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Original Article

A Randomized Study Comparing Non-Closure and Closure of Visceral and Parietal Peritoneum During Cesarean Section

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Abstract :

Objectives: To assess the short term morbidity of non-closure of the visceral and parietal peritoneal at caesarean section as compared to suture peritonization. *Methods:* A prospective randomized controlled trial of 200 women undergoing cesarean section was done; randomized into non-closure and closure groups. Perioperative, intraoperative and postoperative details were recorded in the proforma. Chi-square/student t-test were used to compared outcome between the two groups. *Results:* Operating time, anesthesia time and time of ambulation were significantly shorter in non-closure group ($p<0.0001$). There was less postoperative pain, analgesic requirement and febrile morbidity in non-closure group; however it was not statistically significant. *Conclusion:* Avoiding the closure of visceral and parietal peritoneum at cesarean is associated with lesser operating time, decreased febrile morbidity and lesser need for postoperative analgesics. Hence routine closure of peritoneum at cesarean can be avoided.

Keywords: peritoneal closure, cesarean section, postoperative morbidity

Introduction

Cesarean section is most certainly one of the oldest operations in surgery, with its origin lost in antiquity and in ancient mythology. Over the years, there is little information relating to the optimum operative technique for this method of delivery[1]. Traditionally, suturing of the visceral and parietal peritoneum at cesarean section has been widely accepted, despite the lack of evidence establishing its benefits. Apart from aesthetic consideration, there is a belief that closure of peritoneum can prevent adhesions[2]. On the contrary, theoretical consideration and animal experiments support the opposite view[3]. Suture peritonization tends to cause ischemia, necrosis, inflammation and foreign body reactions to the suture material. On the other hand, clean incision of the peritoneal surface without suturing the cut edges provides more rapid peritoneal repair, leading to less postoperative pain, fever, lesser risk of ileus and better wound healing[4-6].

The present study aims to assess the short-term morbidity, to evaluate whether non-closure of the visceral and parietal peritoneum has benefits over routine closure, with regards to the intraoperative and early postoperative course.

Methodology

It was a prospective randomized controlled study to determine the short term clinical outcome of non-closure

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in comparison with closure of visceral and parietal peritoneum at cesarean delivery. It was carried out in the Department of Obstetrics and Gynecology, Mahadevappa Rampure Medical College, Gulbarga, from June 2003 to May 2005.

Two hundred women undergoing emergency or elective lower segment cesarean section were recruited for the study. Exclusion criteria were history of previous lower abdominal surgery, severe anemia, presence of pelvic infection and adhesions, morbid obesity and foul smelling vaginal discharge.

After detailed history, examination and investigations, informed written consent was obtained from each patient for participation in the study. By using computer generated random numbers, with the use of opaque sealed envelopes, the women were randomly allocated to one of the two groups, closure (control) or non-closure (subject) group. The envelopes were opened in sequence in the operating theatre, just before the start of the surgery and note shown to the surgeon. On call consultants or third year postgraduate students supervised by consultants performed all operative procedures.

All the women underwent lower segment cesarean section through a pfannenstiel incision. Uterus was closed with continuous number 1 polyglactin. In the control group, both the layers of peritoneum were sutured with continuous 1-0 chromic catgut. Rectus sheath was closed with a continuous number 1 prolene. The skin was approximated with continuous subcuticular number 2-0 polyglactin. Subject group had similar procedure of cesarean section but without reapproximation of visceral and parietal peritoneum.

Injection Amoxicillin and clavulanic acid 1.2g single dose was given preoperatively, by intravenous route in elective cases, whereas in the emergency group, intravenous injection Ampicillint Cloxacillin 500mg 8^{th} hourly, injection metromidazole 400mg 8^{th} hourly and injection Garramycin 80mg 12^{th} hourly were given on the first two days of surgery and oral antibiotics for the next three days.

After the operation, all patients were managed in the same postoperative ward. The consultants and postgraduate students who did not perform the surgery were blinded to the study and made all postoperative assessment and management. In the absence of

Table 1.

Patient characteristics, type of anesthesia and cesarean

	Non-closure n=100	**Closure** n=100	**Statistical significance**
Age (Years) Mean±SD	24.5±4.4	23.7±3.7	t=1.3,p=0.2 Not significant
Parity Mean±SD	0.6±1.1	0.5±1.1	t=0.4,p=0.6 Not significant
Gestational age Mean±SD	37.5±2.3	37.6±2.0	t=0.3,p=0.6 Not significant
Anaesthesia			
General	19	20	X^2=0.4, p=0.5
Spinal	81	80	Not significant
Elective	13	9	X^2=0.1, p=0.8
Emergency	87	89	Not significant

p=p value; t-student t test

Table 2.

Outcome data in terms of operative and postoperative course

Parameter	**Non-closure** n=100	**Closure** n=100	**Statistical significance**
Operative time Minutes mean±SD	32.02±4.9	43.24±4.61	t=16.74, p<0.0001 significant
Anesthesia time Minutes mean±SD	42.8±5.03	53.09±4.67	t=16.06, p<0.0001 significant
Total Pain score Mean±SD	35.58±3.30	36.56±3.91	t=1.83, p=0.06
Febrile morbidity (no. of patients)	12	16	X^2=0.004, p=0.57
Time of oral intake (days) Mean±SD	1.34±0.47	1.61±0.49	t=1.30, p=0.19 Not significant
Time of ambulation (days) Mean±SD	1.39±0.51	2.28±0.56	t=11.22, p<0.0001 significant
Wound infection (no. of patients)	5	7	X^2=0.35, p=0.55 Not significant
Hospital stay (days) Mean±SD	7.17±0.75	7.29±1.00	t=1.10, p=0.27 Not significant

complications, patients were discharged on the seventh postoperative day.

The outcome measures noted were anesthesia time, operating time, postoperative pain, duration of ileus, time of ambulation, febrile morbidity, endometritis, cystitis, wound infection and length of the hospital stay.

Analgesic injection Diclofenac sodium 75mg intramuscularly, were given 8th hourly, in the first 24 hours of surgery and then as needed. Analgesics were changed over to oral on the first postoperative day. Requirement of parenteral analgesia after 24 hours of surgery was considered as additional dose of analgesia and was recorded.

Postoperative pain was assessed by 10cm visual analog scale – VAS (no pain=0), worst pain ever=10) at 24 hours after surgery and daily till the time of discharge. Women were asked to indicate average intensity of pain they had experienced during the last 24 hours.

Oral alimentation was reintroduced once bowel sounds were returned. Febrile morbidity was defined as temperature more than 38^0 C on two occasions at least twelve hours apart, excluding the first postoperative day. Endometritis was diagnosed if uterine tenderness, vaginal discharge and fever were present. Cystitis was diagnosed by positive urine culture growth or more than 1,00,000 colonies per ml of a single species of bacteria in the urine. Wound infection was diagnosed when there was serous or purulent discharge from the skin incision with erythema and induration, with or without fever.

Significance of difference, if any, in the observations made of variables studied in control / subject groups, in numbers or averages, was determined using Chi-square (X^2) or student t–test, as applicable.

Results

Among the 200 women enrolled in the study, 100 subjects had non-closure, while 100 controls had

closure of visceral and parietal peritoneum at cesarean section.

Mean age, parity, gestational ages, anesthesia data, elective or emergency cesarean data, were comparable in both the groups (Table 1).

The outcome data is shown in Table 2. The average duration of operation and anesthesia were less by 11.2 minutes and 10.2 minutes respectively in the subject group.

Women in subject group requiring additional analgesics, either oral or parenteral, were less than that in the control group. 23 subjects and 27 controls required additional dose of analgesic. However, the difference was not significant. Mean total pain score in the subjects was less as compared to that in controls.

Time of oral intake and ambulation was less in subjects than in controls. The febrile morbidity was high in control group as compared to that in the subjects; however it was not statistically significant. Cystitis was three subjects and five and controls. Five subjects had wound infection as compared to seven controls.

The mean hospital stay in subject group was 7.17 days as compared to 7.29 days in controls. Five subjects in subject group and seven in control group stayed in the hospital for more than seven days because of wound infection.

Discussion

Traditional surgical training has always dictated the closure of the visceral and parietal peritoneum[7], without proper evidence. But simplified surgical technique of non-closure of peritoneum, requiring less foreign material is beneficial to the patient.

Histological studies in animals have revealed that the peritoneum regenerates denovo and not from the cut edge of the defect as in skin wounds because the entire surface becomes mesothelialized simultaneously. Therefore peritoneal defects even large when left undisturbed demonstrate mesothelial integrity by 48 hours and complete indistinguishable healing by five days[8]. Leaving the peritoneum open for the debris to be digested by the activity of peritoneal macrophages might be beneficial.

Irrespective of the factors influencing the surgical time,

in the study, there was a significant reduction in the average operating time of 11.2 minutes in the subject group. This finding is consistent with those of other studies who have reported shorter operative time in these groups of patients[8,9]. However, in the present study, surgical time was more than 10 minutes shorter, probably because both visceral and parietal peritoneum were left unsutured; where as Pietrantoni et al[9], left only parietal peritoneum open and Nagele et al[10], left only visceral peritoneum open.

The decrease in operative time reduced the duration of anesthesia exposure and that of exposure of wound to the environmental contaminants. This is reflected in decreased incidence of febrile morbidity and has reproduced the observations made by other researchers[8,9,12].

Non-closure of the peritoneum might reduce the intensity of postoperative pain due to less manipulation of parietal peritoneum, which is sensitive to pain. In addition, ooze or clots in the closed peritoneal space behind uterovesical fold could be the significant factor for postoperative pain in peritoneal closure groups. Nagele et al[10], Hojberg et al[11], and others[8,13,14], found reduced usage of oral analgesics in the subjects. Present study did not show statistically significant difference in the pain medication requirements in the two groups. The mean pain score was less in subject group and similar finding was also reported by Rafique et al[14].

Grundsell[9], showed a decreased incidence of wound complications in the non-closure group. The present study showed decreased incidence of wound infection in the subject group, which was statistically significant and was comparable with the findings of Hull[7] and Nagele et al[10].

Conclusion

Avoiding the closure of visceral and parietal peritoneum at cesarean delivery is associated with lesser operating time, decreased incidence of febrile morbidity, lesser need for postoperative analgesics, early ambulation and quicker recovery than the closure group. Hence routine closure of peritoneum at cesarean can be avoided.

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