

Ultrasound Evaluation of Uterine Scar in Primary Caesarean Section: A Study of Single versus Double Layer Uterine Closure

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Abstract Caesarean section is one of the common surgical procedures to deliver baby done worldwide in obstetric practice. The aim of the study was to determine if technique of uterine closure had an effect on scar thickness measured by Ultrasonography at 6 week safter primary cesarean delivery. The Prospective study was done in department of Obstetrics and Gynecology, Manipal Teaching Hospital, Pokhara, Nepal. Fifty patients undergoing primary caesarean section were randomly assigned to one or double layer closure of lower uterine segment. Patients were followed up by ultrasonography at 6 weeks postpartum and uterine scar was measured. The mean scar thickness measured after 6 weeks by ultrasonography in single layer closure was 15.10 mm (Standard deviation 1.31) whereas it was 15.36 mm (Standard deviation 1.38) in double layer closure of uterus. There was no statistically significant difference in scar thickness after 6 weeks post partum period in single and double layer closure of lower uterine segment.

Keywords: caesarean section, single and double layer uterine closure, scar thickness

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1. Introduction

Caesarean section is an operative procedure to deliver baby/babies by an incision through the abdomen and uterus [1]. It is one of the common surgical procedures done worldwide in obstetric practice [2,3]. The rate of caesarean section has dramatically increased from 12% in 1990 to 24% in the year 2008 with not much significant improvement in the outcome of baby [4], thus impacting the rate of vaginal delivery after the first caesarean section. The rate of vaginal delivery after caesarean section had drastically decreased from 28.3% in 1996 to only 10.6% in 2003 [5]. In 1882, Sanger recommended the suturing of the uterus after caesarean section which was a milestone and reduced the maternal mortality. In 1926, Kerr advocated the technique of double layer uterine closure [6]. The closure of uterus has gained large interest due to the risk of uterine rupture in subsequent pregnancies [7]. Uterine rupture is the worst complication which has significant maternal and neonatal morbidity [8,9].

Basically in single layer closure of uterus continuous running suture or locking suture is applied, whereas in double layer closure of uterus, it adds muscular fold to cover the previous layer. Usually the assessment of healing of the scar is done by ultrasonography after 6 weeks of operation [10,11]. It is considered that thicker the scar lower the rate of complications [12]. Thickness of

uterine scar may be of help in deciding vaginal birth after caesarean section. An ideal cut off value is not given as there are more requirements for standardized measurement technique [13,14].

There are number of studies that reports advantages of single layer closure over the double layer closure [15,16,17,18]. There are studies that report that single layer closure is safe for vaginal delivery for subsequent pregnancy having no increased risk of uterine rupture or dehiscence [19,20]. While Bujold et al reported that single layer closure may be one of the most important factor related to uterine rupture [21,22].

2. Methodology

This was a comparative prospective study done at Department of Obstetrics and Gynecology, Manipal Teaching Hospital, Pokhara, Nepal from December 2014 to July 2015.

2.1. Inclusion Criteria

1. Singleton pregnancy
2. Gestational age between 37 completed weeks to 42 weeks.
3. Patients undergoing Primary caesarean section

This study was carried out in 50 patients. Patients were divided into two groups (A and B). Women undergoing Primary emergency or elective caesarean section were

randomly allocated to either single or double layer closure. Patients categorized under Group A underwent single layer closure of transverse lower uterine segment. Group B underwent double layer closure.

In patients randomly assigned to one layer closure, transverse uterine incision was closed in one layer with running locking sutures penetrating the full thickness of myometrium with absorbable suture (Vicryl) no 1. Patients randomly assigned to the two layer closure had an initial closure identical to the one layer closure as above. An additional layer of absorbable suture (Vicryl) no 1 was used to imbricate the first layer in a continuous non-locking suture.

Postoperative evaluation of the uterine scar was done as described by Koutsougeras [10]. Scar was measured in midsagittal plane perpendicular to the uterine wall by transabdominal ultrasonography. The scar was identified as a discontinuity in the architecture of the uterus in the midsagittal plane and manifested by either a hyper echoic or hypo echoic line perpendicular to the wall of uterus. Measurements were done by one of the investigator who was blinded to the allocation group for type of closure. Ultrasound measurement of the uterine scar thickness was performed at 6 weeks post-partum.

2.2. Approval of Ethical committee

The study was approved by the Institutional Ethics Committee.

2.3. Sample size calculation

In a pilot study done prior to the original study with 10 sample size showed that proportion of single layer closure in elective caesarean section was 0.7 and proportion of double layer closure in elective caesarean section was 0.3 with power 80% and significance level 0.05. The sample size required for each arm was 23 [23].

Statistical package for the social sciences (SPSS) for windows version 16.0 was used to analyze the data. Chi square test and student T test was used as appropriate. p value <0.05 was considered significant.

3. Results

This study included 50 cases where the study Group A underwent single layer closure of uterus and Group B underwent double layer closure. Total number of Caesarean delivery in our hospital in 2014 was 875/2466 giving the incidence of 35.4%.

The difference between the two groups for maternal age, parity and gestational age was statistically insignificant as shown in Table 1.

Table 1. Maternal Demographics with Type of Closure

Variables	Group A	Group B	p value
Maternal age (years)	26.04 ± 5.06 ^a	23.92 ± 4.32 ^a	0.36
Parity	Primi	17(68)	0.18
	Multi	4(16)	
Gestational age (weeks)	38.36 ± 2.21 ^a	38.92 ± 1.35 ^a	0.36

a – Mean ± SD, Values in Parentheses indicate percentages.

Elective caesarean section was more in Group A whereas emergency caesarean was common in Group B as shown in Table 2.

Table 2. Caesarean Delivery with Type of Closure

Caesarean Section	Group A	Group B
Elective	16(64%)	8(32%)
Emergency	9(36%)	17(68%)

In our study group the most common cause of caesarean section was Cephalopelvic disproportion (CPD) in both the groups as shown in Table 3.

Table 3. Indications for Caesarean Delivery

Indications	Group A	Group B
Malpresentation	5(20%)	6(24%)
CPD	7(28%)	9(36%)
Fetal distress	6(24%)	2(8%)
IUGR	2(8%)	2(8%)
Severe Oligohydramnios	1(4%)	3(12%)
Severe Preeclampsia	4(16%)	1(4%)
Major degree placenta previa	0	2(8%)

There is no difference in scar thickness after single layer or double layer closure of lower uterine segment. The mean scar thickness measured after 6 weeks by ultrasonography in single layer closure was 15.10 mm (SD 1.31) whereas it was 15.36 mm (SD 1.38) in double layer closure of uterus which was statistically insignificant as shown in Table 4.

Table 4. Thickness of Uterine Scar

	Group A (Mean±SD)	Group B (Mean±SD)	p value
Scar thickness	15.10±1.315 mm	15.36±1.388 mm	0.5

4. Discussions

Caesarean section is commonly performed as a major abdominal operation in women in both affluent and low-income countries. Rates vary considerably between countries and health services [24,25,26]. The rising trend of caesarean section in modern obstetrics has become a major concern in health care system all over the world [27].

Our study revealed a Caesarean section rate of 35.4% in 2014. The rate of caesarean section in 2007 was 33.7% in a study done by S Chhetri, and U Singh in Eastern Nepal [28]. High rate of caesarean section in our setting may be because it is a tertiary referral centre.

Closure of the hysterotomy site has gained interest because of the potential relationship with uterine rupture during a trial of labor in the future pregnancies [8,9,29]. Several techniques for myometrium closure have been described, including the use of interrupted, locked, and unlinked continuous sutures with single or double layer closure [2].

The ultrasonographic measurement of the uterine scar is useful for deciding the best type of delivery in patients with previous caesarean section. Among the patients with previous caesarean section, a thin uterine scar may contribute to increase the rate of elective caesarean section

whereas a thick uterine scar may help to reduce the rate of caesarean section during labor, by lowering the fear of uterine rupture [30].

The mean age of patients in Group A (single layer closure) was 26.04 years whereas it was 23.92 years in Group B (double layer closure). Mean period of gestation in Group A was 38.36 weeks and in Group B was 38.92 weeks. This was similar to the study done by EL- Gharib and Awara et al [31]. The most common indication of CS in our study group was CPD which was also one of the commonest indications in a study done by EL-Gharib and Awara [31].

The mean scar thickness measured by ultrasound at 6 weeks postoperative was 15.10 mm in Group A (single layer closure) and 15.36 mm in Group B (double layer closure). p value was >0.05 which was statistically insignificant which indicated that there was no difference in scar thickness in both the groups.

Our study was similar to the study done by Hamar *et al.* who concluded that uterine scar thickness does not vary with the mode of hysterotomy closure [32]. Similar finding was seen in a Cochrane review that concluded no advantage or disadvantage of single layer closure over double layer closure except a shorter operating time [33].

5. Conclusion

Ultrasonographic measurement of scar thickness done at 6 weeks post-operative period did not reveal any statistical significance on the method of closure of lower uterine segment. We conclude that any method of uterine closure can be done as per surgeon's preference but we recommend a larger study.

Declaration of Conflicting Interests

The authors declare that there is no potential conflicts of interest with respect to the research, authorship and /or publication of this article.

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