

A randomized controlled study of peritoneal closure at cesarean section

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ABSTRACT

Objective: To assess the benefits or problems that may be associated with peritoneal closure at cesarean section.

Methods: A randomized-controlled study of women undergoing cesarean section in Sultan Qaboos University Hospital Maternity Unit. After the decision is taken for cesarean section, women were randomized to either repair of peritoneum using standard technique or non-repair of peritoneum. Duration of operation, maternal morbidity, blood loss assessed by post-operative hemoglobin change and requirement of transfusion, post operative infection, thromboembolic disease, and length of hospital stay were analyzed in 2 groups of patients. Sixty women were randomized into the study, 30 group A, had peritoneal closure and 30, group B, and had non-closure.

Results: The average duration of operation for group A

was 61.9 \pm 12.734, and for group B was 53.56 \pm 11.209 ($p < 0.01$ statistically significant). There was no statistically significant difference in the length of stay, estimated blood loss, the mean drop in hemoglobin, postoperative pyrexia, and wound infection rate between the 2 groups.

Conclusions: Our study has confirmed the previous study findings, and has shown that there are no advantages in suturing of the peritoneum in terms of blood loss, blood transfusion, operation duration, postoperative pyrexia and wound infection. In fact non-suturing of the peritoneum was associated with shorter operation duration ($p < 0.01$ significant), and reduced cost.

Keywords: Cesarean section, peritoneal closure.

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Traditionally both the parietal and visceral peritoneum is closed during cesarean section. The reasons are to restore the anatomy, to approximate tissue for healing, and to reduce the risk of herniation or dehiscence of abdominal wound.¹ It was also thought that it helped reduce adhesion formation.^{1,2} Few studies have shown that non-closure of the peritoneum was associated with more rapid healing. The absence of suture material and the reduced tissue handling is thought to contribute to less adhesion formation.^{2,3} The physiological explanations for the better tissue healing and less adhesions are, the deperitonelized surfaces which are not traumatized heal without permanent adhesions because they retain their ability to lyse fibrinous adhesions before organization can occur.^{2,4} Tight

sutures may cause the peritoneum to become ischemic and therefore it loses the ability to lyse fibrin.^{3,4} There is evidence that if left unsutured, peritoneal defects will have mesothelial integrity within 48 hours, and there will be no fibrosis or scar formation in 5 days.^{3,5-8} Closure of the peritoneum was addressed at 4 randomized-controlled trials; all these trials were included in the Cochrane Systematic Review. The review concludes that currently available evidence questions the routine use of peritoneal closure as conventional practice in routine cesarean section.⁵

Methods. The patients consent was taken once the clinical decision has been made for cesarean section. Sixty women were recruited from the labor

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Table 1 - The clinical characteristics of women in the study.

| | Closure | Non-closure |
|-------------------|---------|-------------|
| Age | 28 | 26 |
| Parity | 4 | 5 |
| Weight in kg | 65 | 63 |
| Gestation (weeks) | 39 | 39 |

ward at Sultan Qaboos University Hospital. They were randomized to one of 2 groups by numbered envelope technique. Thirty to peritoneal closure and 30 to non-closure of peritoneum.

Group A. After closure of the uterus in the usual manner, the parietal and visceral peritoneum was closed using 2.0 vicryl sutures. Hemostasis is checked as normally practiced. Abdominal wall is closed in layers as standard practice.

Group B. The procedure is as for group A except that both the parietal and visceral peritoneum is left without closure. Again hemostasis is checked before continuing to close the abdominal wall. All women had primary cesarean section, and no previous laparotomy. The Pfannenstiel incision was used for all patients, and general anesthesia was used in both groups. No patient received corticosteroids, pre operative antibiotics or antihistamines.

All women under going cesarean section have a sample of blood taken for hemoglobin estimation. Post-operative hemoglobin specimens were taken 48 hours after the cesarean section. The hematocrit was noted in each specimen, to allow accurate estimation of the drop in Hb concentration, which reflects blood loss. The doctors completed a questionnaire after the

procedure. The collected data was entered into a database for analysis.

Results. All women who were asked to take part in the study accepted. The mean age of the patients in the group with peritoneal closure was 28 years, and 26 years in the group with peritoneal non-closure. There were no significant differences in the 2 examined groups as far as parity, weight and gestational age (Table 1). No case of deep venous thrombosis or pulmonary embolism occurred in either group. The duration of cesarean section performed using non-closure was much shorter than these performed by the standard technique. The difference was statistically significant. There were no differences in the length of stay, post operative infection rate, and no significant difference between the estimated blood loss, blood transfusion, and operative duration between the 2 groups (Table 2).

Discussion. Closure of peritoneum was addressed at 4 randomized-controlled trials; all these trials were included in the Cochrane Systematic Review. The review concludes that currently available evidence questions the routine use of peritoneal closure as conventional practice in routine cesarean section.⁵

Recommendation from the Royal College of Obstetricians and Gynecologists guideline No 15 states “the closure of peritoneal defects even with minimally reactive suture materials, results in increased tissue reaction and may result in adhesion formation. Non-closure appears to have few risks and may be recommended in many obstetric and gynecology operations. Surgeons abandoning closure should be no less meticulous in other aspects of their craft”.

Table 2 - Study parameters in both groups.

| | Group A n = 30 | Group B n = 30 | z | p |
|--|-------------------|-------------------|------|-------|
| Duration of op in minutes | 61.9 +/- 12.734 | 53.56 +/- 11.209 | 2.69 | <0.01 |
| Drop in Hb | 0.874 +/- 0.633 | 0.657 +/- 0.557 | 1.41 | ns |
| Blood transfusion | 3.0 | 2.0 | | 1.00 |
| Estimate of blood loss (ml) | 483.3 +/- 187.696 | 400.0 +/- 177.628 | 1.76 | ns |
| Hospital stay (days) | 6.0 +/- 0.913 | 5.5 +/- 1.137 | 1.88 | ns |
| Post-op Pyrexia | 9.0 | 7.0 | | 0.771 |
| Ileus | 0.0 | 0.0 | | |
| Wound infection | 7.0 | 4.0 | | 0.506 |
| op = operation Hb = hemoglobin z = Fisher's exact test p = p value (single tailed distribution, p < 0.05 (significant)) | | | | |

Our study has confirmed the previous studies findings and has shown that there are no advantages in suturing of the peritoneum in terms of blood loss, blood transfusion, operation duration, post-operative pyrexia and wound infection. In fact non-suturing of the peritoneum was associated with shorter operation duration ($p < 0.01$ significant), reduced rate of post-operative pyrexia and wound infections (non-significant). Non-closure of the peritoneum would be associated with reduced operative time and therefore reduce the exposure to anesthesia and rate of thromb-embolic complications. The shorter operative time leads to more efficient use of the theater time and therefore reduces cost. Another aspect we have addressed in this study was the cost of the suture materials. The suture used for closure of the peritoneum is vicryl 0.0, and on average 2 of these suture materials are used during cesarean delivery. In the non-closure group R.O 1.013 was saved for each procedure, i.e. in total = 30.39.

This study shows that non-closure of the peritoneum at cesarean section is associated with reduced operation time which in-turn reduces the anesthetic exposure and complications. It has further proven that non-closure of the peritoneum is not associated with increased morbidity.

References

1. Duffy DM, di Zerega GS. Is peritoneal closure necessary? *Obstet Gynecol Surv* 1994; 49: 817-822.
2. di Zerega GS, Duffy DM. Is peritoneal closure necessary? *The Royal College of Obstetricians and gynecologists. PACE Review* 1996: 96/02.
3. Nygaard IE, Squatrito RC. Abdominal incisions from creation to closure. *Obstet Gynecol Surv* 1996; 51: 429-436.
4. Rayburn WF, Schwartz WJ 3rd. Refinement in performing a cesarean delivery. *Obstet Gynecol Surv* 1996; 51: 445-451.
5. Hankins GDV, Clarks SL, Cunningham G, Gilstrap LC. Cesarean section. In: *Operative Obstetrics. Connecticut: Appleton and Langer; 1995. p. 301-332.*
6. Tulandi T, Hum HS, Gelfand MM. Closure of laparotomy incisions with or without peritoneal suturing and second look laparoscopy. *Am J Obstet Gynecol* 1988; 158: 536-537.
7. Wilkinson CS, Enkin MW. Peritoneal non-closure at cesarean section. In: Neilson JP, Crowther CA, Hodnett ED, Hofmeyr GJ, editors. *Pregnancy and Childbirth Module of the Cochrane Database of Systemic Reviews. The Cochrane Collaboration, Issue 1. Oxford: Update Software; 1997.*
8. Hull DV, Vaner MW. A randomized study of closure of the peritoneum at cesarean delivery. *Obstet Gynecol* 1991; 77: 818-821.