

Non-closure of the visceral and parietal peritoneum at caesarean section: A randomized study

Mariam Faruqui Shati
Anoware Begum
Farzana Sohael

ABSTRACT

Objective: To assess that non closure of visceral and parietal peritoneum during caesarean section is not associated with increased intra-operative or immediate postoperative complication.

Study design: 208 pregnant women undergoing a lower segment caesarean section were randomized to either the closure of both the visceral and parietal peritoneum with absorbable suture or no peritoneal closure.

Setting: Dhaka Medical College Hospital of Bangladesh.

Main outcome measures: No detrimental effect in the immediate post-operative recovery period, length of post operative hospital stay. Maternal pain as assessed by visual analogue scale and requirement for post operative analgesics, post operative bowel function and febrile morbidity and time taken for operation was also assessed.

Results: We allocated 100 women to the non closure group and 108 women to the closure group. There were no demographic differences between the groups and no differences in methods of anaesthesia or use of different peripartum narcotics analgesia. The mean length of hospital stay was 7.11 (SD 2.3) days for the non closure group and 6.62 (SD 1.9) days for the closure group. The incidence of fever or wound infection was similar between two groups. There were no difference in the number of patients requiring parenteral narcotic analgesics or in the number of doses per patient. Post operative pain and number of analgesics doses was significantly lesser.

The frequency with which post operative ileus was diagnosed was similar. The average operating time was shorter for open than closure group ($p < 0.005$).

Conclusion: Non closure of the visceral and parietal peritoneum at caesarean section appears to have no adverse effects on immediate postoperative recovery. It decreases postoperative analgesic requirements, bowel function is restored easily and allows a simplified and shorter surgical method.

INTRODUCTION

Caesarean section is one of the most common intraperitoneal surgical operation done in our country¹. Usual and traditional method done is in closing abdomen, closure of the visceral peritoneum and also parietal peritoneum separately from the other layers. Common belief is that it prevents adhesions. Even in

general surgery literature review it has been found that reapproximation is not only unnecessary for wound healing and strength but may actually delay healing and promote adhesion formation²⁻⁴. There are also different views and also animal experiments which supports this technique⁴.

Peritoneal and vascular injury produced by any suture may be a major cause of adhesions induction and routine closure of the peritoneum may be abandoned. We conducted this randomized controlled study to assess that non-closure of the visceral and parietal peritoneum at caesarean section is not associated with increased intraperitoneal or immediate post operative complications.

Correspondence:

Dr. Mariam Faruqui
Department of Obstetrics and Gynaecology,
Dhaka Medical College Hospital,
Dhaka,
Bangladesh.

MATERIALS AND METHODS

This trial was done in Obstetrics and Gynaecology Department of Dhaka Medical College Hospital. 208 women undergoing elective or emergency caesarean section between July 1997 to June 1998 in the year were randomized to one of the two categories. The random number was drawn with the help of random number table. A system of sealed envelopes containing treatment allocations was used. The envelopes were opened in the operation theatre at the start of operation. The control group undergoing caesarean section with active closure of both visceral and parietal peritoneum using continuous running delayed absorbable suture (Ethicon O cat gut). The study group consisted of patients undergoing same surgical procedure but without closure of both peritoneum.

108 women were randomized to control group and 100 were taken in study group.

A pfannenstiel incision was employed in all cases and all uterine incision were of the low transverse type. The uterine incisions were closed with catgut no. 1. Ethicon, and Rectus Sheath repaired with Dexon O. In all cases skin was repaired with O silk. In closure group peritoneum was repaired with O catgut Ethicon.

Prophylactic antibiotics were used as routine practice. Caesarean section were performed by residents, fellows and attending physicians working in the obstetrics department. Immediate post operative pethidine were usually given to women with both general and spinal anaesthesia. The patients were managed in the usual postoperative manner. All medications were administered on an as-needed basis. After pethidine, analgesic used was voltaren suppositories as required.

The day of caesarean section was considered as day 0. Women stayed in post operative ward for a 24 hours and then transferred to postpartum ward. Treatment group was not disclosed to nursing or medical staff in postpartum ward and not even to the women. In the absence of complications, mothers were discharged from the hospital on 6th postoperative day – as routine hospital policy.

During the study period, we reviewed the records of patient demographics, duration of surgery and post operative complications like fever (temperature of 38°C or greater at least once during post operative hospitalization), ileus or paralytic ileus and wound problems. Length of hospital stay reflecting short term maternal morbidity was also evaluated. Post operative pain was measured once by administering a 10 cm visual analogue scale (no pain = 0, worst pain

ever = 10) at 24 hours after surgery. Analgesics were given as needed and number of doses were recorded. Pethidine and voltaren suppositories were used as needed. Bowel sounds were recorded by auscultations. Oral alimentation were started after 6 hours of operation. Febrile morbidity was defined as a sublingual temperature > 38°C lasting for more than 24 hours. Operation time was also noted from the operation notes.

Results are presented as means \pm standard deviations (SD), groups and are compared by χ^2 , student's t-test where appropriate. Student t-test was used for continuous variables and χ^2 analysis for discrete variables^{5,6}. Differences are considered statistically significant if $P < 0.05$.

RESULTS

Between July 1997 and June 1998, 208 women were recruited. We allocated 100 women to the study group and 108 women to the control group.

Table 1 represents the patient demographic and anaesthesia data. The experimental and control groups were similar with respect to maternal age, parity and gestational age. Groups were also similar with respect to indications for caesarean section, mode of anaesthesia and in both groups it was the 1st caesarean section.

The mean post operative hospital stay was 6.62 (SD 1.9) days for the women in the experimental group and 7.11 (SD 2.3) days in the control group.

There were 13 (13%) women from the non closure group and 30 (28%) women from the closure group who stayed more than 7 days in the hospital.

Regarding post operative pain between two groups as measured by the need of analgesics there was a significant difference. In closure group (voltaren suppositories) need of analgesics were also more. Pain levels were significantly lower in non-closure group.

There was no significant difference between the groups in the number of doses of postoperative parenteral narcotics (Pethidine) per subject [control group 79.16 (12.5%), study group 81.5 (11.52%)].

The percentage of positive auscultation of bowel sounds immediately was 66 (61.11%) in closure group and 87 (87%) in non-closure group ($p = 0.006$).

In 9 women (9%) and 4 (4%) women bowel sounds appeared within 6 hours and 12 hours respectively in non-closure group and 12 (11.11%) and 30 (27.7%) in closure group.

There was no difference between the groups with regard to the day on which patients were provided liquid or solid diets. No bowel stimulant like suppositories or enemas were used in any groups.

Of the 208 women 54 (26%) had a temperature > 38°C lasting for 24 hours. Three cases had endometritis with excessive per vaginal bleeding, 6 cases due to wound infection and 3 with breast engorgement.

Some difference was observed in relation to closure (33.33%) and non-closure group (8%) in relation to febrile morbidity.

In addition to these complications, three women developed wound haematoma at visceral peritoneum and two developed intestinal obstruction due to adhesions of raw wound of visceral peritoneum.

Women in non-closure group had a shorter operative time than those in the closure group. The mean operative time in the control (closure) group was 27.44 (2.73) minutes, versus 19.6 (2.03) minutes in the study (non-closure) group ($p < 0.05$). (Time recorded from beginning of skin incision to last stitch of skin closure).

Although not statistically significant, peritonisation had slightly longer post operative hospitalizations (control group 7.11 ± 2.3 days, study group 6.62 ± 1.9 days). However, a few of the cases in both groups took a longer time due to wound infection.

However, a significantly greater proportion of the study subjects were discharged by the 6th post operative day (study group 87 of 100 or 87%, control 66 of 108 or 61%; $p < 0.05$).

TABLE 1
Patient Demographics, values are shown as mean (SD) or n (%) as appropriate

| | Control (closure) N = 108 | Study (non-closure) N = 100 |
|----------------------|---------------------------|-----------------------------|
| Maternal (years) age | 23.88 (4.15%) | 25.04 (4.25%) |
| Parity | 1 (1.04%) | 0.63 (0.88%) |
| Gestational age | 39.44 (1.17%) | 40.06 (1.40%) |
| Anaesthesia | | |
| • Spinal | 72 (66.67%) | 93 (93%) |
| • General | 30 (27.78%) | 4 (4%) |
| • Epidural | 6 (5.56%) | 3 (3%) |

TABLE 2
Patient Demographics, values are shown as mean (SD) or n (%) as appropriate

| Indication n = (%) | Control (closure) N = 108 | Study (non-closure) N = 100 |
|--------------------|---------------------------|-----------------------------|
| Foetal distress | 12 (11.11%) | 21 (21%) |
| Obstructed labour | 6 (5.56%) | 12 (12%) |
| Placenta praevia | 24 (22.22%) | 3 (3%) |
| CPD | 6 (5.56%) | 7 (7%) |
| Twin | 18 (16.67%) | 3 (3%) |
| Prolonged labour | 18 (16.67%) | 12 (12%) |
| Post dated | 6 (5.56%) | 15 (15%) |
| Breech | 6 (5.56%) | - |
| Eclampsia | 6 (5.56%) | 3 (3%) |
| BOH | 6 (5.56%) | 3 (3%) |
| Transverse lie | - | 6 (6%) |
| PET | - | 9 (9%) |
| IUGR | - | 6 (6%) |

TABLE 3
Postoperative morbidity indicators by study group

| | Control (closure) N = 108 | Study (non-closure) N = 100 |
|--|---------------------------|-----------------------------|
| a. Postoperative hospitalization Mean (SD) | 7.11 (2.30) | 6.62 (1.93) |
| b. Operation time (mins) | 27.44 (2.73) | 19.6 (2.03) |
| c. Analgesic requirements | | |
| j) Pethidine (mg) | 79.16 (12.5) | 81.5 (11.52) |
| i) Voltaren suppositories (stick) | 4.38 (1.56) | 0.58 (0.78) |
| d. Postoperative – Bowel sounds Auscultation | | |
| • Immediately | 66 (61%) | 87 (87%) |
| • Within 6 hrs | 12 (11%) | 9 (9%) |
| • Within 12 hrs | 30 (28%) | 4 (4%) |
| e. Febrile morbidity | 36 (33%) | 18 (18%) |

DISCUSSION

In laparotomy, if left undisturbed peritoneal wound shows mesothelial activity by 48 hours and complete indistinguishable healing (no scarring) by 5 days. Reapproximation of peritoneal edges or repair of defects, even with suture material considered to be minimally reactive, results in increase tissue ischemia and subsequent necrosis and foreign body tissue reactions which may lead to increased adhesion formation at the sites of reperitonisation.

There is evidence that simplified surgical techniques requiring less foreign materials are beneficial to the patient^{7,8}.

In our study of caesarean section, there was no significant increase in febrile morbidity, antibiotic usage, length of hospital stay or return of bowel function in the non-closure group. On the other hand, non-closure group had less post operative analgesic requirements, difficulties with some bowel function and no extra hospitalization time. The controls required more analgesics.

A few studies were also done in this respect. Pietrantonio et al⁹ kept only the parietal peritoneum open in a study of more than 200 women and found no differences with controls in post operative complications.

Hull et al¹⁰ in a study of more than 100 cases reported shorter operation times, less oral analgesia and less bowel stimulant administered when both peritoneum are left open. No adverse effects on immediate post operative recovery were found.

The decrease in the operation time with non-closure of the peritoneum was associated with less anaesthesia time and the wound exposed to the environmental contaminants for less time¹¹⁻¹³. The difference of 7 minutes in operation time between two groups is

statistically significant. The benefits here include decreased anaesthesia and operating room costs, personal time and expense, and suture costs¹⁴⁻¹⁷.

The length of post operative hospital stay is an objective measure of short term maternal morbidity. This main outcome was similar between two groups, closure 7.11 days (SD 2.3) and non-closure 6.6 days (SD 1.9).

The proportion of women remaining in hospital longer than six days were slightly more in closure group.

Non closure of peritoneum also made differences in post operative pain as well as in the requirements of analgesics¹⁸⁻²⁰.

Febrile morbidity was dissimilar between two groups. Wound infection occurs only in few cases in both groups. Although 3 women suffered from wound haematoma at visceral peritoneum and two developed intestinal obstruction due to adhesions of raw wound of visceral peritoneum, still difference in infection rate due to closure and non-closure is not remarkable.

Adhesion formation remains a major concern after any surgery. Adhesions are caused by ischemia, inflammation and infection rather than by open surfaces. Omental and bowel adhesions are rare in lower caesarean section as compared with classical caesarean section.

Other studies also confirmed that non-closure of the peritoneum after gynaecological surgery did not increase adhesion as found at second look laparoscopy or laparotomy²⁰⁻²³.

If bladder flap is less adherent to the lower uterine segment, less adhesions will be formed. Therefore bladder discomfort may be decreased and subsequent

pelvic surgery may be easier. Tulandi et al found no difference in the frequency of adhesions to the laparotomy incisions¹³.

Peritoneal closure after caesarean section however, is still a popular practice.

CONCLUSION

Our data support the following conclusions regarding non-closure of the visceral and parietal peritoneum at the time of operation

1. It seems to have no serious detrimental effect in the immediate post operative recovery period
2. It significantly decreases post operative analgesic requirements
3. There is no delay in the return of bowel function
4. It provides simple surgical technique requiring less suture materials and less operating time.

REFERENCES

1. Lomas J, Enkin M. Variations in operative delivery rates. In: Chalmers I, Enkin M, Keirse MJN, editors, *Effective care in Pregnancy and Childbirth*. Oxford: Oxford University Press, 1989; 1182-1195.
 2. Conolly WB, Stephens FO. Factors influencing the incidence of intraperitoneal adhesions: an experimental study. *Surgery* 1968; 63: 976-979.
 3. Elkins Th E, Stovall Th G, Warren J, Ling FW, Meyer NL. A histologic evaluation of peritoneal injury and repair: implications for adhesions formation. *Obstet Gynaecol* 1987; 70: 225-228.
 4. Neff MR, Holtz GL, Betsill WL. Adhesion formation and histologic reaction with polydioxanone and polyglactin suture. *Am J Obstet Gynaecol* 1985; 151: 20-21.
 5. Armitage P, Berry G. The planning of statistical investigations. In: Armitage P, Berry G, editors, *Statistical methods in Medical Research*, 3rd edn. Oxford: Blackwell Scientific Publications, 1994: 175-206.
 6. Bernard PM, Lapointe C. Intervalle de confiance. In: Bernard PM, Lapointe C, editors. *Measure statistiques en Epidemiologie*. Quebec: Presses de l'Universite du Quebec, 1991: 275-296.
 7. Hauth JC, Owen J, Davis RO. Transverse uterine incision closure: one versus two layers. *Am J obstet gynaecol* 1992; 167: 1108-1111.
 8. Ellis H, Heddle R. Does the peritoneum need to be closed at laparotomy? *Br J Surg* 1977; 64: 733-736.
 9. Pietrantonio M, Parsons MT, O'Brien WF, Collins E, Knuppel R, Spellacy WN. Peritoneal closure or non-closure at caesarean. *Obstet Gynaecol* 1991; 77: 293-296.
 10. Hull DB, Varner MW. A randomized study of closure of the peritoneum at caesarean delivery. *Obstet Gynaecol* 1991; 77: 818-821.
 11. Stricker B, Blanco J, Fox HE. The gynaecologic contribution to intestinal obstruction in females. *J Am Coll Surg* 1994; 178: 617-620.
 12. Panel. Indications for caesarean section: final statement of the panel of the National Consensus Conference on Aspects of Caesarean Birth. *Can Med Assoc J* 1986; 134: 1348-1352.
 13. Tulandi T, Hum HS, Gelfand MM. Closure of laparotomy incision with or without peritoneal suturing and second look laparoscopy. *Am J Obstet Gynaecol* 1988; 158: 536-537.
 14. Placek PI, Taffel SM. Recent patterns in caesarean delivery in the United States. *Obstet Gynaecol Clin North Am* 1987; 15: 607-27.
 15. Kerr JMM. The technique of caesarean section with special reference to the lower uterine segment incision. *Am J Obstet Gynaecol* 1926; 12: 729-34.
 16. Cunningham FG, MacDonald PC, Gant NL. *Williams obstetrics*. 18th ed. Norwalk, Connecticut: Appleton and Lange, 1989-451.
 17. Buckman RF, Jr, Buckman PD, Hufnagel HV, Gervin AS. A physiologic basis for adhesion-free healing of deperitonealized surfaces. *J Surg Res* 1976; 21: 67-76.
 18. Karipineni RC, Wilk PJ, Danese CA. The role of the peritoneum in the healing of abdominal incisions. *Surg Gynaecol Obstet* 1976; 142: 729-30.
 19. McFadden PM, Peacock EE Jr. Preperitoneal abdominal wound repair: Incidence of dehiscence. *Am J Surg* 1983; 145: 213-4.
 20. Poole GV Jr. Mechanical factors in abdominal wound closure: The prevention of fascial dehiscence. *Surgery* 1985; 97: 631-40.
 21. Williams DC. The peritoneum. A plea for a change in attitude towards this membrane. *Br. J Surg* 1953; 42: 401-5.
 22. Ratcliff JB, Kapernick P, Brooks GG, Dunnihoo RR. Small bowel obstruction and previous gynaecologic surgery. *South Med J* 1983; 76: 1349-50.
 23. Gabert HA, Bey M. History and development of caesarean operation. *Obstet Gynaecol Clin North Am* 1988; 15: 591-605.
-