ISSN: 0975-3583, 0976-2833 VOL16, ISSUE 2, 2025

"Comparative study of uterine scar thickness ultrasonographically at 6 weeks in single and double layer uterine closure after primary cesarean delivery: A Prospective study"

[1]neha kakran,[2]janki doshad, [3]nidhi Bahuguna*,[4]arjun singh doshad,[5]ravindea singh bisht

*corosponding author

AIM: To Compare the uterine scar thickness in single and double layered uterine closure by ultrasonography at 6 weeks of primary cesarean delivery.

INTRODUCTION: There are several techniques for myometrium closure have been described, including the use of interrupted locked and unlocked continuous sutures with single-or double-layer closure.However, a sensitivity analysis indicated that the risk of uterine rupture was increased after a locked single-layer closure but lesser after an unlocked single-layer closure, compared with a double-layer closure. The ultrasonographic measurement of the thickness of the LUS is useful for deciding the best mode of delivery for patients. The knowledge of this ultrasound measurement may explain the differences in the results for both study groups.

MATERIAL AND METHOD :The study was conducted in Fortis Health Management (North) India Limited Faridabad Haryana from January 2018 to November 2019. Total 150 patients divided into two groups, Each group having 75 primary cesarean delivery. Group (A): underwent single layer closure of transverse uterine incision that involved a single continuous locking layer of absorbable suture. Group (B): underwent double layer closure of transverse uterine incision. Patients had ultrasound evaluation of the LUS for scar thickness at 6 weeks postoperatively.

RESULT: The mean scar thickness after six weeks in single layer was 6.42 with standard deviation of 0.73 and in double layer 7.18 with standard deviation of 1.14 which is significant with p value < .05.

CONCLUSION: This study concludes that the scar thickness at six weeks in double layer uterine closure is significantly significant when compared to single layer closure of uterus studied ultrsonographically.so, in our study we recommends double layer uterine closure over single layer.

Key words- CS- caesarean section, LUS- lower uterine segment, scar thickness, 6 weeks, usg

INTRODUCTION:

Cesarean section is certainly one of the oldest operation. It is the most common surgery in obstetrics. In the early days it was resorted to only as a last measure and was associated with very high maternal mortality of up to 70-80%.[1]

With the developments in the field of medicine like safe anaesthesia, availability of antibiotics and blood transfusion facilities and improved surgical techniques, cesarean section has become a safer operative technique with a fall in maternal mortality from 0.3% in late 1950 to 12.8 per

ISSN: 0975-3583, 0976-2833 VOL16, ISSUE 2, 2025

100,000 deliveries in 1990's.[2] The cesarean delivery rate is increasing with each decade. In 1950's in India the incidence was 1.6/100 deliveries and has increased to 19.8% in the 1990's.[3] As per the latest data (national family health survey 15-16) NFHS-4 the cesarean rate at population level in India seem to be 17.2%[4]

There are many approachs to cesarean section (Vertical, Transverse, Extraperitoneal)s,uterine incision (Classical, lower segment transverse, vertical), removal of placenta, closure of uterus, peritoneum and abdominal wall. There is conflicting opinions among obstetricians about the advantages and disadvantages of one over the other. For example, single layer over double layer closure of uterine incision, closure or non-closure of visceral/parietal peritoneum, exteriorization of uterus or no exteriorization, Misgav-Ladach over standard Pfannenstiel approach. Several techniques for myometrium closure have been described, including the use of interrupted locked and unlocked continuous sutures with single or double-layer closure. Basically in single layer closure of uterus running suture or locking suture is applied, whereas in double layer closure of uterus, it adds muscular fold to cover the previous layer. However, a sensitivity analysis indicated that the risk of uterine rupture was increased after a locked single-layer closure but lesser after an unlocked single-layer closure compared with a double-layer closure.

The ultrasonographic measurement of the thickness of the LUS is useful for deciding the best mode of delivery for patients.The knowledge of this ultrasound measurement may explain the differences in the results for both study groups: Among patients with one previous CS, concern about a thin lower segment probably contributed to increase the rate of elective CS while knowledge of a thick myometrium helped to reduce the rate of CS during labor by lowering the fear of uterine rupture. [5] A growing body of evidence suggests that the surgical technique for uterine closure influeneces uterine scar healing and the residual myometrial thickness, but there is still no consensus about optimal uterine closure. So, the present study aim is to evaluate the uterine scar thickness in single and double layered uterine incision closure by ultrasonography after primary cesarean delivery , So that the subsequent pregnancy complications can be reduced and monitored timely

AIM :

1) To Compare the uterine scar thickness in single and double layered uterine closure by ultrasonography at 6 weeks of primary cesarean delivery.

ISSN: 0975-3583, 0976-2833 VOL16, ISSUE 2, 2025

OBJECTIVES:

1)To minimise the subsequent pregnancy complications.

2) To identify the high risk patient for subsequent pregnancy.

INCLUSION CRITERIA

1) Singleton pregnancy Gestational age between 37 weeks-42 weeks
2) Patient undergoing primary caesarean section(with valid indication)

EXCLUSION CRITERIA

1) Multiple gestations
2) Uterine malformations
3) Placenta previa
4) Placenta accreta
5) cervical fibroid
6) Fetal macrosomia
7) If the surgeon needs more than three additional sutures for hemostasis and reoperation following the cesarean section.
8) Any previous uterine operation or any other medical disease that compromises wound healing such as diabetes mellitus, collagen diseases or anaemia.

METHOD AND MATERIAL:

STUDY SITE: This study was conducted at Fortis Hospitals Limited , Faridabad Haryana . **STUDY DURATION:** This study was conducted during the period of January 2018 to November 2019

STUDY DESIGN: Prospective comparative Study. **STUDY POPULATION:** primary elective or emergency cesarean delivery due to fetal or maternal causes after taking care of inclusion and exclusion criteria.

SAMPLE SIZE: This study was conducted in 150 patients, divided into two groups. Each group having 75 primary cesarean delivery.

Group (A): underwent single layer closure of transverse uterine incision and one layer closure usually involves a single continuous, locking layer of absorbable suture.

Group (B): underwent double layer closure of transverse uterine incision. In a two layer closure, initial closure was identical to the single layer closure as above. An additional layer of absorbable suture was used to imbricate the first layer in a continuous non-locking manner.

ISSN: 0975-3583, 0976-2833 VOL16, ISSUE 2, 2025

Patients had an ultrasound evaluation of the scar thickness in both the groups at 6 weeks postoperatively.

DATA ANALYSIS

Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean ± SD and median. Normality of data was tested by Kolmogorov-Smirnov test. If the normality was rejected then non parametric test was used. Statistical tests was applied as follows

1) Quantitative variables was compared using Unpaired t-test/Mann-Whitney Test (when the data sets were not normally distributed) between the two groups and Paired t-test/ Wilcoxon test within the groups across follow-ups.
2) Qualitative variables was compared using Chi-Square test /Fisher's exact test. The data was entered in MS EXCEL spreadsheet and analysis was done using Statistical Package for Social Sciences (SPSS) version 21.0. A p value of <0.05 was stastically significant.

OBSERVATION AND RESULT

A total of 150 primary cesarean deliveries were taken after taking care of inclusion and exclusion criteria and the women who gave consent for the study.

150 patients were divided into Group- A 75 patients (single layer) of which 47 patients underwent elective cesarean and 28 patients underwent emergency cesarean.

Group -B 75 patients (double layer) of which 48 patients underwent elective cesarean and 27 patients underwent emergency caesarean

Table 1-USG EVALUATION AT 6 WEEKS

USG EVALUTION 6 WEEKS	Single layer	Double	

ISSN: 0975-3583, 0976-2833 VOL16, ISSUE 2, 2025

		layer	
Sample size	75	75	
Mean ± Stdev	6.42 ± 0.73	7.18 ± 1.14	<.0001
Median	6.2	7	
Min-Max	5-9.2	5.2-10	
Inter quartile Range	6 - 6.900	6.125 – 8	

Out of 150 patients , 75 underwent single layer uterine closure,the mean scar thickness after 6 weeks was 6.42 with standard deviation of 0.73 and it ranges from 5 mm to 9.2 mm; whereas 75 underwent double layer uterine closure,the mean scar thickness after 6 weeks was 7.18 with standard deviation of 1.14 and it ranges from 5.2 mm to 10 mm. The difference was statistically significant.

Table 2- scar thickness of elective patients at 6 week

	Single layer	Double layer	P value
Sample size	47	48	
Mean ±stdev	6.31 ±0.6	7.39± 1.2	
median	6.2	7.5	
Min-max	5 - 8	5.2 – 10	
Interquartile range	6 – 6.500	6.300 – 8.250	≤ 0.001

Out of 150 patients, 95 cases underwent elective cerearean section of which 47 patients underwent single layer uterine closure and 48 patients underwent double layer uterine closer.

On USG study at 6 weeks the mean thickness in single layer closer was 6.31±0.6 and in double layer closer 7.39±1.2. The median of thickness in single layer was 6.2 and 7.5 in double layer.

On applying the statistical analysis the p value was found to be ≤ 0.001 which is statistically significant.

Table 3- comparison of scar thickness of emergency patients

	Single layer	Double layer	P value

ISSN: 0975-3583, 0976-2833 VOL16, ISSUE 2, 2025

Sample size	28	27	
mean±stdev	6.61±0.9	6.81±0.91	
median	6.2	6.5	
Min-max	5.5 – 9.2	6 – 10	
Interquartile range	6 – 6.950	6.100 – 7	0.135

Out of 150 patients ,55 patients underwent emergency cs of which 28 cases underwent single layer uterine closure and 27 cases underwent double layer uterine closure.

On USG study at 6 weeks the mean thickness in single layer closer was 6.61±0.9 and in double layer closer 6.81±0.91. The median of thickness in single layer was 6.2 and 6.5 in double layer.

On applying the statistical analysis the p value was found to be 0.135 which is statistically non-significant. In emergency cases uterine scar remodelling slow down due to increased stress on the body during surgery, potential tissue damage from rapid incision, increased inflammation ,blood loss, and a disrupted physiological state, which can all impair the body's natural wound healing mechanism as compared to elective cases .

DISCUSSION

Caesarean section is the most commonly performed surgery in the field of obstetrics. The rate of CS has been constantly increasing in the last few decades. The technique of performing CS varies among many obstetricians. Through this surgery the mother is having a scar in her uterus which leads to various complications in a long run, important being uterine rupture and placenta accreta. This risk of uterine rupture is the main reason for decreasing rate of vaginal birth after CS and increasing rates of repeat CS. [6] Hamar et al. disclosed insignificant variations in the lower segment uterine scar thickness at 2 weeks postoperatively between one-layer compared with two-layer closure technique of the uterine incision. They concluded that uterine scar thickness diminishes progressively after both one- or two-layer closure, but does not vary with the mode of uterine closure.[7] However study done by Mohamed Nabih EL-Gharib, Ahmad M Awara et al on 'Ultrasound Evaluation of the Uterine Scar Thickness after Single Versus Double Layer Closure of Transverse Lower Segment Cesarean Section' They found an increase in the thickness of LUS-CS scar in cases with double layer closure of the incision than a single layer closure as depicted by ultrasonography after

ISSN: 0975-3583, 0976-2833 VOL16, ISSUE 2, 2025

2 days and 2 weeks post-operatively. They suggested that the number of closing layers of CS directly affect the thickness of the scar.[8] Hamar BD, Saber SB, Cackovic M et al.[9] randomised 30 women to one or twolayer closure and followed them up with ultrasonographic assessment of the scar remodelling at the 2nd and 6th post-operative weeks. They reported equivalent scar thickness irrespective of the method of closure. Although these data support the use of single-layer closure, effect on future childbearing needs to be kept into consideration. Roberge, S. Demers, M. Girard, O et all[10] evaluated the impact of uterine closure on uterus scar healing.They recruited women with singleton pregnancy undergoing an elective primary Caesarean at ≥38 weeks of gestation. They concluded that Double-layer closure of the uterus is associated with better scar healing than single layer closure. As per the Chantale Vachon-Marceau, MD; Suzanne Demers et al ; study on 'Single versus double-layer uterine closure at cesarean: impact on lower uterine segment thickness at next pregnancy ' they concluded that as compared with single-layer closure, a double-layer closure of the uterus at previous cesarean delivery is associated with a thicker third-trimester lower uterine segment and a reduced risk of lower uterine segment thickness

There were two randomized trials, they compared the 2 types of closure for the risk of uterine rupture at the next pregnancy: Chapman et al[11] reported no uterine rupture and 1 case of uterine scar dehiscence after TOLAC among 70 women with single-layer and neither uterine rupture nor scar dehiscence after TOLAC in 75 women randomized to double-layer closure; in addition, the CORONIS collaborative group reported 1 (0.06%) case of uterine rupture of 1610 births after single-layer closure and 2 (0.12%) cases of 1624 births after double-layer closure in the 3-year follow-up of their multicenter randomised trial.[12] Those 2 randomised trials did not have sufficient power to detect moderate difference in the risk of uterine rupture between the 2 types of uterine closure.

In our study we found that the mean scar thickness after six weeks in single layer was 6.42 with standard deviation of 0.73 and in double layer 7.18 with standard deviation of 1.14 which is statistically significant with single layer,(P=< 0.0001), which was significant..

CONCLUSION-

ISSN: 0975-3583, 0976-2833 VOL16, ISSUE 2, 2025

In our study we found that the lower uterine scar thickness at 6 weeks post-operative was significantly thicker among women submitted to two layer technique of uterine closure than those submitted to a single-layer uterine closure technique. Therefore , our study supports the use of double layer technique in primary caesarean section so that in next pregnancy there will be reduction of uterine scar defect during trial of labour after caesarean section(TOLAC). The study was conducted in a small sample size, so these findings could not be extrapolated to a large population of various populations. Further research regarding to follow up these women in their next pregnancies and assess the chance of vaginal delivery or assess the scar thickness at surgery is also needed.

FINANCIAL SUPPORT AND SPONSORSHIP- nil

CONFLICT OF INTEREST – there are no conflicts of interest

LACUNAE IN STUDY- smaller sample size and shorter duration

REFERENCES-

1) Myerscough.PR. Cesarean section sterilization,anhysterectomy.In Munrokerr'sthOperative obstetrics; 10ed. London. Balliere 2000 :320-26

2) Cunnigham et al . Cesarean Delivery and Peripartum Hysterectomy. In Williams and Obsterics; 2red, USA; McGraw - Hill companies. 2005 : 588-598.

3) Ratnam SS, Rao Bhaskar, ArulKumaran. Changings trends in cesarean section. InObstetrics and Gynecology for post graduates: Vol 1; 1996: 134-140.

4)The Federation of Obstetric & Gynecological Societies of India> FOGSI – Cesare- an Rates (JDT)

5)Rozenberg P, Goffinet F, Philippe HJ, Nisand I. Thickness of the lower uterine segment: Its influence in the management of patients with previous cesarean sections. Eur J Obstet Gynecol Reprod Biol 1999;87:39-45.

6)Glavind J, Madsen LD, Uldbjerg N, Dueholm M. Ultrasound evaluation of Ce- sarean scar after single- and double-layer uterotomy closure: a cohort study. Ultra- sound Obstet Gynecol. 2013;42:207-12.

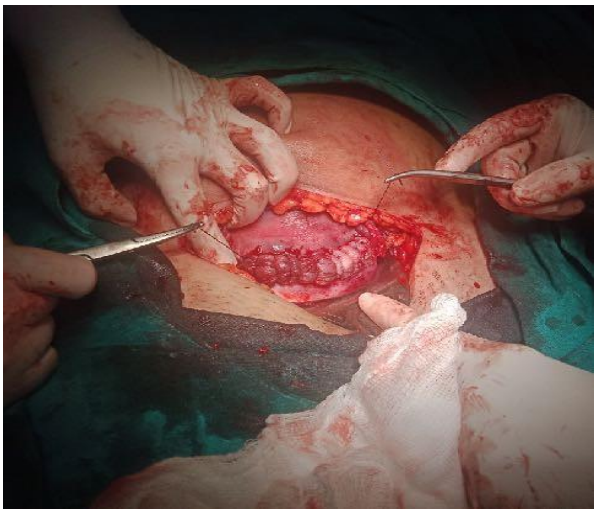
7)Hamar BD, Saber SB, Cackovic M, Magloire LK, Pettker CM, Abdel-Razeq SS, et al. Ultrasound evaluation of the uterine scar after cesarean delivery: A randomized controlled trial of one- and two-layer closure. Obstet Gynecol 2007;110:808-13.

ISSN: 0975-3583, 0976-2833 VOL16, ISSUE 2, 2025

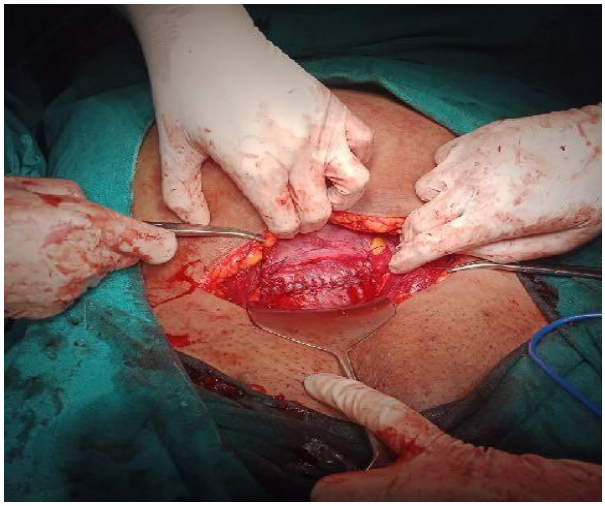
8)Mohamed Nabih EL-Gharib, Ahmad M Awara Department of Obstetrics and Gynecology, Faculty of Medicine, Tanta University, Tanta, Egypt

9)Abdel-Razeq SS, Hamar BD,et al. Ultrasound evaluation of the uterine scar after cesarean delivery: A randomized controlled trial of one- and twolayer closure. Obstet Gynecol. 2007;110:808–14. [PubMed]

10)S. Roberge2, S. Demers4, M. Girard1, O. Vikhareva3,
11)Abalos E, Addo V, Brocklehurst P, et al. Caesarean section surgical techniques: 3 year follow-up of the CORONIS fractional, factorial, unmasked, randomised con- trolled trial. Lancet 2016;388:62-72.
12)American Journal of Obstetrics & Gynecology 65.e1 July 2017



Single layer



Double layer

ISSN: 0975-3583, 0976-2833 VOL16, ISSUE 2, 2025

1- Author- Dr.neha kakran, Assistant professor, Department of obstetrics and gynaecology, Veer Chandra Singh Garhwali Government Medical Science And Research Institute Srinagar, Uttarakhand , email id-neha.kakran44@gmail.com

2- Janki dosad, Demonstrator, Department of Biochemistry, Veer Chandra Singh Garhwali Government Medical Science And Research Institute Srinagar, Uttarakhand, email id-doshadjanki24@gmail.com

3- Corrosponding author-Dr. nidhi bahuguna, Senior resident, , Department of obstetrics and gynaecology, Veer Chandra Singh Garhwali Government Medical Science And Research Institute Srinagar, Uttarakhand, email id-ndhbahuguna@gmail.com

4- Dr. Arjun singh doshad, Assistant professor,Department of ENT, Veer Chandra Singh Garhwali Government Medical Science And Research Institute Srinagar, Uttarakhand, email id-arjun.msent@gmail.com

5- Dr. Ravinder singh bisht, professor, Department of ENT, Government Doon Medical college,Uttarakhand, email id- Dr_rsbisht@rediffmail.com