickness, assessed sonographically, and intraoperative findings (IOF). **STUDY DESIGN:** Descriptive study. **PLACE AND DURATION OF STUDY:** Department of Obstetrics and Gynecology, Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar from June 2019 to May 2020. **METHODOLOGY:** A total of 70 pregnant patients were included in this study. Transabdominal ultrasound was done for scarred uteri. Sonographic findings were co-related with intraoperative findings. All the given data were entered on SPSS version 23. Age was expressed as mean $\pm$ SD. Parity, gestational age, and interval between cesarean sections were expressed as frequencies with percentages. Statistical analysis was done by using Chi-square test for categorical data for association between sonographic scar thickness and intraoperative findings. The statistical significance was set at p-value <0.05 . **RESULTS:** The age range of the patients was 20-36 years with a mean of 27.91 ± 3.690 years. Gestational age at the time of cesarean section was between 27-40 weeks of gestation with a mean of 37 ± 2.126 weeks. The interval from previous cesarean was 10 months at the minimum, and 6 years at the maximum with a mean of 2.29 ± 1.0 months. Mean scar thickness was 2.5 mm. Association between scar thickness ($<1-3$ mm) and intraoperative findings of dehiscence and rupture showed a p-value of <0.001 . **CONCLUSION:** Sonographic assessment of a uterine scar has a practical application to determine the thickness of previous scar, and assess its integrity.

KEYWORDS

Uterine Rupture, vaginal Birth After Cesarean Section (VBAC), Cesarean Section, Scar Thickness, Ultrasound.

INTRODUCTION

Lower segment cesarean section (LSCS) rates are raising throughout the world. Women with previous one cesarean can undergo either the trial of vaginal birth or elective repeat cesarean section in their next pregnancy. Uterine scar dehiscence is one of the complications associated with previous LSCS, in which there is disruption and separation of previous scar. The incidence reported for uterine scar dehiscence was between 0.2-4.3% of all pregnancies associated with previous cesarean section. A successful vaginal birth after cesarean (VBAC) is associated with fewer complications than an elective repeat cesarean section. However, elective repeat LSCS is better to be done than failed trial of labour after LSCS. Advantages of VBAC include avoidance of major abdominal procedure, decrease risk of postpartum hemorrhage, and purpural infections and reduction in the recovery time after delivery. It also reduces the further risk of repeat cesarean section, lessen the chances of cesarean hysterectomy, bowel and bladder damage, and need for blood transfusion and abnormal placental conditions in future, e.g. placenta previa and placenta accreta. Disadvantages of VBAC are risk of uterine rupture due to dehiscence of previous cesarean section scar. It can be life-threatening due to excessive hemorrhage.

There are different methods to check the integrity of previous cesarean section scar. These include post-operative echographic evaluation of uterine wound, interval hysterography, and MRI imaging. Ultrasonography can be used to check the integrity of previous scar; and it can be helpful in the prediction of uterine rupture during labour, and detect the lower uterine thickness. The lower uterine segment (LUS) thickness is categorised into 4 grades. Grade 1 is a well formed LUS. Grade 2 is a thin uterine scar but no uterine contents are visible. Grade 3 is scar dehiscence. Grade 4 is dehiscent or ruptured scar.

Different studies had given varying cut-off values for the safe trial of VBAC, but still there is no consensus on a safe limit. The cut-off value of LUS scar thickness in different studies range between 2-3.5 mm, above which the chances of uterine rupture during labour is less likely. Factors associated with uterine scar rupture during labour include number of LSCS, inter-delivery interval, prior vaginal delivery, age of the mother, gestational age at delivery, and birth weight.

OBJECTIVE

The objective of the present study was to find out the association between scar thickness, assessed sonographically, and intraoperative integrity.

MATERIAL AND METHODS

This descriptive study was conducted in Obstetrics and Gynecology Department of Sri Krishna Medical College and Hospital (SKMCH), Muzaffarpur, Bihar from June 2019 to May 2020. Patients were recruited from outpatient and inpatient departments of SKMCH. Inclusion criteria were patient with previous LSCS, singleton pregnancy, and cephalic presentation and after the age of viability admitted either for elective LSCS or emergency LSCS. Exclusion criteria were patients with twin gestations, previous spontaneous vaginal deficiencies (SVDs) and placenta previa. History and examination of all included patients were done. Age, gravidity, parity, time interval between previous LSCS, number of LSCS were asked specifically in history. General physical examinations and abdominal examinations were done in these patients and scar tenderness was elicited.

The LUS scar thickness was assessed from the Radiology Department of SKMCH by transabdominal ultrasonography with a partially full bladder after taking informed consent. Ultrasound was done 24 hours prior to undergoing elective LSCS or, in case of emergency LSCS, prior to surgery without contractions. The LUS was assessed both in longitudinal and transverse plane under magnification to find out the weakened area or rupture. At least two measurements were recorded and the lowest measurement was taken. These sonographic findings were related with the intraoperative LUS appearance.

During surgery, the LUS scar was identified by the surgeon and the scar was scored according to normal, thinned out, dehiscent or rupture scar.

All the given data were entered on Statistical Package for Social Sciences (SPSS) version 23. Age was expressed as mean $\pm$ SD. Parity, gestational age, and interval between cesarean sections were expressed as frequencies with percentages. Statistical analysis was done by using Chi-square test for categorical data. Scar thickness was taken as a dependent variable; while sonographic findings and intraoperative findings were taken as independent variables. The statistical

significance was set at p-value <0.05.

RESULTS

The age range of the patients in present study was 20-36 years with a mean of 27.91 ± 3.69 years. Gestational age at the time of cesarean section was between 27-40 weeks of gestation with a mean of 37 ± 2.12 weeks. The interval from previous cesarean was 10 months at the minimum and 6 years at the maximum with a mean of 2.2986 ± 1.00903 . Regarding gravidity, 40 (57%) patients were 3rd or 4th gravida, 19 (27%) patients were second gravida and 41 (58%) patients were para 2 and 3; while 24 (34%) patients were para 1. Only one (1.4%) patient was having parity of more than 5 with a mean parity of 2.01 ± 0.95 .

Regarding scar thickness, which was assessed sonographically, 12 (17%) patients were having a scar thickness of more than 3 mm, 15 (21%) patients were having thickness of 3 mm and there were 25 (36%) patients in which scar thickness was between 2.5-3 mm; while 6 (8.5%) patients had scar thickness of 2.5 mm. Between 2-2.5 mm thicknesses, there were 12 (17%) patients. Scar thickness of 18 (26%) patients were between 1.5-2 mm. Minimum scar thickness was 0.9

mm, which was found in one (1.4%) patient only. Mean scar thickness was 2.5 mm.

Regarding intraoperative findings, in 20 (28.6%) patients scar was found to be normal; while 31 (44.3%) patients had thinned out scar intraoperatively. Eighteen (25.7%) patients were found to be having dehiscent scar and in only one (1.4%) patient scar was found to be completely ruptured and that patient has a scar thickness of 0.9 mm on ultrasound.

Regarding the association of scar thickness with the intraoperative findings, only one (1.4%) patient had scar thickness of <1 mm and scar was ruptured intra-operatively. In 26 (37%) patients, scar thickness was between 1-2 mm; and out of 26 (37%) patient scar of 1 (1.4%) patient was normal, 10 (14%) has thinned out, in 15 (21%) cases it was dehiscent, and none was rupture. Between 2.1-3 mm scar thickness, scar was normal intraoperatively in 14 (20%) cases, 16 (23%) scars were thinned out and 3 (4.2%) were dehiscent. In cases with scar thickness of more than 3 mm, 5 (7%) scars were found to be normal, 5 (7%) were thinned out, and no scar was found to be dehiscent or rupture. This is shown in Table 1.

Table – 1 : Distribution of cases for intraoperative findings in relation to the sonographic scar thickness (n=70)

Intraoperative findings	Scar thickness (mm)				Total
	<1mm	1-2	2.1-3	>3	
Normal	0(0.0%)	1(5.0%)	14(70%)	5(25%)	20(100%)
Thinned out	0(0.0%)	10(32.3%)	16(51.6%)	5(16.1%)	31(100%)
Dehiscent	0(0.0%)	15(83.3%)	3(16.7%)	0(0.0%)	18(100%)
Rupture	1(100%)	0(0.0%)	0(0.0%)	0(0.0%)	1(100%)
Total	1(1.4%)	26(37.1%)	33(47.1%)	10(14.3%)	70(100%)

Chi-square test=96, p-value <0.001 at df 9.

DISCUSSION

The risk of uterine scar dehiscence or rupture is a life-threatening condition for both mother and baby. The frequency of uterine rupture is 0.5- 0.8% after one LSCS.1 Measuring lower uterine segment thickness before surgery in patients with scarred uteri can identify those patients who are at risk of dehiscence or rupture. In this study, sonographic findings were compared with the intraoperative findings to assess the relationship between the two, and support our findings in using ultrasound as a diagnostic modality in cases of previous LSCS.

The age range of the patient in our study was 20-36 years with a mean of 27.91 ± 3.690 years. Gestational age was between 27 -40 weeks with a mean of 37 ± 2.126 weeks. These findings are comparable to the findings by Jastrow et al.,2 Cheung et al., Micheal et al., and Martin et al. who performed the study in third trimester as well. While it differs from the findings of Qureshi et al., who started assessing lower segment as early as 16 weeks of gestation. Many studies in literature assessed the LUS even before conception. The benefit of performing ultrasound at later gestation is that LUS has been developed and the presenting part is engaged in the pelvis.

Many studies have been done to assess the scar thickness by ultrasound. The lower segment scar is visible in only 30% of the patients. Studies have suggested that there is an inverse relationship between scar thickness, assessed sonographically, and risk of uterine rupture. The risk factors associated include induced labour, reduced inter-delivery interval, the number of previous cesarean, type of closure of uterus, previous vaginal delivery, maternal age, gestational age at delivery, and fetal birth weight. Sonographic and intraoperative analyses show a p-value of 0.001, which is significant. Based upon this findings, ultrasound can be used to assess the LUS and this modality can be used in third trimester in those cases where trial of labour after previous LSCS is intended. This finding is supported by the findings of Mohammad et al. Risk of thinning, dehiscence or rupture of scar is based upon the ultrasound appearance of LUS and its measurement. Suzuki et al. and Fukude et al. also supported these findings.

Transabdominal ultrasound was used in our study to assess lower uterine segment thickness or thinness. Suzuki et al., Fukude et al., and Rozenberg et al. also used transabdominal ultrasound to assess previous scar. While Gotoh et al. used transvaginal ultrasound to assess the lower segment scar.

Based upon the results of this study, sonographic assessment of previous scar has a practical application to predict the thickness and

thinness of previous scar. It can be performed in patients with previous scar reliably, to assess its integrity. One of the drawbacks of using this technique is that it is operator dependent. To overcome this problem, standardisation of technique is important. Further studies are needed to define a safe cut-off at which trial of labour after LSCS can be given.

CONCLUSION

Sonographic assessment of a uterine scar has a practical application to determine the thickness of previous scar, assess its integrity.

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