Short Term Outcome of Closure or Non-Closure of Peritoneum in Caesarian Section

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ABSTRACT

Background: Cesarean section (CS) can be considered as one of the most frequently performed surgical procedure worldwide, accounting for up to 70% of deliveries, depending on the facility being assessed and the country involved. In Egypt its rate reach about 51.8% from deliveries. **Objetive:** To compare closure versus non-closure of visceral and parietal peritoneum during primary cesarean section regarding early postoperative outcome.

Patients and Methods: A randomized-controlled study that was conducted at Ismailia General Hospitals during the period from November 2018 to March 2019. Included 142 pregnant women attending Obstetrics and Gynecology Department for primary cesarean section who were divided into two groups. Group I (Control) 71 patients with closure of both the visceral and parietal peritoneum (Study) 71 patients with non-closure of both the visceral and parietal peritoneum. Patients were assessed for intra-operative parameters including operation time. Postoperatively, patients were assessed for pain degree, distention, fever, regain of intestinal sound, wound infection and duration of hospital stay.

Results: There was statistically significant difference between both groups regarding age, BMI, parity, gestational age and type of CS. Non-closure technique of both visceral and parietal peritoneum in CS is associated with shorter operation time, less postoperative pain score, rapid regain of intestinal motility and less duration of hospital stay.

Conclusion: Non-closure of both visceral and parietal peritoneum at CS is associated with less operative time, less postoperative pain and distention and wound infection hence routine closure of peritoneum at CS can be avoided.

Keywords: Peritoneal closure , Caesarian section, Peritoneum.

INTRODUCTION

Caesarean section (CS) is one of the most frequently performed surgical procedures worldwide, accounting for anything up to 70% of deliveries, depending on the facility assessed and the country involved. In general, rates around the world range from about 5% to over 20% of all deliveries [(1)].

There are many ways of performing a caesarean section and the techniques used depend on a number of factors including the clinical situation and the preference of the operator. The peritoneum is a thin membrane made of primitive cells called mesothelium and supported by a thin layer of connective tissue. It lines both the abdominal and pelvic cavities where it is called parietal peritoneum. When it covers the external surface of internal organs like the intestine, the bladder and the uterus, it is termed visceral peritoneum, and during caesarean section these peritoneal surfaces have to be cut through in order to reach the uterus and for the baby to be born. Following a caesarean section, it has been standard practice to close the peritoneum by stitching (suturing) the two layers of tissue that line the abdomen and cover the internal organs, to restore the anatomy. It has however been suggested that peritoneal adhesions may be more likely rather than less likely when the peritoneum is sutured, possibly as a result of a tissue reaction to the suture material [(2)].

In CS, surgical complications such as fever, wound infection, post-operative pain and bleeding occur more frequently than in normal vaginal delivery and these conditions may affect the postnatal care of newborn infants. Traditionally, suturing of peritoneal layers in CSs have been done, but in many randomized clinical trials, this stage could be easily eliminated since it does not increase the rate of morbidity [(3)]. A series of studies evaluated the effects of leaving the peritoneum open and compared it with closing after CS. Reasons noted for closure of the peritoneum include restoring anatomy and re-approximating tissues, reducing infection by re-establishing an anatomical barrier, decreasing wound dehiscence, reducing hemorrhage and minimizing adhesions. Reasons cited for non–closure of the peritoneum include: reduction of operation duration, shortening of hospitalization stay, use of less analgesic, earlier return of bowel function, reduction of urinary bladder adhesion following next CS, and immediate post-operative recovery. It would also reduce the number of stitches, which is the preferred option given that the body responds to stitches as if they were a foreign material [(4)].

The step of either suturing or not suturing the peritoneal surfaces is one of several surgical techniques of caesarean section addressed in Cochrane reviews. If this step could be omitted without adverse effect or with benefit for the individual patient, and with a reduction in operating time and suture material, this could lead to a meaningful cost saving, taking into cognizance the large numbers of caesarean sections performed worldwide [(5)].

The aim of this study was to compare closure versus non-closure of visceral and parietal peritoneum during primary cesarean section regarding early postoperative outcome.

PATIENTS AND METHODS

This randomized controlled study included 142 patients with age range from 19-30 years subjected to primary cesarean section. They were divided into two groups: Group I included 71 patients performed a

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primary cesarean section with closure of both visceral and parietal peritoneum. Group II included 71 patients performed a primary cesarean section with non-closure of both visceral and parietal peritoneum.

Inclusion criteria: Primary cesarean section for obstetric causes (breech, CPD...etc).
Exclusion criteria: Prior cesarean section. Prior gynecologic abdominal surgery. Patient having any previous surgical lower abdominal operation. Medical disorder with pregnancy (diabetes mellitus or liver and heart disease). Patients presented with febrile morbidity prior to operation.

Preoperative:

After the patients were enrolled in the study, age, weight, height and BMI were estimated. Type of cesarean section was recorded. All participants underwent a detailed history, general examinations, obstetrical examination, ultrasound examination and preoperative laboratory workup (complete blood count, PT, PTT and liver enzymes]. Preoperative hydration using intravenous infusion of 1000 ml ringer lactate solution.

Intra operative procedures:

Intravenous antibiotic was given: ampicillin plus sulbactam (Unasyn) 1.5 gm were injected every 12 hours before fetal delivery. A standard surgical technique was performed through a Pfannenstiel incision followed by transverse lower segment uterine incision that was closed with two layers (the 1st layer by continuous and the 2nd by inverted Lambert suture) using Vicryl 1. In the peritoneal closure group both layers of peritoneum were closed with a continuous Vicryl 1 sutures. In the non-closure group, neither visceral nor parietal peritoneum were closed. The rectus sheath was sutured using continuous absorbable sutures (Vicryl 1) and the skin was closed with a continuous subcuticular sutures (Prolene). Operative time was recorded in minutes from skin incision to the last suture.

Postoperative evaluation:

After the operation the patient received immediately declofenac sodium 75 mg then pethidene on demand. All patients were subjected to the routine follow up (vital signs, abdominal laxity, uterine contractions and vaginal bleeding) within the first 24 hours. Postoperative pain was assessed by Visual Analog Scale (VAS) by measuring in centimeters from the left hand end of the line to the point that the patient marks. Postoperative pain was evaluated using (VAS) of 0-10 cm. Pain was classified into 4 categories: no pain (VAS=0-0.4), mild pain (VAS=0.5-4.4), moderate pain (VAS=4.5-7.4), and severe pain (VAS=7.5-10).

Patients were assessed for postoperative fever using oral route every six hours, distention, regain of intestinal sounds using the stethoscope auscultation in the right iliac region and in the umbilical region. Patients were followed up and examined in the Outpatient Clinic at the 7th day after undergoing cesarean delivery. Wound infection was diagnosed when there was serous or purulent discharge from the skin incision with erythema and indurations, with or without fever. Duration of hospital stay starting from the time of cesarean delivery was counted.

Ethical consent:

An approval of the study was obtained from Zagazig University Academic and Ethical Committee. Every patient signed an informed written consent for acceptance of the operation. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical Analysis

Data collected throughout history, basic clinical examination, laboratory investigations and outcome measures were coded, entered and analyzed using Microsoft Excel software. Data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) software for analysis. According to the type of data, qualitative data were represent as number and percentage. Quantitative continues group was represented by mean ± SD, the following tests were used to test differences for significance. Difference and association of qualitative variable by Chi square test (X^2). Differences between quantitative independent groups by t test. P value was set at ≤ 0.05 for significant results & <0.001 for high significant result.

RESULTS

Age was distributed as 23.67 ± 3.15 and 23.64 ± 2.94 years between closure and non-closure groups respectively with no significant difference between groups. In addition, there was no significant difference regarding BMI or GA between groups as they were distributed as 28.34 ± 2.12 & 29.18 ± 1.94 kg/m^2 and 38.83 ± 0.86 & 38.67 ± 1.05 weeks respectively between groups, and majority in both groups were PG and P1 with no significant difference between groups regard parity **(**Table 1).

This study showed that non-closure group significantly had shorter operation time, sutures number, hospital stay and time needed for mobilization. Besides, lower analgesia needed but there was no significance regarding anesthesia type (Table 2).

Table (3) showed that there was no significant difference between groups regarding hematocrit values.

Complication, urinary tract infection (UTI) and wound infection were higher in closure group but not significantly, while distension was significantly higher in closure group (Table (4).

Table (1): Basal characters distribution between studied groups

			Non-Closure (N=71)		Closure (N=71)		P
Age /YEAR			23.67 ± 3.15		23.64 ± 2.94		0.956
BMI			28.34 ± 2.12		29.18 ± 1.94		0.091
GA/WEEK			38.83 ± 0.86		38.67 ± 1.05		0.339
			No.	**%**	**No.**	**%**	
Parity	**PG**	**N**	37	52.1	37	52.1	0.091
	P 1	**N**	23	32.4	31	43.7	
	P 2	**N**	8	11.3	3	4.2	
	P >2	**N**	3	4.2	0 0.0	0.0	
Total		**N**	**71**	**100.0**	**71**	**100.0**	

Table (2): Operation characters and data distribution between groups

			Non-Closure (N=71)	Closure (N=71)	t	P
Operation duration/m			37.39 ± 1.16	46.33 ± 2.29	-29.244	**0.00****
Temp			37.02 ± 0.41	37.1 ± 0.47	-1.111	0.269
Suture number			2.5 ± 0.55	3.77 ± 0.42	-15.294	**0.00****
Hospital stay/ H			13.3 ± 3.75	18.4 ± 2.08	-9.935	**0.00****
Oral start /min			3.7 ± 0.61	3.6 ± 0.89	0.808	0.421
Mobilization after			3.18 ± 0.66	3.81 ± 0.87	-4.843	**0.00****
N Analgesia ampule needed			3.26 ± 0.77	3.68 ± 0.62	-3.523	**0.001****
Anesthesia	**General**	**N**	0	2	2.84	0.21
		%	0.0%	2.8%		
	Spinal	**N**	71	69		
		%	100.0%	97.2%		

Table (3): Pre- and Post-hematocrit distribution between groups

	Non-Closure (N=71)	Closure (N=71)	P
Pre HCT	29.98 ± 3.09	30.21 ± 3.72	0.069
Post HCT	28.79 ± 2.93	29.11 ± 3.31	0.067
Paired t	2.473	2.654	

Table (4): Outcome and complication distribution between groups

		Group				Total		X^2	P
		Non-Closure		Closure					
		No.	**%**	**No.**	**%**	**No.**	**%**		
Wound Infection	**Yes**	1	1.4	2	2.8%	3	2.1%	0.34	0.56
Distention	**Yes**	0	0.0	6	8.5%	6	4.2%	6.26	0.012*
Endometritis	**Yes**	0	0.0	2	2.8%	2	2.9%	0.00	1.00
UTI	**Yes**	7	9.9	14	20.0%	21	14.9%	2.86	0.091
Complication	**Yes**	7	9.9	12	17.1%	19	13.5%	1.6	0.2
Total		71	100.0	70	100.0%	141	100.0%		

DISCUSSION

Regarding the preoperative data in this study, there was no significant statistical difference between both groups as regards age, parity, BMI, gestational age and types of cesarean sections to ascertain that the postoperative outcomes will be related mainly to the selected procedure. The mean age was 23.64 ± 2.94 years in closure group, and 23.67 ± 3.15 years in non-closure group; the age of our patients was comparable to other studies [6].

The mean gestational age was 38.67 ± 1.05 weeks in closure group and 38.83±0.86 weeks in non-closure group, in the study by **Ghongdemath and Banale** [7] it was 37.5 ± 2.3 weeks in closure group and 37.6 ± 2.0 weeks in non-closure group.

In this study there was significant statistical difference regarding operative time, as the operative time was shorter (8.9 minutes) in the non-closure group than the closure group. **Rafique *et al.*** [6] revealed a reduction in operative time (6 minutes) in the non-closure group than in the closure group**, Bamigboye and Hofmeyer** [8] revealed a reduction in operative time (7.33 minutes) in women who had both peritoneal surfaces unsutured in comparison with sutured peritoneum, **Ghongdemath and Banale** [7] revealed a reduction in operative time (11.2 minutes) in the non-closure group than the closure group and in the study by **Tabasi *et al.*** [9] the operative time was shorter (6.89 minutes) in the non-closure group than in the closure group. The decrease in operative time reduced the duration of anesthesia time exposure and that of exposure of wound to the environmental contaminants. This is reflected in decreased incidence of febrile morbidity. American Society for Reproductive Medicine in collaboration with Society of Reproductive Surgeons 2008 found that non-closure of the parietal peritoneum in cesarean sections will definitely reduce the surgical time by five to six minutes. In the study by **Shakeel *et al.*** [10] and **Zareian and Zareian**[11]**,** operative time was shorter in non-closure group than closure group.

There was a significant statistical difference between both groups regarding mean degree of pain "using Visual Analogue Scale". Women in non-closure group had lower pain scores. **Rafique *et al.*** [6] in a randomized-controlled study of 100 women of 549 women reported less postoperative analgesia when the peritoneum was not sutured at CS. Pain was the primary outcome measure and investigators found no overall difference in pain scores between the two groups, although there was a trend of lower pain scores in non-closure group. Analgesic use was measured and authors found lower narcotic use in non-closure group. This study supports our study. In addition to the cited study, a series of other studies also support our findings [9]**.** Better pain outcomes following peritoneal non closure were attributed to the rich nerve supply and poor blood supply of the peritoneum. Stretching, suturing, and re-approximation of the peritoneum causes ischemia, which leads to greater postoperative pain [6]**.**

On the other hand there was no statistically significant difference regarding the pain degree and the analgesia requirements**.** In the study by **Choudhary *et al.*** [12] the non-closure group had more postoperative pain because of the presence of adhesions due to non-closure of peritoneum during primary CS, our study was deficient in the history of previous CS technique.

Regarding febrile morbidity, there was no significant statistical difference between the two groups, as the mean temperature was 37.02 ± 0.41°c in the non-closure group, while it was 37.1 ± 0.47 in the closure group. Several studies did not show any significant difference regarding fever between the closure and non-closure groups [9]**,** which also supports our findings.

In the present study, we found that bowel function took longer time to return to normal after closure of the peritoneum compared to non-closure and all cases regain intestinal motility within the first 12 hours postoperatively. **Irion *et al.*** [13] found that bowel function took a slightly longer time to return to normal after closure of the peritoneum compared to non-closure. There was no statistical significant difference between the two groups as regards bowel function in the study by **Galaal and Krolikowski** [14]**.**

Concerning postoperative distention, there was no significant statistical difference between both groups. **Hull and Varner** [15] found no difference in the episodes of ileus or partial ileus in the closure or non-closure group. They observed that bowel stimulants were more frequently used in the closure group compared to the non-closure group. There was also no significant statistical difference regarding degree of distension in the study by **Grundsell *et al.*** [16]**.** In these studies there was no exclusion of patients with GIT problems.

There was also significant statistical difference regarding length of post-operative hospital stay between closure and non-closure groups. Closure of peritoneum led to a longer hospital stay. Similarly **Shakeel *et al.*** [10] showed that there was statistically significant difference regarding length of post-operative hospital stay. In contrast to this result, **Rafique *et al.*** [6] did not show any significant difference regarding length of post-operative hospital stay between the closure and non-closure groups. On the other hand, **Choudhary *et al.*** [12] showed decreased postoperative hospital stay in the closure group because it depends on the technique of the previous CS, which was not included in our study.

The present study showed no significant statistical difference regarding postoperative wound infection between both groups (however not significant). there were two cases of wound infection detected in closure group versus one cases in non-closure group. Cases of wound infection were resolved with wound care and medical treatment. In the study done by **Ghongdemath and Banale** [7] the febrile morbidity was high in closure group as compared to that in the non-closure; however it was not

statistically significant. A systematic review by **Bamigboye and Hofmeyr** [8] showed no statistical significant difference regarding wound infection and febrile morbidity. The study include large number of cases more than in our present study. In the study done by **Tabasi *et al.*** [9]**,** there were no cases of wound infection in either of the two groups; however in this study there was exclusion of previous cesarean section and high cover of antibiotics.

From our findings we conclude that non-closure of the visceral and parietal peritoneum was associated with improvement in the short term postoperative outcome and the following studies assure our findings. **Tabasi *et al.*** [9] studied the controversial reports about the outcomes of closure versus non-closure of the parietal peritoneum following CS, and to compare postoperative morbidity of cited techniques. They confirmed that non-closure of both visceral and parietal peritoneum was associated with shorter operation duration, less pain, less demand for analgesia and is perhaps a preferred way to manage the CS patients because of these benefits. **Takreem** [17] studied the short-term outcomes of closure versus non-closure of peritoneum at cesarean section (primary and repeated section), and compared postoperative morbidity of cited techniques. They concluded that non-closure of both visceral and parietal peritoneum at CS is associated with less operative time and less postoperative pain and distention and wound infection hence routine closure of peritoneum at CS can be avoided.

CONCLUSIONS

Non-closure is recommended technique of both visceral and parietal peritoneum in CS because it results in significantly shorter operation time, less postoperative pain score, rapid regain of intestinal motility, less duration of hospital stay, and is perhaps a preferred way to manage the CS patients because of these benefits.

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