



A COMPARATIVE STUDY BETWEEN CLOSURE VERSUS NON-CLOSURE OF PERITONEUM DURING CAESAREAN SECTION

Obstetrics & Gynaecology

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ABSTRACT

AIMS : To assess the short term outcome of closure versus non-closure of both visceral and parietal peritoneum during caesarean section on basis of Duration of surgery (to compare operative time in both groups), Post-operative pain, Use of analgesics, Return of bowel movements and Post-operative febrile episodes

STUDY SETTING: This study was conducted in Department of Obstetrics and Gynecology, Guru Gobind Singh Medical College and Hospital, Faridkot.

STUDY DESIGN: This was a randomized controlled trial of over 300 patients consisting of 2 groups. Group 1 undergoing closure of peritoneum (control group) and Group 2 with non-closure of peritoneum (study group). The study was approved by the Institutional Ethics Committee.

Methods and Material: A total of 300 cases undergoing emergency or elective lower segment caesarean section were recruited for the study. The study was approved by the Institutional Ethics Committee. After a detailed history, general physical examination, obstetric examination and routine investigations, informed consent was taken from each patient for participation in the study. Group allocation was done using Microsoft excel where randomization was done using serial number of patients prior to commencement of the study and the women were randomly allocated to one of the two groups (closure or non-closure group 150 in each).

Results: In the present study, mean age of the patients of the closure group and non-closure group was 29.2 years and 28.1 years respectively. Mean duration of procedure among patients of the closure group and non-closure group was 39.69 minutes and 32.26 minutes respectively. Among the patients of the closure group, mean VAS (Visual Analogue Scale) at immediate postoperative period, at postoperative 6 hours, postoperative 12 hours and postoperative 24 hours was found to be 4.8, 6.33, 4.61 and 3.86 respectively. In the present study, 8 percent of the patients of the non-closure group while 10.4 percent of the patients of the closure group had incidence of postoperative febrile episode. Mean time for returning of bowel movements for the patients of the closure group and non-closure group was 1.72 days and 1.49 days respectively. Mean duration of hospital stay among the patients of the closure group and non-closure group was 2.3 days and 2.06 days respectively. Postoperative wound infection was present in 1.6 percent of the patients of the closure group and 1.6 percent of the patients of the non-closure group. Postoperative wound dehiscence was present in 0.8 percent of the patients of 55 the closure group and 0.8 percent of the patients of the non-closure group.

Conclusions: Avoiding the closure of visceral and parietal peritoneum at caesarean delivery is associated with lesser operating time, decreased incidence of febrile morbidity and lesser need for postoperative analgesics. Hence, routine closure of peritoneum at caesarean section can be avoided.

KEYWORDS

Caesarean section, Peritoneum

INTRODUCTION

Since the advent of Caesarean Section in 1876 to the present day, this operation has undergone significant procedural changes with refinement of surgical techniques, improved and safer anesthesia, availability of antibiotics and blood transfusion facilities. Caesarean section has become a safer operative technique with a fall in maternal mortality from 0.3% in late 1950 to 12.8 per 100,000 deliveries in 1990's^[1]. The caesarean delivery rate is increasing with each decade. In 1950s in India, the incidence was 1.6/100 deliveries and has increased to 19.8% in the 1990s^[2]. Over the past three decades there has been a striking increase in caesarean section rates despite evidence that there is no associated parallel improvement in maternal and perinatal mortality and morbidity (Mazzoni et al., 2010)^[3]. It was Kerr who described the original technique of lower segment caesarean section operation in 1926 and recommended closure of both visceral and parietal peritoneum routinely (Kerr, 1986)^[4]. Surgical approach of caesarean section has traditionally included closure of both visceral and parietal peritoneum. The reason for this is to establish normal anatomical relations, to prevent adhesion formation between the intestine and fascia or between uterus and fascia, re-establishment of the peritoneal barrier to reduce the risk of infection and to reduce the risk of herniation or dehiscence. However, the advantages of this technique have not been proved by prospective randomized trials (Ellis et al., 2012)^[5]. Till the 1980's, uterus was closed in double layer and peritoneum was closed, in 1990's single layer uterine closure, and non-closure of visceral / parietal peritoneum came in to use.

The arguments for peritoneal closure have been^[6]

- restoration of anatomy and re-approximation of tissues for

healing.

- re-establishment of peritoneal barrier to reduce infection
- reduced risk of wound dehiscence and adhesions

The arguments against closure are

- it is not detrimental
- peritoneum heals rapidly without re approximation
- suture presence and additional tissue handling contributes to adhesion formation

The peritoneum is often defined in literature as a 3-layer structure: a mesothelial cell layer, a basal lamina and sub-mesothelial stroma^[7]. The peritoneum has a surface area of approximately 1.8 m². Parietal peritoneum lines the abdomino-pelvic cavity whereas visceral peritoneum covers most visceral organs. As a consequence, the abdominal walls and all intra-abdominal structures are covered with peritoneum, with exception of the bare area of the liver. Most caudally in the abdomino-pelvic cavity, the peritoneum covers the dome of the bladder and the anterior rectal surface. Hence, the bladder and rectum are located under the peritoneum in the sub-peritoneal space. The uterus and uterine tubes are situated between rectum and bladder. These organs are initially situated in the sub and retroperitoneal spaces, covered with parietal peritoneum. As these organs develop, they will protrude into the intra-abdominal cavity and are therefore covered for a large part by parietal peritoneum^[8]. The double layers of peritoneum on the lateral sides of the uterus are identified as the broad ligament (consisting of mesometrium), the mesosalpinx and the mesovarium^[9]. Initially peritoneum responds to injury by forming a fibrin matrix and re-epithelisation throughout the surfaces by mesothelial cells. The

fibrin matrix is later lysed by fibrinolysis and subsequently fibroblasts proliferate. But a peritoneum which has been made ischaemic by suturing tightly loses its fibrinolytic activity; hence there is persistence of fibrin which gets organized to form adhesions. It is said that suturing peritoneum causes sub peritoneal pockets which fill with blood and secretions from uterine incision and serves as a nutrient media for bacteria. Also surgical manipulation of UV fold leads to increased incidence of cystitis. Shorter operative time with non-closure reduces wound infection rate. If the peritoneum is left open, it leads to digestion of the debris by macrophages and hence reduced chances of wound infection. Peritoneum has a rich nerve supply and a poor vascular supply. Any minor injury will result in ischemia with pain. Any excessive manipulation will also cause pain. Suturing the peritoneum will cause both excessive manipulation and ischemia of peritoneum leading to increased pain and hence higher analgesic requirement. In order to test these hypothesis and in view of recent studies suggesting conflicting results about the outcomes in the two types of closure, there is a need for comparative study. Considering the above factors this study is done to evaluate and assess the advantages and disadvantages of closure of both visceral and parietal peritoneum versus non-closure of both the peritoneum.

AIMS AND OBJECTIVES

To assess the short term outcome of closure versus non-closure of both visceral and parietal peritoneum during caesarean section on basis of

1. Duration of surgery – to compare operative time in both groups.
2. Post-operative pain
3. Use of analgesics
4. Return of bowel movements
5. Post-operative febrile episodes

MATERIALS AND METHODS

A total of 300 cases undergoing emergency or elective lower segment caesarean section were recruited for the study. The study was approved by the Institutional Ethics Committee. After a detailed history, general physical examination, obstetric examination and routine investigations, informed consent was taken from each patient for participation in the study. Group allocation was done using Microsoft excel where randomization was done using serial number of patients prior to commencement of the study and the women were randomly allocated to one of the two groups (closure or non-closure group 150 in each).

STUDY SETTING: This study was conducted in Department of Obstetrics and Gynecology, Guru Gobind Singh Medical College, Faridkot.

STUDY DESIGN: This was a randomized controlled trial of over 300 patients consisting of 2 groups. Group 1 undergoing closure of peritoneum (control group) and Group 2 with non-closure of peritoneum (study group).

DURATION OF STUDY: 1 year

STUDY POPULATION

INCLUSION CRITERIA:

- Age between 20-40 years
- No past history of any abdominal surgery including caesarean section

EXCLUSION CRITERIA:

- Age below 20 and above 40 years
- Any previous intraabdominal operations or caesarean section
- Chorioamnionitis
- Moderate Anaemia < 8 gm/dl
- Jaundice
- Diabetes mellitus
- Placenta previa and placenta accreta.
- Obstructed labour

METHODOLOGY

Prospective Randomized Controlled study to determine short term clinical outcome of non-closure in comparison with closure of visceral and parietal peritoneum at caesarean delivery was carried out in the Department of Obstetrics and Gynecology, Guru Gobind Singh Medical College and Hospital, Faridkot over duration of one year. All the women were delivered by lower segment caesarean section

through a Pfannenstiel incision. The subcutaneous tissue was incised and rectus sheath was cut transversely. Rectus muscles were separated and parietal peritoneum was opened vertically. Utero vesical fold of peritoneum was incised transversely and incision was extended with fingers and bladder retracted down. The lower uterine segment was opened transversely and the incision was extended with fingers. Uterus was closed with continuous No. 1 Vicryl.

Both the layers of peritoneum were sutured with continuous 1-0 chromic catgut after the closure of uterine incision in closure group. Another group underwent similar procedure of caesarean section but without re-approximation of visceral and parietal peritoneum. Rectus Sheath was closed and skin was reapproximated. Urinary indwelling catheter was inserted before the surgery and removed within 24 hrs after surgery.

After the operation, all patients were managed in the same postoperative ward. The day of operation was considered as day zero.

The outcomes measured were

1. Duration of surgery: The time of skin incision and end of surgery time was noted.

2. Postoperative pain: Pain assessment was started from zero hour which was skin closure time and thereafter at 6 hours, 12 hours and 24 hours interval by using Visual Analogue Scale.

3. Use of Analgesia: Mild and moderate pain was managed by injection Diclofenac Sodium 75 mg intravenous 8 hourly in the first 24 hours of surgery and then as needed. Severe pain was managed by Tramadol 50 mg in 100 ml Normal Saline 12th hourly. Analgesics were changed over to oral on the first postoperative day. Requirement of parental analgesia after 24 hours of surgery was considered as additional dose of analgesia and was recorded.

4. Return of bowel function was assessed by auscultation and passage of flatus.

5. Postoperative febrile episodes: Defined as temperature more than 38 degree C on two occasions at least 12 hours apart, excluding the first postoperative day.

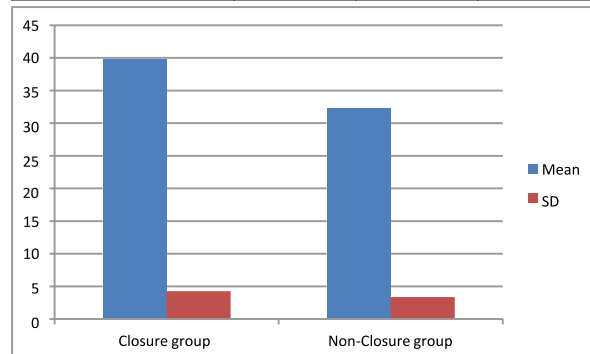
6. Duration of Hospital stay postoperatively. Day of surgery was taken as day 0.

RESULTS

Mean Duration of Procedure

Table 1: Comparison of Mean Duration of Procedure

Duration of procedure (minutes)	Closure group	Non-Closure group	p- value
Mean	39.69	32.26	0.00
SD	4.27	3.37	(Significant)



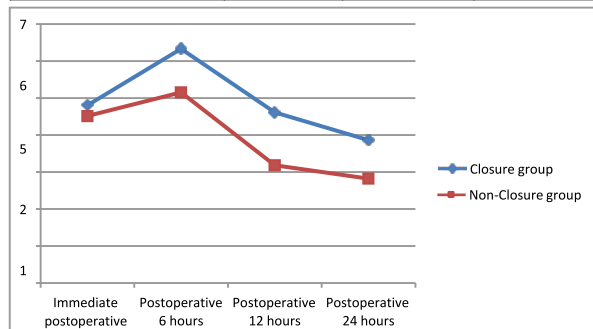
Graph 1: Comparison of Mean Duration of Procedure

Postoperative analgesic requirement

Table 2: Comparison of Postoperative Pain as Assessed by VAS

Mean VAS	Closure group	Non-Closure group	p- value
Immediate postoperative period	4.80	4.51	0.79

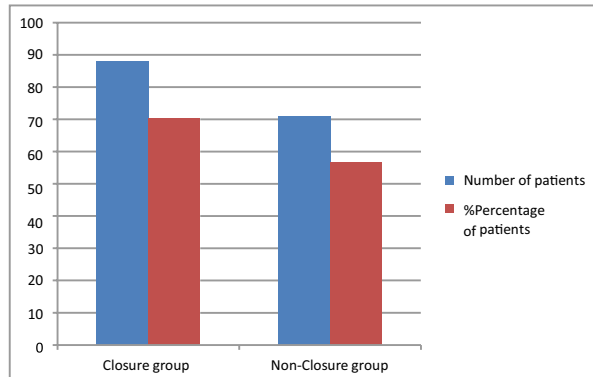
Postoperative 6 hours	6.33	5.15	0.02 (Significant)
Postoperative 12 hours	4.61	3.18	0.00 (Significant)
Postoperative 24 hours	3.86	2.82	0.01 (Significant)



Graph 2: Comparison of Post Operative Pain as Assessed By VAS

Table 3: Comparison of Frequency of Patients Requiring Post-operative Analgesia

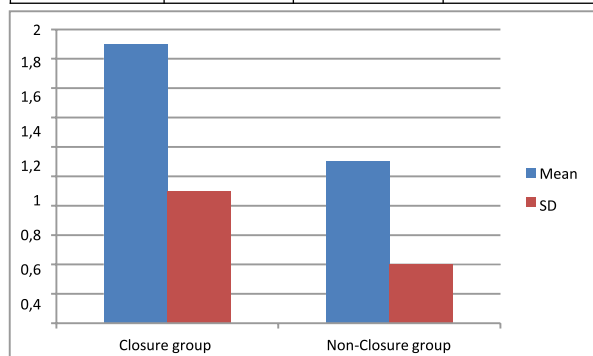
Patients requiring Post-Operative Analgesia	Closure group	Non-Closure group	p- value
Number of patients	88	71	0.00 (Significant)
Percentage of Patients(%)	70.4	56.8	



Graph 3: Comparison of Frequency of Patients Requiring Postoperative Analgesia

Table 4: Comparison of Postoperative Analgesia

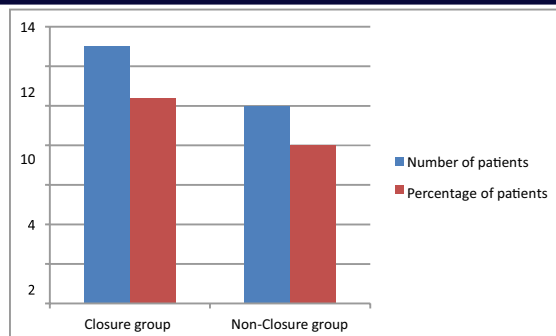
Diclofenac dose (75 mg)	Closure group	Non-Closure group	p- value
Mean	1.9	1.1	0.00 (Significant)
SD	0.9	0.4	



Graph 4: Comparison of Postoperative Analgesia

Table 5: Comparison of Incidence of Postoperative Febrile Episodes

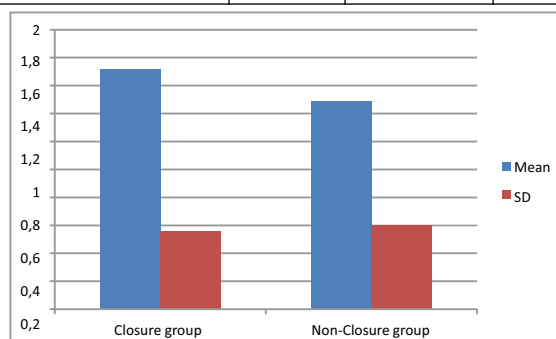
Postoperative febrile episodes	Closure group	Non-Closure group	p- value
Number of patients	13	10	0.56
Percentage of patients	10.4	8	



Graph 5: Comparison of Incidence of Postoperative Febrile Episodes

Table 6: Comparison of Mean Time for Return Of Bowel Movements

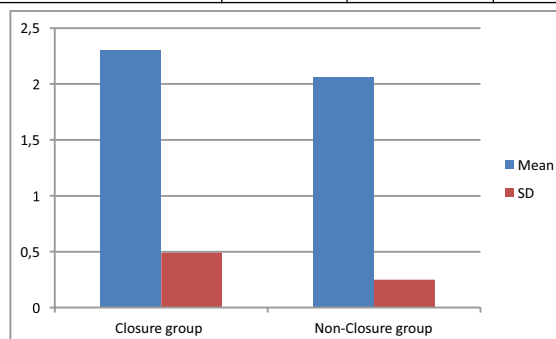
Time for return of bowel movements (days)	Closure group	Non-Closure group	p- value
Mean	1.72	1.49	0.70
SD	0.56	0.60	



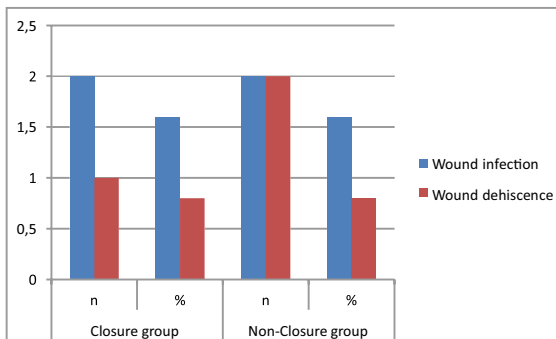
Graph 6: Comparison of Mean Time for Return of Bowel Movements

Table 7: Comparison of Mean Duration of Hospital Stay

Duration of hospital stay (days)	Closure group	Non-Closure group	p- value
Mean	2.3	2.06	0.49
SD	0.49	0.25	



Graph 7: Comparison of Mean Duration of Hospital Stay



Graph 8: Comparison of Postoperative Complications

Table 8: Comparison of Postoperative Complications

Postoperative complications	Closure group		Non-Closure group		p-value
	n	%	n	%	
Wound infection	2	1.6	2	1.6	0.33
Wound dehiscence	1	0.8	2	0.8	

DISCUSSION

Caesarean section is the most popular obstetric intra-peritoneal operation. Caesarean delivery confers an increased risk of wound complications, iatrogenic injury to bladder / bowel, anaesthetic risk and venous thromboembolism (American College of Obstetricians and Gynecologists, 2007)^[10].

There is no widely accepted technique for performing caesarean sections, numerous approaches have been described and technique often varies from surgeon to surgeon (Tully et al^[11], 2002). Routine closure of the peritoneum (both visceral and parietal) has been accustomed which has been handled down through generation of Obstetricians and Gynaecologists.

Mean age

In the present study, mean age of the patients of the closure group and non-closure group was 29.2 years and 28.1 years respectively. Previous studies have also reported similar age range of patient population in their respective studies. In a study conducted by Anteby EY et al^[12] mean age of the patients of the closure group and non-closure group was 29.2 years and 29.4 years respectively.

Mean duration of procedure (Table 1)

Mean duration of procedure among patients of the closure group and non-closure group was 39.69 minutes and 32.26 minutes respectively. While analysing statistically, it was seen that mean duration of procedure among the patients of the closure group was significantly higher in comparison to patients of the non-closure group. Our result was in concordance with the results obtained by Irion et al and Gupta et al who also reported similar findings in their respective studies. In the study conducted by Irion et al^[13] mean operative time among the patients of the closure group was 53.2 minutes and among patients of the non-closure group was 47.3 minutes (p- value < 0.05).

Mean VAS (Table 2,3,4)

Among the patients of the closure group, mean VAS (Visual Analogue Scale) at immediate postoperative period, at postoperative 6 hours, postoperative 12 hours and postoperative 24 hours was found to be 4.8, 6.33, 4.61 and 3.86 respectively. Among the patients of the non-closure group, mean VAS at immediate postoperative period, at postoperative 6 hours, postoperative 12 hours and postoperative 24 hours was found to be 4.51, 5.15, 3.18 and 2.82 respectively. While analysing statistically, it was seen that mean VAS among the patients of the non-closure group was significantly lower in comparison to the patients of the closure group at all postoperative time intervals.

70.4 percent of the patients of the closure group and 56.8 percent of the patients of the non-closure group required postoperative analgesia. Mean dose of Diclofenac (75 mg) among the patients of closure group was 1.9 while among the patients of the non-closure group was 1.1. On comparison statistically, the results were found to be significant. Our result was in concordance with the results obtained by previous authors who also reported similar findings in their respective studies. In a previous study conducted by Mohammed MS et al^[14], authors observed that mean dose of Diclofenac was significantly higher for patients of the closure group (205.5 mg) in comparison to the patients of the non-closure group (183 mg).

Postoperative febrile episode (Table 5)

In the present study, 8 percent of the patients of the non-closure group while 10.4 percent of the patients of the closure group had incidence of postoperative febrile episode. However; on comparing the results were found to be non-significant.

Mean time for returning of bowel movements (Table 6)

Mean time for returning of bowel movements for the patients of the closure group and non-closure group was 1.72 days and 1.49 days respectively. However; on comparing statistically, non-significant results were obtained. Our results were in concordance with the results obtained by previous authors who also reported similar findings in their respective studies. In a previous 54 study conducted by Altinbas

SK et al, authors reported non-significant difference while comparing the mean time for returning of bowel movements.

Mean duration of hospital stay (Table 7)

Mean duration of hospital stay among the patients of the closure group and non-closure group was 2.3 days and 2.06 days respectively. On comparing statistically, non-significant results were obtained.

Postoperative complications (Table 8)

Postoperative wound infection was present in 1.6 percent of the patients of the closure group and 1.6 percent of the patients of the non-closure group. Postoperative wound dehiscence was present in 0.8 percent of the patients of 55 the closure group and 0.8 percent of the patients of the non-closure group.

Guidance in the UK^[15] recommends that both layers of the peritoneum should not be closed, as this is associated with a lower risk of morbidity based on existing evidence.^[16] The data from CAESAR demonstrate that there are no differences in any of the short-term morbidity outcomes associated with closure versus non-closure of the pelvic peritoneum at caesarean section, although there is a difference in the duration of surgery (mean difference 2.4 minutes; 95% CI, 1.3–3.6 minutes), favouring non-closure. However, the duration of surgery is a poor surrogate for morbidity, as there will be a lower threshold below which duration is associated with greater morbidity. There have been three follow-up studies of existing trials of caesarean section techniques.^[17-19] The sample sizes of these studies are small, and included only 18% of the women randomised into the original trials for two studies,^[17-19] and 51% for the third.^[19]

In the only study comparing single versus double layer uterine closure, no differences were found in inter pregnancy interval, vaginal delivery, length of hospital stay, preterm delivery, amnionitis, postpartum endometritis, placental abruption, postpartum haemorrhage, blood transfusion or uterine dehiscence. This was based on a sample size of 145 women of the 906 randomised in the original trial.^[18] From the two follow-up studies of trials comparing closure versus non - closure of the peritoneum (209 women in total), no differences were observed in terms of intra-abdominal adhesions, abdominal pain, dyspareunia, constipation, urinary symptoms and infertility.^[18]

CONCLUSION

Avoiding the closure of visceral and parietal peritoneum at caesarean delivery is associated with lesser operating time, decreased incidence of febrile morbidity and lesser need for postoperative analgesics. Hence, routine closure of peritoneum at caesarean section can be avoided.

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