

Post-operative Analgesic Requirement in Non-closure and Closure of Peritoneum during Open Appendectomy: A Randomized Controlled Study

BASARKOD SURESH, AMBI UDAY S, GANESHNAVAR ANILKUMAR, EMMI SHAILESH, LAMANI Y P

ABSTRACT

Objectives: To assess the post-operative analgesic requirement of non-closure of the visceral and parietal peritoneum at open appendectomy as compared to suture peritonization.

Design: A randomized double-blind controlled trial was performed on 100 patients who underwent open appendectomy.

Main outcome measures: Post-operative pain scores as assessed by visual analogue scale and analgesic requirement.

Results: Pain scores at 24 hours were less in non-closure than closure group and analgesic requirement was significantly lesser in non-closure than closure group after 24 hours.

Conclusion: In conclusion, not suturing the peritoneum at the appendectomy has beneficial effects on post-operative pain and we also emphasise the absence of short term morbidity when peritoneum is not closed. Therefore we recommend the non-closure of peritoneum at appendectomy.

Key Words: Peritoneal closure, Appendectomy

INTRODUCTION

It is conventional to suture all the layers that are cut during surgery. This is indeed what every surgeon is taught and every surgeon is practicing. The fear of increased adhesions following the non-closure of peritoneum has been disapproved by many studies [1,2]. Much of the experience on non-closure of peritoneum in the literature comes from obstetric and gynaecological surgeries. The effect of post-operative pain remains a controversial issue [3]. To the best of our knowledge, no study in general surgery was specifically designed to assess the post-operative pain and analgesic requirement. Our hypothesis is that – peritoneum has rich nerve supply and poor blood supply. Closure of peritoneum results in more pain because of ischaemia produced by suturing. To test our hypothesis we took up this randomized, double blind controlled study to know the effect of non-closure of peritoneum at appendectomy on post-operative pain and analgesic requirement.

METHODS

After obtaining the approval from institutional ethical committee, a double-blind randomized, prospective trial comparing the effect of closure or non-closure of peritoneum on post-operative pain following open appendectomy was taken up. This study was carried out in the Department of Surgery, S Nijalingappa Medical College, Bagalkot, India from June 2010 to May 2011. One hundred patients undergoing emergency or elective Open appendectomy with proven ultrasonographic findings were recruited for the study. Exclusion criteria were Children below 12-years, Neurotic\psychiatric patients, complicated appendicitis, patients who were operated under anaesthesia other than spinal anaesthesia. Intra-operatively patients who had additional pathology, who underwent additional procedure and patients who developed wound infection were also excluded.

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 patients were randomly allocated to one of the two groups, closure (control) or nonclosure (subject) group. Both control and study group were matched in all aspects except for peritoneal closure or non-closure. The randomization sequence into closure and non-closure group was generated by computer generated number instructing the surgeon to open or close the peritoneum. The information was enclosed in sealed envelope. Envelopes were opened prior to the surgery before surgeon and the surgeon was asked to follow the instruction enclosed in the envelope, regarding closure or non-closure of peritoneum.

The patients enrolled for the study underwent open appendectomy under spinal anaesthesia. Mc Burney's incision was employed in all the cases. Per-operative findings on opening the abdomen were noted. Patients with complications, additional pathology and who underwent additional procedure were excluded. After removing the appendix the peritoneum was closed or left open based on the instruction enclosed in the envelope. Rest of the layers was closed as in routine. The time when surgery ended was taken as "0" hour and the day of surgery was taken as "0" day.

Post-operatively pain was recorded using Visual Analogue Scale (VAS), on day 0, day 1 and day 2. Analgesics were administered when VAS is more than 40mm on the scale. The analgesic requirement was recorded. Patients were watched for wound infection.

RESULTS

Among the 100 patients enrolled in the study, 47 subjects had non-closure, while 47 controls had closure of visceral and parietal peritoneum at open appendectomy. Mean age, sex, anesthesia data, were comparable in both the groups [Table/Fig-1]. The average

Patients Characteristics	Closure group	Non closure group
Age (yrs)	25.8	24.6
Sex	20:27	25:22
Mean H.B(gm%)	10.2	10.4
Operative time (mins)	37	31
Complications		
Appendicitis	One appendicular abscess	One With perforation
Any additional procedure	Meckel's excision	Twisted ovarian tumour
Post-operative wound infection	1	1

[Table/Fig-1]: Patient characteristics and operative details

	Closure group n =47	Non closure group n= 47	P Value
Day – 0	52.52±8.54	44.34±7.44	<0.001
Day – 1	40.04±5.98	37.36±5.79	<0.05
Day - 2	32.54±4.92	28.21±5.043	< 0.01

[Table/Fig-2]: Visual analogue scale score

	Non Opioid analgesia (IM diclofenac)			Opioid analgesia (IV tramadol)		
	Closure group n= 47	Non closure group n= 47	P Value	Closure group n= 47	Non closure group n= 47	P Value
Day – 0	128 ±34.14	108.5 ±37.69	<0.001	152±12.24	57±8.2	<.05
Day – 1	102 ±45.71	67.02 ±28.12	< 0.001	75±15.54	27±21.32	<0.05
Day – 2	48.91 ±47	23.5 ±40.80	<0.05	34±24.08	10±2.80	<0.01

[Table/Fig-3]: Analgesic requirement (parenteral)

duration of operation was less by 6 minutes in the non- closure group. Three patients in each group were excluded from the study due to associated complications and additional pathology.

The visual analogue score data is shown in [Table/Fig-2]. Mean total pain score in the, non–closure group was less as compared to that in controls. Patients in the non-closure group requiring parenteral analgesics was significantly less than that in the control group [Table/Fig-3].

DISCUSSION

Closure of peritoneum at Laparotomy has been a standard practice. Leaving the peritoneum open does not have any untoward effect, but has several advantages, which is supported by clinical and animal data. The advantages include reduced operative time, lower intra -abdominal adhesions, lower operative morbidity and early discharge from hospital [3,4,5]. The effect of non-closure of peritoneum on post-operative pain remains an issue of debate. Some studies have documented the reduction of post operative pain, while some studies did not, when peritoneum was not closed [4,6]. Only few studies were specifically designed to study post-operative pain [4,6]. We wanted to study the effect of non-closure of peritoneum on post-operative pain and analgesic requirements at open appendectomy, a commonly performed surgery even in the era of laparoscopy.

In our study post-operative VAS were significantly less in non-

closure group than the closure group. Post-operative analgesic requirement was less in non-closure group as compared to the closure group. Our results are comparable to a RCT by E. S.Hajsedvadi and F Rasekh [7] in which 160 pregnant women underwent caesarean section. In the non-closure group the analgesic requirement was 90.8 mg of diclofenac and 1.16 capsule of mephenemic acid whereas in the closure group it was 112.9mg of diclofenac and two capsules of diclofenac and two capsules of mephenemic acid. The mean VAS in closure group and non-closure group were 5.5 and 4.24 respectively. The difference between two groups was statistically significant. Similar findings are in conformity with the study by Ghongdemath JS [8].

In contrarily to our findings in study done by Z. Rafique et al [9] and Demirel Y et al [10] there was no overall difference in visual analogue scale between the two groups. But there was a tendency of lower pain scores in the non-closure group. In this study visual analogue scale/verbal rating scale scores were administered by the attending midwives and there were a number of missing values in the data as patients were not disturbed if they were sleeping in order to complete the data sheet. Significantly higher demand for morphine during 24-hour post-operative period (closure group 0.82mg/kg closure group vs 0.64mg/kg non-closure group) substantiates that closure group suffered more pain. Though there was no statistically significant difference between the two groups in the use of oral analgesia but a trend could be seen that the non-closure group used less oral analgesia. Xiong et al [11] in their study revealed that closure of the peritoneum and subcutaneous tissue provides no immediate post-operative benefits while unnecessarily lengthening surgical time and anesthesia exposure. The practice of closure of the peritoneum and subcutaneous tissue at radical hysterectomy should be questioned.

Hull et al.[12] in a study of 113 women and Nagele et al. [4] in a randomized trial of 549 women, reported less use of post-operative analgesia when the peritoneum was not sutured at caesarean section, but in both of these studies pain was not the primary outcome measure. Furthermore the anaesthetic technique was not standardized: some patients received general anesthesia and others either epidural or spinal with or without neuroaxial opioids. In both these studies importance was given to the number of doses rather than the actual amount used and post-operatively pain was not assessed. Similar criticism can be applied to a study by Irion et al.[13] which found no difference in the number of analgesic doses required post-operatively in their study of 280 patients. The CORONIS Trial [14] suggests that non-closure of the peritoneum may carry some short-term advantages, including a lower risk of post-operative infection, shorter operating time and shorter hospital stay. Again, however, the studies identified were small and the methodology was not always strong.

To test our hypothesis properly we attempted to standardize procedures as much as possible including anaesthesia technique and surgical procedure. The study and control group were similar in all aspects except peritoneal closure. We have not used patient controlled analgesia as it was not available in our institute at the time of study which remains as limitation.

In conclusion, not suturing the peritoneum at the appendectomy has beneficial effects on post operative pain and we also emphasise the absence of short term morbidity when peritoneum is not closed. Therefore we recommend non-closure of peritoneum at appendectomy.

REFERENCES

- [1] Duffy DM, diZerega GS. Is peritoneal closure necessary? *Obstet Gynaecol Surv* 1994;49:817-22.
- [2] Bamigboye AA, Hofmeyr GJ. Non-closure of peritoneal surfaces at caesarean section- a systematic review. *South African Medical Journal* 2005; 95:123-6.
- [3] Cheong Y, Bajekal N, Li T. Peritoneal closure- to close or not to close. *Human Reproduction* 2001; 16:1548-52.
- [4] Nagale F, Karas H, Spitzer D, Karasegh S, Beck A, Husslein P. Closure or nonclosure of the peritoneum at caesarean delivery. *Am J Obstet Gynaecol* 1996;174:1366-70.
- [5] Kapur ML, Daneswar A, Chopra P. Evaluation of peritoneal closure at laparotomy. *Am J Surg* 1979;137:650-2.
- [6] Hugh TB, Nankivel C, Meagher AP, Li B. Is closure of the peritoneal layer necessary in the repair of midline surgical abdominal wounds? *World J Surg* 1990;14:233-4.
- [7] Hajsedvadi ES, Rasekh F. Post-caesarean pain in closure versus non-closure of parietal peritoneum. *The Journal of Qazvin Univ. of Med. Sci* 2006;10:45-8.
- [8] Ghongdemath JS, Banale SB. A randomized study comparing No-closure and closure of visceral and parietal peritoneum during caesarean section. *The Journal of Obstetrics and Gynecology of India* 2011;2:48-52.
- [9] Rafique Z, Shibli KU, Russel IF, Lindow Sw. A randomized controlled trial of the closure or non-closure of peritoneum at caesarean section: effect on post operative pain. *BJOG* 2002;109:694-8.
- [10] Demirel Y, Gursoy S, Duran B, Erden O, Cetin M, Balta O, et al. Closure or non closure of the peritoneum at gynaecological operations. Effect on post-operative pain. *Saudi Med J* 2005 ;26:964-8.
- [11] Xiong Z, Dong W, Wang Z. Non-closure of the peritoneum and subcutaneous tissue at radical hysterectomy: A Randomized controlled trial. *Front Med China* 2010; 4: 112-6.
- [12] Hull DB, Varner MW. A randomized study of closure of the peritoneum at caesarean delivery. *Obstet Gynaecol* 1991;77:818-21.
- [13] Irion O, Luzuy F, Benguin F. Non closure of the visceral and parietal peritoneum at caesarean section: Randomized control trail. *Br J Obstet Gynaecol* 1996; 103:690-94.
- [14] CORONIS Trial Collaborative Group. The CORONIS Trial. International study of caesarean section surgical techniques: a randomised fractional, factorial trial. *BMC Pregnancy and Childbirth* 2007;7:24.

AUTHOR(S):

1. Dr. Basarkod Suresh
2. Dr. Ambi Uday S
3. Dr. Ganeshnavar Anilkumar
4. Dr. Emmi Shaileshl
5. Dr. Lamani Y P

PARTICULARS OF CONTRIBUTORS:

1. Corresponding Author,
 2. Assistant Professor, Dept. Of Anaesthesiology,
 3. Assistant Professor, Dept. Of Anaesthesiology,
 4. Assistant Professor, Dept of Surgery,
 5. Assistant Professor, Dept of Surgery,
- SN Medical College and HSK Hospital, Bagalkot, Karnataka, 587102, India.

NAME, ADDRESS, TELEPHONE, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Basarkod Suresh,
Associate Professor, Department of Surgery,
SN Medical College and HSK Hospital, Bagalkot,
Karnataka -587102, India.
Phone: 918354-235400
E-mail: sureshbasarkod@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS:

None.

Date Of Submission: **Nov 11, 2011**

Date Of Peer Review: **Dec 06, 2011**

Date Of Acceptance: **Dec 22, 2011**

Date Of Publishing: **Apr 15, 2012**