A COMPARATIVE STUDY OF SINGLE VERSUS DOUBLE LAYER CLOSURE ON LOWER SEGMENT CAESAREAN SCAR

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ABSTRACT

BACKGROUND

There are few issues in modern obstetrics that have been as controversial as management of a woman with a prior caesarean delivery. Hence, it is required to have evidence based correct practice of this surgical procedure. Healing of the uterine incision and the strength of the scar should be the most important consideration. The aim of the study is to compare the effect of technique of uterine closure (Single Layer vs. Double Layer) on subsequent pregnancies and to find out, which technique has a better maternal and neonatal outcome by strengthening the scar.

MATERIALS AND METHODS

500 cases of previous caesarean section pregnancies were taken, 250 from single layer closure group and 250 from double layer closure group. The mode of delivery during present pregnancy was noted. Integrity of scar, thickness of scar, presence of adhesion were documented. The neonates were observed. Results were compared so as to draw an inference about the better method.

RESULTS

Mean age between the two groups were similar. Majority did not have history of premature rupture of membrane during previous pregnancy. Postoperative complications were more when double layer closure of uterine scar was done in index surgery. Interpregnancy gap of <3 years was more commonly present in double layer closure group (52.8% in double layer versus 34.8% in single layer). Single layer had more scar tenderness (21.2%), thinned out scars (34.6%), incomplete ruptures (7.1%) and complete ruptures (2.8%) than double layer closure group. Neonatal outcomes were not statistically different in both the groups.

CONCLUSION

Double layer uterine closure seems to have better impact on scar integrity as compared to single layer uterine closure.

KEYWORDS

Lower Segment Caesarean Section, Single Layer Closure, Double Layer Closure, Scar Tenderness.

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BACKGROUND

Caesarean section is the commonest major surgery performed in obstetrics. Since 1500 AD, successful caesarean section on a living lady by Nufer, there are many modifications. Total CS rate in USA in 1965 and 1988 are 4.5% and 24.7%, respectively.[1]

But, caesarean rate became stable after 1988 and in 2001, it was 24.49%.[2] Repeat section in their country accounted for a large percentage (37%) of caesarean section.[3] By reducing the primary caesarean rate and by promoting vaginal birth after caesarean, total caesarean rate is stabilised. Evolution in surgical technique involves all sections, which includes skin incision, uterine incision, uterine closure and closure verses non-closure of peritoneum. Uterine closure can be performed either in a single layer or double layer. A Cochrane review in 2008 compares single layer uterine closure vs. double layer closure and shows statistically significant reduction in mean blood loss, duration of surgery and postoperative pain in single layer closure group.[4] Similar results was also seen by an Indian study in 2013.[5]

Poidevin demonstrated in several animal models that decidual inclusion in the scar, eversion of the hysterotomy edge or both are important factors related to the subsequent uterine scar defect.[6] Bujold and Hamilton in their study showed a 4 fold increase in the risk of uterine rupture in single layer group compared with a double layer closure group.[7] There is no doubt that single layer closure is associated with decreased infectious morbidity in index surgery. But, its association with uterine rupture or other adverse outcome in the subsequent gestation is yet to be

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studied.[8] Risk of scar rupture in subsequent pregnancy is very important in developing countries like India where female education is less favoured and pregnant ladies are brought to the hospital in labour from remote villages. There is a lot of time gap between onset of labour and receiving institutional care. Therefore, this study was undertaken with the aim to compare the effects of technique of uterine closure (Single vs. Double Layer) on subsequent pregnancies and to find out, which technique will minimise the morbidity in next pregnancy and have a better foetomaternal outcome by strengthening the uterine scar.

MATERIALS AND METHODS

The study was carried out in the Department of Obstetrics and Gynaecology, Sriram Chandra Bhanja Medical College and Hospital, Cuttack, on pregnant ladies with previous one caesarean section from September 2012 to September 2015. Pregnant ladies who had operative details of the previous operation where uterine closure was mentioned were only taken for the study. The study was done on 500 cases, which were divided into two groups. In one group, 250 cases with single layer uterine closure were taken. Other group also contained similar number of cases with history of double-layer closure. Women with gestational age less than 35 weeks, history of placenta praevia, history of classical or inverted T incision and history of vaginal birth following caesarean section were excluded from the study. A detailed history of all the patients like age, residence, socioeconomic status, past medical and surgical history and past obstetric history were taken. In past obstetric history, history of leaking PV, indication of caesarean, place of surgery and details of postoperative period were asked. General examination followed by thorough obstetrics examination was done. Signs of scar tenderness were searched. Cervical dilation, membrane status and head station were noted and clinical pelvimetry was done in every case where vaginal delivery was planned.

The mode of delivery of present pregnancy whether repeat caesarean or vaginal delivery or laparotomy for ruptured uterus was noted. Integrity of scar and thickness of scar was documented. Any complication during immediate postoperative period was noted. The Apgar score at 0 and 5 minutes and other complications during neonatal period were documented. The results were compared and statistical analysis was done by SPSS (Statistical package for Social Science, Version 7) proportions were compared by chi-square test. In the present study, p-value less than 0.005 was considered as the level of significance.

RESULTS

Features		Single Layer Closure n=250	Double Layer Closure n=250	P-Value
Age	20-25	96	84	0.413
	26-30	113	131	
	31-35	36	32	
	>35	5	3	
Literacy	Literate	215	206	0.27
	Illiterate	35	44	
Habitat	Rural	143	155	0.274
	Urban	107	95	
Socioeconomic Status	High	32	19	0.137
	Middle	177	183	
	Lower	41	48	

Table 1. Sociodemographic Features

Table 1 shows p-value is more than 0.05 in all parameters. It signifies that features in both the groups were comparable.

Details of Previous C.S.		Single Layer Closure n=250	Double Layer Closure n=250	P-Value
Membrane Status	Absent	94	107	0.235
	Present	156	143	
Type of C.S. (Elective/Emergency)	Emergency	177	166	0.289
	Elective	73	84	
Postoperative Complication	Uneventful	217	199	0
	Wound Infection	9	11	
	Secondary Suturing	5	7	
	Blood Transfusion	11	12	
	Injectable Iron	8	21	

Table 2. Details of Previous Caesarean Section

Table 2 shows that the postoperative complications were seen in 33 cases of single layer group and in 151 cases of double layer group, which was statistically significant (p=0.00).

Years	Single Layer Closure n=250	Double Layer Closure n=250	Total	Percentage (%)	P-Value
<3	87	132	219	43.8	0
>3	163	118	281	56.2	
Total	250	250	500	100	

Table 3. Distribution Pattern According to Interpregnancy Interval

Out of 500 cases studied, majority, i.e. 56.2% (65.2% in single and 47.2% in double layer) had a gap of more than 3 years between pregnancies and 43.8% (34.8% in single and 52.8% in double layer) had a gap of less than 3 years in pregnancies. As p value is 0, gap between two pregnancies is significantly different among the two groups. In single layer, majority had a gap of more than three years whereas in double layer majority had a gap of less than 3 years. This is because double layer is mostly revived in recent years.

Features		Single Layer Closure n=250	Double Layer Closure n=250	P-Value
Gestational Age	35-37 weeks	19	14	0.475
	37-40 weeks	203	213	
	>40 weeks	28	23	
Mode of Delivery	Repeat Caesarean	211	204	0.283
	Vaginal Delivery	18	28	
	Outlet Forceps	21	18	
Type of Repeat C.S.	Elective	158	165	0.141
	Emergency	53	39	
Adhesions	Present	153	157	0.297
	Absent	58	47	
Scar Tenderness	Present	53	16	0.0
	Absent	197	234	

Table 4. Features in Present Pregnancy

Table 4 depicts that gestational age at delivery, mode of delivery, type of repeat CS and presence of adhesions are not significantly different in both groups. As p value is 0.0, the presence of scar tenderness is significantly different. Single layer closure patients had more incidence of scar tenderness (21.2%) compared to double layer (6.4%).

	Single Layer Closure n=250	Percentage (%)	Double Layer Closure n=250	Percentage (%)	Total	Percentage (%)	P-Value
Normal	117	55.5	142	69.6	259	62.4	0.0016
Thin	73	34.6	57	27.9	130	31.3	
Incomplete Rupture	15	7.1	2	0.9	17	0.04	
Complete Rupture	6	2.8	3	1.4	9	0.022	
Total	211	100	204	100	415	100	

Table 5. Repeat Caesarean Uterine Scar

Table 5 shows that out of 415 cases that underwent surgery, majority, i.e. 62.4% (55.5% in single layer and 69.6% in double layer) had normal scar, 31.3% (34.6% in single layer and 27.9% in double layer) had thinned out scar, 4% (7% in single layer and 1% in double layer) had incomplete rupture and 2.2% (2.8% in single layer and 1.4% in double layer) had complete scar rupture. The p value is 0.0016, which means that the difference between two groups is significantly different. Single layer scars had more thinned out, complete and incomplete ruptures than double layer.

Type of Prev. C.S.	Normal		Thinned Out		Incomplete Rupture		Complete Rupture		P-Value
	No	%	No	%	No	%	No	%	
Elective	154	59.5	68	52.3	6	35.3	4	44.4	0.143
Emergency	105	40.5	62	47.7	11	64.7	5	55.6	
Total	259	100	130	100	17	100	9	100	

Table 6. Comparison of Previous Elective/Emergency Caesarean with Present Uterine Scar

By applying chi-square test, as the p-value is more than 0.05, the relation between previous elective/emergency caesareans with present uterine scar is not statically significant.

Neonatal Complication	Single Layer n=250	Double Layer n=250	Total	Percentage (%)	P-Value
IUGR	12	11	23	4.6	0.708
IUD	3	5	8	1.6	
Preterm	18	12	30	6	
NICU	19	22	41	8.2	
Neonatal Death	11	7	18	3.6	
No Complication	187	193	380	76	

Table 7. Comparison of Neonatal Outcome

Table 7 depicts that out of 500 cases, majority (76%) of newborn had no complication. 8.2% (7.6% in single layer and 8.8% in double layer) had NICU admission, 4.6% (4.8% in single layer and 4.4% in double layer) were IUGR, 3.6% (4.4% in single layer and 2.8% in double layer) were neonatal deaths and 1.6% (1.2% in single layer and 2% in double layer) were IUD. As p-value is>0.05, the neonatal outcome were not significantly different among two groups.

DISCUSSION

The sample size of our study was 500 out of which 250 cases were from single layer closure group and 250 cases were from double layer closure group. The mean age of the single layer group was 27.42 years and that of the double layer group was 27.57. The mean age of women in CORONIS Trial[9] was 27 years. It was a multicentric trial in 6 countries, i.e. Argentina, Ghana, India, Kenya, Pakistan and Sudan. In a study by Sood, it was 26 years.[10] However, according to Hanfy et al, maternal age does not have any significant relationship with scar thickness.[11] There was no significant difference between the two groups with respect to maternal demographics. Similar result was seen in the study by Sood.[10] In our study, 201 patients (40.2%) had history of prelabour rupture of membranes and 299 patients (59.8%) did not have history of the same. Laddad et al observed that 31% had history of prelabour rupture of membrane[5] and Sood observed the same in 34%, which is similar to our study.[10] The difference between two groups is not statistically significant.

In present study, 157 (31.4%) patients underwent emergency caesarean section. This is similar to the study by Sood who observed that more than half of the caesarean sections (66%) were elective.[10] The present study showed that during the first caesarean the postoperative complications were present in 13.2% patients in single layer group and in 20.4% patients in double layer group. In this study, 56.2% women had gap of more than 3 years mostly because they used some form of contraception. There was significant difference between the two groups. 52.8% of double layer cases had a gap of less than 3 years between pregnancies and 65.2% of single layer cases had a gap of more than 3 years. This is because double layer closure is mostly revived again in the recent years.

According to the study by Gyamfi et al, double layer had a longer time interval between pregnancies. But, in our study, single layer cases had more interpregnancy interval.[12] In our study, 21.2% of single layer closure group and 6.4% of double layer closure group had scar tenderness. There was significant difference between the two groups. This is because single layer cases had more thinned out scars and impending rupture than double layer cases. Similar finding was present in study by Hanfy et al.[11] In present study, in single layer group 55.5% had normal scar, 34.6% had thin scar, 7.1% had incomplete rupture and 2.8% had complete rupture. In double layer group, 69.6% had normal scar, 27.9% had thin scar, 0.9% had incomplete rupture and 1.4% had complete rupture. The difference between the two groups was statistically significant. Single layer had more thinned out scar, incomplete and complete rupture than double layer.

In a study by Bujold and Hamilton, single layer closure of the previous lower segment incision was associated with 4 fold increase in the risk of uterine rupture compared with double layer.[7] It was further established that presence of the single layer closure itself, not the suture material that was associated with rupture.

It is possible that a single continuous suture technique does not approximate the tissue precisely together because decidua can be included in the scar. In a study by Gyamfi C. et al, the uterine rupture was significantly higher in single layer closure group (8.6% vs. 1.3%, p=0.015).[12] In a

systemic review and meta-analysis by Roberg S et al, it was seen that single layer and locked first layer were associated with lower residual myometrial thickness.[13] They also concluded that evidence does not support a specific type of uterine closure for optimal maternal outcome and is insufficient to conclude about the risk of uterine rupture.

CONCLUSION

After the advent of safer anaesthesia, good antibiotics and immediate blood transfusion facilities, lower segment caesarean section is now becoming safer and even ladies are opting for it instead of vaginal delivery without any proper indication. Therefore, the potential effects of different surgical techniques in long-term outcomes including the functional integrity of the uterine scar during subsequent pregnancies are now becoming increasingly important for guiding clinical practice. There by in this study, it is seen that the uterine scar had no significant relation with interpregnancy interval or type of first caesarean (elective or emergency caesarean) except on type of previous closure. Double layer uterine closure has better impact on scar integrity as compared to single layer uterine closure.

But, still further research with randomised controlled studies using larger sample size is needed to unify a safe surgical technique for caesarean section.

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