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A study on sonographic measurement of post caesarean scar at term and its correlation with intraop grading of lower uterine segment and feto maternal outcome

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Abstract
Aim: To determine the sonographic measurement of post caesarean scar and its effect on feto- maternal outcome.
Objectives
1. To assess the sonographic measurement of scar thickness near term and to correlate with intraoperative visual assessment of LUS done during caesarean section.
2. To determine the minimum thickness of the lower uterine segment which helps to determine the mode of delivery,either a vaginal birth after caesarean delivery (VBAC) or an elective or emergency lower segment caesarean section (LSCS).
Material and Methods
Study Area: The study was conducted among patients attending to the Department of obstetrics and gynaecology in Mallareddy Medical College for Women, hospital, Hyderabad.
Study Design: Prospective observational study Study Period
September 2022 to February2024 Study Population Pregnant women with one or more previous caesarean section presenting to the department of obstetrics and gynaecology of Malla Reddy Medical College for Women and hospital, Hyderabad.
Method: For the purpose of the study, the bladder was considered moderately full when the vertical length of the bladder on trans abdominal scan is about 6- 8cm i.e., at 2 hours after ingestion of 500ml water. Every patient was asked to drink 500ml water two hours before scheduled ultrasound was done and not to void urine. Ultrasound equipped with Convex Array with frequency 2- 5 MHz at transducer will be used to measure the thickness of lower uterine segment and to detect defects in the lower uterine segment. -Then the case was posted according to scar thickness, scar tenderness, maternal tachycardia into elective,emergency and vaginal birth after caesarean section. During operation we correlated ultrasonography scar thickness to visual intra- op findings and graded them.
Results: This prospective observational study was conducted in the department of Obstetrics and Gynecology of Malla Reddy Medical College for Women and hospital, Hyderabad with an aim to determine the sonographic measurement of post caesarean scar and its effect on feto- maternal outcome. The results of the study showed, the mean age was 27.3± 2.8 years with majority of them being second gravida, the mean gestational age was 37.2±1.1 weeks and many women were previous one LSCS. The indication of the present LSCS was mostly due to previous LSCS.The preoperative
LUS was 2.4± 0.7 mm and the intraoperative findings showed grade I in 44.8%and grade II, III, IV IN 28.8%,12.8and %13.6%. The indication of the present LSCS was mostly due to previous LSCS.In my study 15 cases were given trial for TOLAC with scar thickness >3mm out of which 5 cases(4%) had successful VBAC.Out of 120 caesarean sections 68 were taken up for emergency LSCS (56.7%) and 52 cases were planned elective LSCS(43.3%). 67.2% the maternal outcome was good and the remaining 32.8% had atonic PPH, traumatic PPH and SSI. The APGAR score was close to being above 8 at all times and 24% babies had transient tachypnoea.
Conclusion: Trial of labour after caesa rean section should be encouraged in all patients with previous caesarean section provided no other contraindication exits. Highly correlated with intraoperative findings sonographic evaluation of lower uterine segment thickness is accurate,safe procedure and highly recommended in considering trial of labour after caesarean section. Predicting the risk before and carefully selecting patients for trial of labour helps in
increasing VBAC success rate.Thereby Improving fetomaternal outcome and decreasing the number of emergency laparotomies in cases of uterine rupture.

Keywords: Advanced Intermittent auscultation, Intermittent Auscultation, Intelligent Intermittent Auscultation, Intrapartum fetal monitoring, Fetal asphyxia, Fetal heart rate decelerations, Intrapartum fetal surveillance, late decelerations, baseline variability

Introduction

Caesarean section is a surgical procedure to deliver an infant through an abdominal incision after the period of viability [1]. Caesarean section rate significantly increased worldwide from 18.2% in 2002 to 30.3% in 2012 [2]. In a parous woman with previous caesarean section the chance of a repeat section is as high as 67% [3]. The national average rate of caesarean section in India is 21.5%(National family health survey).

A trial vaginal delivery after caesarean section can save women from risk of repeat C -Sections.
According to RCOG October 2015 guidelines, TOLAC in planned VBAC are appropriate for majority of women. The frequency of uterine rupture during labour has been estimated at between 0.3% to 3.8% and that of uterine dehiscence at between 0.6% to 4% by different studies.
Unsecure prediction of integrity of scarred LUS during labour appears to be one of the reasons for high repeat

caesarean rates.Sonographic methods to measure LUS thickness of previous scar in third trimester have been used to diagnose a degree of LUS thinning, scar healing, scar dehiscence and uterine defect in uterine scar rupture cases [4]. Previous studies have demonstrated that a normal lower uterine segment thickness in healthy scar predicts a safe trial of vaginal birth after C-section. However, the clinical application of LUS measurement in management of VBAC remains controversial [5].

There are different methods for scar evaluation like local examination, TAS,TVS,hysteroscopy,hysterography are other methods for evaluation of scar strength.TAS provides a reasonable accuracy with high sensitivity for scar dehiscence or rupture in third trimester of pregnancy.The possibility of uterine rupture as a result of the prior caesarean section scar dehiscence is a drawback of TOLAC, Because of the severe postpartum hemorrhage, it may be fatal. Ultrasonography can be used to detect decreased uterine scar thickness and to assess the integrity of a previous scar. It can also be useful in predicting the possibility of uterine rupture at the time of labour [6, 7]. The lower uterine segment forms after 28 weeks of gestation and it has 3 definitions

- Metric definition -is that part of uterus which measures 5cm from the internal os. -Physiological definition -is that part of uterus which stretches in labour.
- Anatomical definition-which lied below the level at which the visceral peritoneum is reflected on the dome ofbladder from being adherent to upper uterine segment.

The lower uterine segment (LUS) thickness is categorized into 4 grades [8,9,34].

Factors associated with uterine scar rupture during labour include number of LSCS [10].

- Inter-delivery interval
- Prior vaginal delivery
- Age of the mother
- Gestational age at delivery
- Birth weight.

Rationale of the Study

Despite numerous studies by large number of leading Obstetric and Gynaecology organisations about safe childbirth, showing a very low risk of uterine rupture in vaginal birth after Previous cesarean section (uterine rupture 0.2–0.7%),the rate of repeated caesarean section is constantly growing.

Numerous studies have demonstrated that undergoing a caesarean section should be considered a significant risk to the mother due to higher rates of morbidity and mortality when compared to vaginal delivery. There is a higher risk of infection during the recovery phase, particularly in situations where there is premature rupture of membranes. In non recurring causes of caesarean section—such as fetal distress, placenta previa, breech presentation, unfavorable fetal position, or prolonged labor—an attempt to trial vaginal delivery can be done. Although the nature of uterine dehiscence or rupture as a complication is unpredictable.

Hence, the present study was conducted to estimate the risk of scar dehiscence/rupture by trans abdominal ultrasound,and to determine the correlation between previous scar thickness measured by transabdominal ultrasound with visual assessment of LUS during surgery. Thereby improving fetomaternal outcome and decreasing the number of emergency laparotomies in cases of uterine rupture.

Aims

To determine the sonographic measurement of post caesarean scar and its effect on feto- maternal outcome.

Objectives

1. To assess the sonographic measurement of scar thickness near term and to correlate with intraoperative visual assessment of LUS done during caesarean section.
2. To determine the minimum thickness of the lower uterine segment which helps to determine the mode of delivery, either a vaginal birth after caesarean delivery (VBAC) or an elective or emergency lower segment caesarean section (LSCS).
3. To determine the minimum thickness value for predicting impending scar rupture.

Material and Methods

Study Area

The study was conducted among patients attending to the Department of obstetrics and gynaecology in Mallareddy Medical College for Women, hospital, Hyderabad.

Study Design

Prospective observational study Study Period September 2022 to February2024 Study Population Pregnant women with one or more previous caesarean section presenting to the department of obstetrics and gynaecology of Malla Reddy Medical College for Women and hospital, Hyderabad.

Inclusion Criteria

1. Age between 20 to 40years
2. Gravida with one or more previous caesarean sections
3. Gestational age between 36- 40weeks
4. Normal placental location
5. No congenitalfoetal anomalies
6. Singleton pregnancy
7. Average amnioticfluid index

Exclusion Criteria

1. Subjects < 20 and >40 years
2. Extreme preterm
3. Abnormal placental location
4. presence of congenital anomalies 5. Oligohydramnios/ polyhydramnios
5. Tumors complicating caesarean section
6. Fibroids in LUS

Sample Size

The formula used was N= (Z1-"/2)2 * Sensitivity * (1-Sensitivity)/ W2 * P Using absolute precision Sensitivity: 0.926 Proportion of subjects of Target Condition P = 0.13.5(63.56%) W (Width of Confidence Interval) = 0.125(12.5%) Type
I error: 1.96 (1.96)2*
(0.926) * (1-0. 926)/ (0.135) x (0.125)2 125

The minimum sample size required was 125 patients with the above formula.

Study Methods

- All patients seen at our hospital, during the study period were screened to determine eligibility for inclusion in the study.
- The subjects meeting study criteria were explained (subjects attender) the nature and purpose of this study and were included in the study after their informed consent is taken.
- A Study proforma was used to collect the patients details and findings.
- History was taken from patients and attenders.
- Obstetric history including-.Timing and interval from previous caesarean section.
- Indication for previous caesarean section
- Any complication during pregnancy and previous caesarean section
- Accurate dating from last menstrual period by Naegle ‘s rule and gestational age was confirmed by early ultrasound.. -Number of previous caesarean sections
- A thorough general, physical, obstetric examination including abdominal and vaginal examination and also presence of scar tenderness was noted.
- Obstetrical ultrasound was done for gestational age, placental site, amount of liquor and feta lwell-being and to exclude any malformations.
- Trans abdominal sonographic assessment of thickness
- of lower uterine sesgment was done for the women who satisfied the inclusion criteria.
- For the purpose of the study, the bladder was considered moderately full when the vertical length of the bladder on trans abdominal scan is about 6- 8cm i.e., at 2 hours after ingestion of 500ml water. Every patient was asked to drink 500ml water two hours before scheduled ultrasound was done and not to void urine. Ultrasound equipped with Convex Array with frequency 2- 5 MHz at transducer will be used to measure the thickness of lower uterine segment and to detect defects in the lower uterine segment.
- Then the case was posted according to scar thickness, scar tenderness, maternal tachycardia into elective,emergency and vaginal birth after caesarean section. During operation we correlated ultrasonography scar thickness to visual intra- op findings and graded them into following:

Grade I: well, developed lower uterine segment.

Grade II: Thin lower uterine segment but contents are not visible.

Grade III: Translucent (papery thin) lower segmentand contents are visible.

Grade IV: Well circumscribed defect, either dehiscence/rupture.

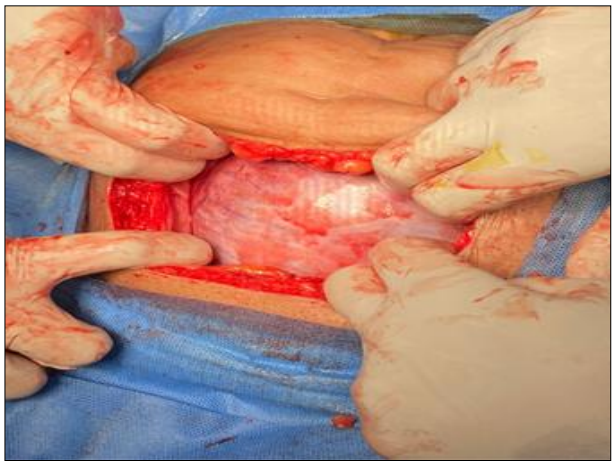

Fig 1: well, developed LUS

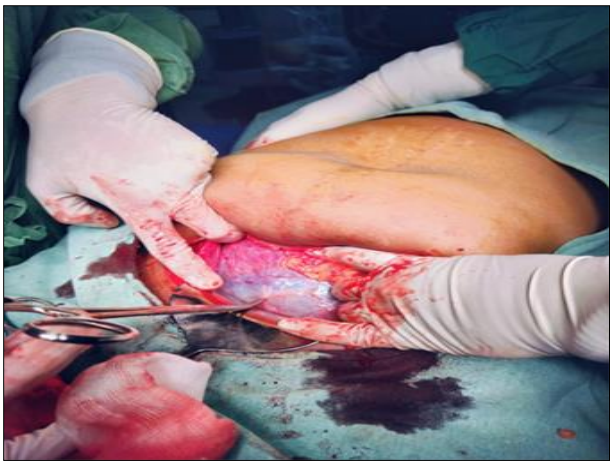

Fig 2: thin LUS but contents are not visible

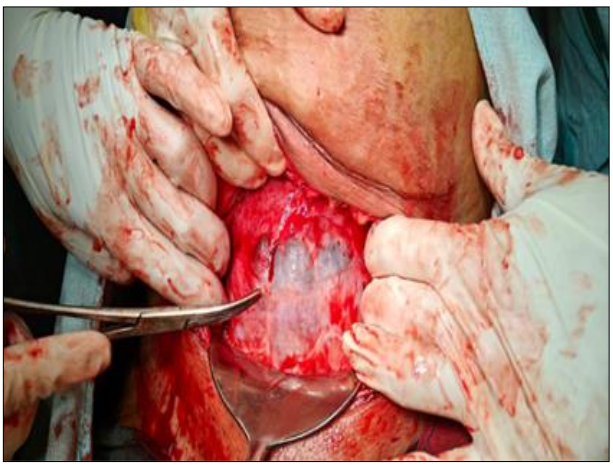

Fig 3: translucent LUS

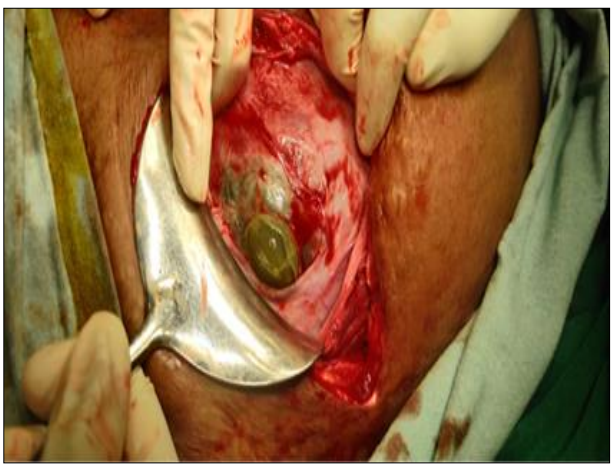

Fig 4: scar dehiscence or rupture

- Maternal outcome was assessed by need for any Emergency or elective LSCS,status of dehiscence of previousuterine scar, post-partum hemorrhage, need for any intra- op blood transfusions and total hospital stay.
- Foetal outcome was assessed by APGAR score, need for NICU admissions,transient tachypnea of newborn, needfor mechanical ventilation.

Results

Table 1: Distribution according to parity

Parity	Frequency	Percent
G2P1L1	81	64.8%
G3P1L1A1	10	8%
G3P2L1D1	7	5.6%
G3P2L2	15	12%
G4P1L1A2	4	3.2%
G4P2L1A1D1	3	2.4%
G4P2L2A1	2	1.6%
G5P2L1D1A2	3	2.4%
Total	125	100%

The parity among the 125 subjects was noted were majority of them were G2P1L1and the remaining 35.2% areas shown in table 2.

2. Distribution according to gestational age

The mean gestational age in the study was 37.2± 1.1 weeks with 69.6% being term gestations and the remaining 30.4% were pre- term.

Table 2: Distribution according to last childbirth (LCB)

LCB in years	Frequency	Percent
1	11	8.8%
2	49	39.2%
3	34	27.2%
4	25	20%
5	6	4.8%
Total	125	100%

Table 2 shows the order of last childbirth were in 39.2% it was second followed by 27.2% (3rd), 20% (4th), 8.8(one) and 4.8% (5th).

Table 3: Indications for LSCS

Indication	Indication for LSCS in Previou pregnancy	Indication for LSCS in Present pregnancy
Previous LSCS	28	112
prev LSCS With breech		5
prev LSCS With fetal distress		2
prev LSCS With MSL		3
prev LSCS with severe pre-eclampsia		3
Failed induction	17	-
CPD	16	-
FP	15	-
Breech	11	-
PROM	8	-
Fetal distress	7	-
Severe pre- eclampsia with poor BISHOPS score	6	-
Severe oligohydramnios	5	-
MSL	5	-
Severe pre- eclampsia	3	-
Breech with polyhydramnios	2	-
Oligohydramnios	2	-
Total	125	125

Table 4: Distribution according to procedure

Procedure	Frequency	Percent
LSCS	120	96%
Emergency LSCS	68	56.7%
Elective LSCS	52	43.3%
VBAC	5	4%
Total	125	100%

Among the 125 women 5 (4%) underwent vaginal birth after caesarean section,56.7% underwent emergency LSCSand 43.3% underwent elective LSCS as seen in table 4.

Table 5: operative lower uterine segment findings

LUS (scar thickness)	Frequency	Percent
>3.65mm	**14**	**11.2%**
<3.65mm	**111**	**88.8%**
Total	**125**	**100%**
Mean LUS: 2.4± 0.7mm		

The mean lower uterine segment was >3.65mm in 11.2% and <3.65 mm in 88.8% women with the mean being 2.4± 0.7mm as shown in table 5.

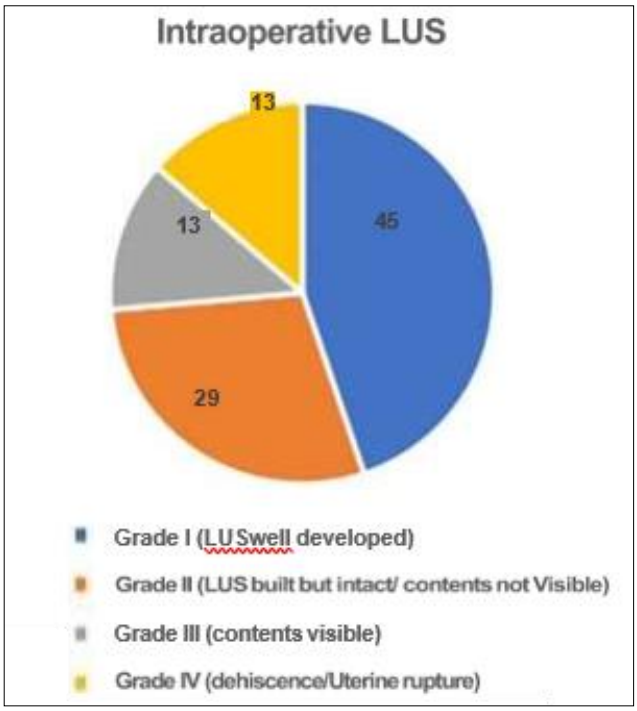

Fig 5: results showing intraoperative LUS

figure- shows the intraoperative findings where the LUS was grade I in 44.8%, grade II in 28.8%, grade III in 12.8%and was grade IV in 13.6%.

7: results showing maternal outcome

In the study among the 125 women 15 (12%) had atonic post- partum haemorrhage, 24 (19.2%) had traumaticpost-partum haemorrhage and 2 (1.8%) had wound infection.

8. results showing foetal outcome

The foetal outcome showed the mean APGAR at birth was 7.9± 1.3 and at 5 minutes it was 8.6± 0.4 and transient tachypnoea was noted in 30 (24%) babies.

9. Linear scatter plot

shows the correlation between preoperative LUS findings and intraoperative LUS were a statistically
significant strong positive correlation (r= 0.69, p<0.001) was obtained suggesting preoperative LUS can be used as basis for estimation of LUS

Summary & Conclusion

This prospective observational study was conducted in the department of Obstetrics and Gynecology of Malla Reddy Medical College for Women and hospital, Hyderabad with an aim to determine the sonographic measurement of post caesarean scar and its effect on feto- maternal outcome. The study was done between September 2022 to February 2024. A total of 125 subjects were included in the study. After obtaining consent from all the subjects' and their attendants. Detailed history and clinical examination was noted using a pre tested questionnaire.

The results of the study showed, the mean age was 27.3± 2.8 years with majority of them being second gravida, the mean gestational age was 37.2±1.1 weeks and many women were previous one LSCS.

The indication of the present LSCS was mostly due to previous LSCS.The preoperative LUS was 2.4± 0.7 mm and the intraoperative findings showed grade I in 44.8%and grade II, III, IV IN 28.8%,12.8and %13.6%.

The indication of the present LSCS was mostly due to previous LSCS.In my study 15 cases were given trial for TOLAC with scar thickness >3mm out of which 5 cases(4%) had successful VBAC.Out of 120 caesarean sections 68 were taken up for emergency LSCS (56.7%) and 52 cases were planned elective LSCS(43.3%). 67.2% the maternal outcome was good and the remaining 32.8% had atonic PPH, traumatic PPH and SSI. The APGAR score was close to being above 8 at all times and 24% babies had transient tachypnoea.

The present study was conducted to estimate the risk of scar dehiscence/rupture by trans abdominal ultrasound,and to determine the correlation between previous scar thickness measured by transabdominal ultrasound with visual assessment of LUS during surgery.

Trial of labour after caesarean section should be encouraged in all patients with previous caesarean section provided no other contraindication exits.

Highly correlated with intraoperative findings sonographic evaluation of lower uterine segment thickness is accurate,safe procedure and highly recommended in considering trial of labour after caesarean section.

Predicting the risk before and carefully selecting patients for trial of labour helps in increasing VBAC success rate.Thereby Improving fetomaternal outcome and decreasing the number of emergency laparotomies in cases of uterine rupture.

References

1. Charoenboon C, Srisupundit K, Tongsong T. Rise in cesarean section rate over a 20-year period in a public sector hospital in northern Thailand. Arch Gynecol Obstet,2013:287(1):47–52.
2. Dhama V, Gupta S, Chaudhary R, Singh S. A sonographic assessment of previous caesarean section scar: is a reliable safeguard for trial of labour? Int J Reprod Contracept Obstet Gynecol,2020:9:1520–1527.
3. American College of Obstetricians and Gynecologists (ACOG). ACOG Practice Bulletin: vaginal birth after previous cesarean delivery: clinical management guidelines. Int J Gynecol Obstet,2004:54:197–204.
4. Cunningham FG, Levono KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, *et al*. Prior caesarean delivery. Williams Obstetrics. 24th ed, New York, McGraw Hill,2014:609–619.
5. Brill Y, Kingdom J, Thomas J. The management of VBAC at term: a survey of Canadian obstetricians. J Obstet Gynaecol Can,2003:25:300–310.
6. Sushma VD, Reddi R, Radhamani S. Ultrasonographic evaluation of lower uterine segment thickness in patients with previous cesarean section. Int J Sci Res,2015:4:878–881.
7. Devindra K, Harminder S. Study of obstetric and perinatal outcome in previous cesarean by sonographic evaluation of scar thickness of lower uterine segment at term. Int J Sci Rep,2015:1:159–162.
8. Lonky NM, Worthen N, Ross MG. Prediction of caesarean scars with ultrasound imaging during pregnancy. J Ultrasound Med,1989:8:15–19.
9. Cheung VY. Sonographic measurement of the lower uterine segment thickness in women with previous cesarean section. J Obstet Gynecol Can,2005:27:674–681.
10. Jastrow N, Chaillet N, Roberge S. Sonographic lower uterine segment thickness and risk of uterine scar defect: a systemic review. J Obstet Gynaecol Can,2010:32:321–327.
11. Pooja P, Nishi M, Smita B, Megha J, Shesha S. Comparison of clinical and radiological findings for the prediction of scar integrity in women with previous lower segment caesarean sections. Cureus,2023:15(8):43976.
12. Omar Md, El-B. Abdl El-M, Noha Md. Comparative study between transabdominal and transvaginal sonography in the assessment of lower uterine segment scar at term. Al Azhar Medical Journal,2022:51(4):2057–2068.
13. Adam M, Jeebodh J, Bok McMinn. Ultrasound of uterine lower segment to determine thickness after one caesarean section. RCOG virtual World Congress, 2021.
14. Bhakti K, Vijay K, Shrinavas G, Kokila A. Correlation of maternal and early neonatal outcome with strength of lower segment caesarean section scar on abdominal ultrasonography. The New Indian Journal of OBGYN,2021:7(2):142–147.
15. Jamal Md, Hesham Md. Sonographic assessment of lower uterine segment thickness and integrity in patients with previous caesarean delivery. Bahrain Medical Bulletin,2021:43(1):357–360.
16. Pralhad K, Suneeta G. Sonographic assessment of lower uterine segment at term in women with previous caesarean delivery. Arch Gynecol Obstet,2020:283(3):455–459.
17. Abdel B, Diaa A, Mamdouh T, Enas M. Ultrasonographic evaluation of lower uterine segment thickness in pregnant women with previous caesarean section. Middle East Fertility Society Journal,2020:15(3):188–193.
18. Haripriya V, Nandini J, Ramadevi N, Vasundhara K, Sarada S. A study of correlation of antenatal uterine scar thickness by transabdominal ultrasound with intraoperative lower uterine segment scar grading in elective repeat caesarean delivery. IJRCOG,2019:8(12):4878–4884.
19. Rosa F, Perugin G, Schettini D, Romano N, Romeo S, Podesta R, *et al*. Imaging findings of caesarean delivery complications: caesarean scar disease and much more. Insights into Imaging,2019:10:98.
20. Shazia T, Maimoona H, Rukhsana M, Tashhir R. Ultrasound predictability of LUS cesarean section scar thickness. JCPS Pakistan,2018:28(5):361–364.
21. Neeti N, Sunita M, Shivani B. Ultrasonographic assessment of strength of previous caesarean scar during pregnancy. IJRCOG,2018:7(4):1458–1463.
22. van der Voet Lucy F, Jordans Inge P M, Brölmann Hans A M, Veersema Sebastiaan, Huirne Judith A F. Changes in the uterine scar during the first year after a caesarean section: A prospective longitudinal study. Gynecologic and Obstetric Investigation, 2017, 28957798.
23. Misao F, Kiyomi F, Takashi S, Emmanuel B. Ultrasound assessment of lower uterine segment thickness during pregnancy, labour and the postpartum period. JOGC,2016:38(2):134–140.
24. Vincent Y. Sonographic measurement of the lower uterine segment thickness in women with previous caesarean section. J Obstet Gynaecol Canada,2015:27(7):674–681.
25. Ejub B, Vesna B, Hadzo K, Admir R. Ultrasound evaluation of uterine scar after caesarean section. Acta Inform Med,2012:20(3):149–153.
26. Ofili-Yebovi D, Ben-Nagi J, Sawyer E, Yazbek J, Lee C, Gonzales J, Jurkovic D. Deficient lower-segment Cesarean section scars: prevalence and risk factors. Ultrasound Obstet Gynecol,2008:31(1):72–77.
27. Vikhareva Osser O, Jokubkiene L, Valentin L. High prevalence of defects in Cesarean section scars at transvaginal ultrasound examination. Ultrasound Obstet Gynecol,2009:34(1):90–97.
28. Gilliam M. Cesarean delivery on request: reproductive consequences. Semin Perinatol,2006:30(5):257–260.
29. Duff P. A simple checklist for preventing major complications associated with cesarean delivery. Obstet Gynecol,2010:116(6):1393–1396.

30. Bignardi T, Condous G. Transrectal ultrasound-guided surgical evacuation of Cesarean scar ectopic pregnancy. Ultrasound Obstet Gynecol,2010:35(4):481–485.
31. Wang CB, Chiu WW, Lee YL, Lin YH, Tseng CJ. Cesarean scar defect: correlation between Cesarean section number, defect size, clinical symptoms and uterine position. Ultrasound Obstet Gynecol,2009:34(1):85–89.
32. Khoshnow Q, Pardey J, Uppal T. Transvaginal repair of caesarean scar dehiscence. ANZ J Obstet Gynaecol,2010:50:94–95.
33. Reynard C, Nosbusch M, Fellemans C, Benali N, van Rysselberghe M, Barlow P, Rozenberg S. Cesarean section scar evaluation by saline contrast sonohysterography. Ultrasound Obstet Gynecol,2004:23(3):289–292.
34. Vedantham H, Jahagirdar NJN, Ramadevi N, Kamineni V, Saranu S. A study of correlation of antenatal uterine scar thickness by transabdominal ultrasound with intraoperative lower uterine segment scar grading in elective repeat cesarean delivery. Int J Reprod Contracept Obstet Gynecol,2019:8:4878–4884.
35. Kalyankar B, Kalyankar V, Gadappa S, Gaikwad KA. Correlation of maternal and early neonatal outcome with strength of lower segment caesarean section scar on abdominal ultrasonography. The New Indian Journal of OBGYN,2021:7(2):142–147.
36. Tazion S, Hafeez M, Manzoor R, Rana T. Ultrasound predictability of lower uterine segment cesarean section scar thickness. J Coll Physicians Surg Pak,2018:28(5):361–364.
37. Jamal Mohammad Mutlaq, Hesham Mohamad Hamad. Sonographic assessment of the lower uterine segment (LUS) thickness and integrity in patients with previous cesarean delivery. Bahrain Medical Bulletin,2021:43(1):357–360.
38. Saba Pario, Sanober Omer, Sughra Abbasi, Anam Pario, Sadia Suboohi, Ramla Javed Baig. Ultrasound assessment of Cesarean section scar and its correlation to intraoperative scar status. Pakistan Journal of Medical and Health Sciences,2022:16(10):942–945.
39. Pahirah N, Laosooksathit W, Kongsomboon K, Kitporntheranunt M. Sonographic lower uterine segment thickness to predict cesarean scar defect in pregnant women. Siriraj Medical Journal,2021:73(5):330–336.