ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 9, Issue – 6, December – 2024 , Page No. : 22 – 26

Comparison of lower uterine segment thickness in 3rd trimester of pregnancy with and without previous caesarean section history

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Citation this Article: Dr. Vinay Bhangdiya, Dr. Ashutosh Chitnis, "Comparison of lower uterine segment thickness in 3rd trimester of pregnancy with and without previous caesarean section history", IJMSIR - December - 2024, Vol – 9, Issue - 6, P. No. 22 – 26.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Objective: To compare lower uterine segment (LUS) thickness in third trimester of previous caesarean pregnancy with normal pregnancy.

Methods: Women undergoing third-trimester sonographic examination, 50 with a history of LSCS and 50 with no history of cesarean delivery, were included for sonographic measurement of the lower uterine segment with a high-frequency probe. LUS was examined longitudinally and transversely to find areas of obvious uterine scar dehiscence. The calipers placed at the thinnest place so that the line of measurement had to be exactly perpendicular to the measured wall. Full LUS thickness was quantified with 1 cursor at the interface between urine and the bladder wall and another at the interface between amniotic fluid (or fetal scalp) and the decidua, P < .05 was considered significant.

Results: The mean age participants was 25.78 years (SD = 3.87). The lower uterine segment was thinner in women with a previous cesarean delivery compared with normal group (mean ± SD, 3.140 ± 0.495 versus 4.096 ± 0.413 mm; P< .001)

Conclusions: The lower uterine segment during a third-trimester sonographic examination is significantly thinner in women with a previous cesarean delivery.

Keywords: Caesarean Section, Lower Uterine Segment, Bladder Wall, Normal Pregnancy.

Introduction

Caesarean section rates are on the rise in many countries, according to the World Health Organization (WHO), with averages in some regions surpassing 15% of all births (WHO, 2015) [1]. Although cesarean delivery is frequently required for maternal or fetal reasons, there are hazards involved, such as difficulties in following pregnancies such placental abnormalities and uterine rupture [2]. Because of these dangers, subsequent pregnancies require thorough evaluation and counseling regarding the delivery method.

A crucial factor in the management of pregnancies after a prior lower segment Caesarean section (LSCS) is the

determination of the thickness of the lower uterine segment (LUS) [3]. Given the increased incidence of cesarean deliveries worldwide and the growing need for vaginal birth after cesarean (VBAC), this topic is extremely important. The integrity of the uterine scar from the prior caesarean section is evaluated as part of the VBAC decision-making process. Of special relevance is the lower uterine section, where the scar usually forms. In daily practice, the evaluation of the morphological and functional characteristics of the uterine scar is primarily subjective and is based on examination, bimanual palpation, ultrasound assessment of scar, and thickness measurement. Since ultrasound is widely accessible and non-invasive, it has emerged as the main method for determining LUS thickness [4].

The lower uterine segment is visualized on ultrasonography with outer hyperechoic layer considered to be the posterior bladder wall and the uterovesical peritoneal reflection; the inner less echoic layer that is considered to be the myometrium and of decidua.[5]

There is a need of data for lower uterine segment thickness for establishing risk stratification in previous LSCS pregnancy as fewer studies have been undertaken for it [6-11].

Materials and Method

A total of 100 women participated in the study, with 50 having a history of cesarean delivery and 50 without any previous cesarean. All participants underwent sonographic evaluation between 36 and 38 weeks of gestation in 3rd trimester. Exclusion criteria included multiple gestations and refusal to participate.

Each subject underwent routine transabdominal sonography for the fetal biometry and growth. Along with the above, lower uterine segment thickness was measured. Informed consent was taken from all the participants.

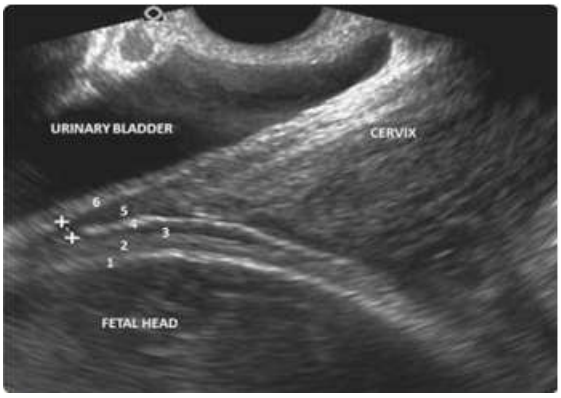
The LUS thickness measurement was performed transvaginally with 4-8 MHz transducer probe when the bladder was empty (i.e., when the women empty the bladder); the LUS was examined longitudinally and transversely to find areas of obvious uterine scar dehiscence. The calipers placed at the thinnest place so that the line of measurement had to be exactly perpendicular to the measured wall. Full LUS thickness was quantified with 1 cursor at the interface between urine and the bladder wall and another at the interface between amniotic fluid (or fetal scalp) and the decidua.

The Data analysis was performed using a combination of descriptive and inferential statistical methods. Descriptive statistics were used to summarize the central tendencies and dispersion of continuous variables such as age and Lower Uterine Segment (LUS) thickness across different trimesters. The mean, median, interquartile range (IQR), mean, and standard deviation (SD) were calculated to provide a comprehensive overview of the data distribution.

To compare differences between the normal and previous LSCS groups, inferential statistics were employed

All statistical analyses were conducted using JASP version 0.18.3 and R version 4.3.3, and a p-value of less than 0.05 was considered statistically significant.

Figure 1 shows layers from fetal to maternal side as 1 - fetal skull, 2 - scalp, 3 – amniotic fluid, 4 – decidua, 5 – myometrium and 6 – bladder wall.



Result

Figure 2: Shows LUS thickness value ranges in previous caesarean pregnancy group.

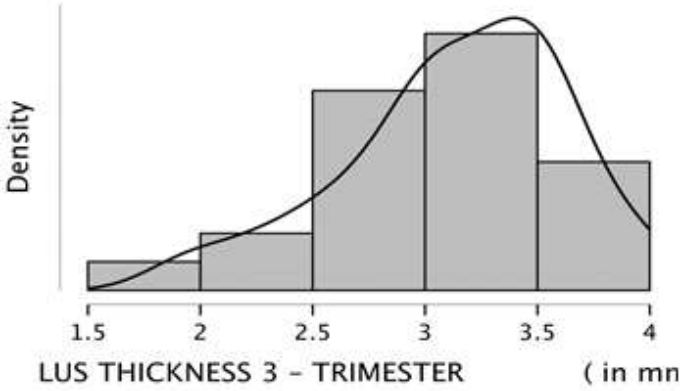


Figure 3: Shows LUS thickness value ranges in normal pregnancy group.

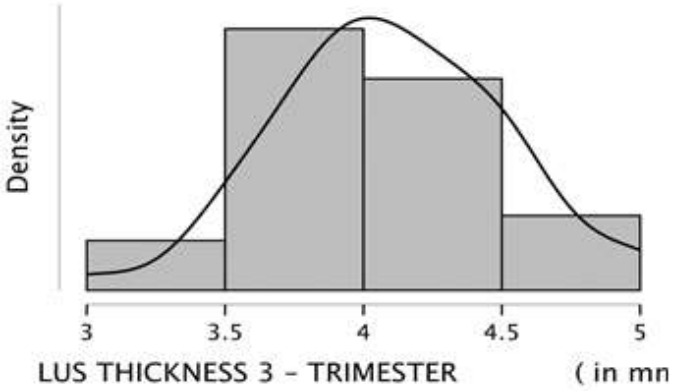


Figure 4: Shows age wise distribution of study population

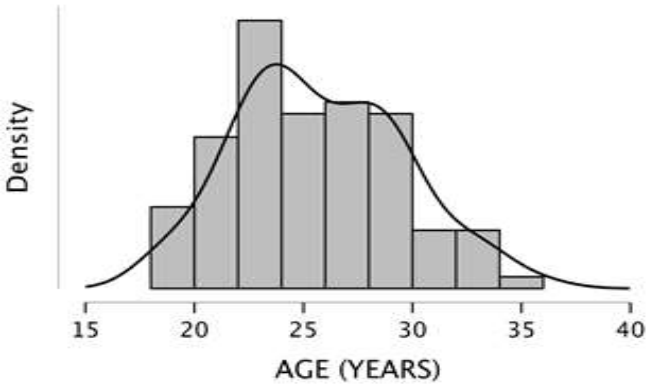


Table 1:

Lus Thickness (in mm)	Normal	With H/O Previous Lscs
Mean	4.096	3.140
Standard Deviation	0.413	0.495
Standard Error	0.060	0.072
Coefficient Of Variation	0.101	0.158

Discussion

Descriptive statistics revealed key information about the participants. The age of the participants ranged from 18 to 36 years, with a mean age of 25.78 years (SD = 3.87). The median age for the normal group was 25.0 years (IQR: 22.3, 28.8), while for the previous LSCS group, it was 25.5 years (IQR: 23.0, 28.8) with a p-value of 0.5, indicating no significant difference in age distribution between the two groups. Parity showed a significant difference ($p < 0.001$), with 44% of the normal group being multiparous compared to 100% in the previous LSCS group. The median number of previous LSCS in the previous LSCS group was 1.0 (IQR: 1.0, 1.0), significantly higher than the normal group, which had no previous LSCS ($p < 0.001$).

LUS thickness showed significant differences between the groups. The normal group had a median thickness of 4.00 mm (IQR: 3.80, 4.40) compared to 3.20 mm (IQR: 2.90, 3.50) in the previous LSCS group ($p < 0.001$).

The lower uterine segment was significantly thinner in women with a previous cesarean delivery compared with control subjects (mean ± SD, 3.140 ± 0.495 versus 4.096 ± 0.413 mm; P< .001)

The between-subjects effects analysis revealed a significant main effect of group on LUS thickness ($F(1, 87.846) = 112.722$, $p < .001$, $\eta^2p = 0.548$), indicating that, the normal group had higher LUS thickness compared to the previous LSCS group. This finding highlights the impact of prior cesarean sections on uterine integrity and its potential implications for subsequent pregnancies.

The mean difference in LUS thickness between the normal and previous LSCS groups was 0.955 mm.

Our study confirms the more thinning of lower uterine segment in previous caesarean pregnancy, but a larger, clinical trial would be needed to evaluate outcomes based on sonographic thickness of lower uterine segment.

Conclusion

My study provides insights into the lower uterine segment thickness of pregnant women with and without a history of caesarean section. The findings suggest that the age distribution between the two groups is similar, but women with a history of LSCS are exclusively multiparous, highlighting the necessity for tailored clinical management in this population. The observed significant difference in LUS thickness between groups, emphasizes the importance of vigilant monitoring to mitigate the risk of uterine rupture and other complications. Regular ultrasound assessments of LUS thickness can provide crucial information for making informed decisions about the mode of delivery and timing of intervention if necessary.

Additionally, the differences in LUS thickness between normal and previous LSCS groups highlight the need for individualized care plans.

Further research is warranted to explore the long-term outcomes of pregnancies in women with varying degrees of LUS thickness, particularly focusing on maternal and neonatal health post-delivery.

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