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## RESEARCH ARTICLE

### DOES PERITONEAL CLOSURE INCREASE POST APPENDECTOMY PAIN? A RANDOMIZED STUDY FROM A TERTIARY CARE HOSPITAL

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#### ABSTRACT

**Background:** Appendectomy for acute appendicitis is the most common urgent abdominal surgical procedure. Closure of peritoneum tends to cause ischemia, necrosis, inflammation and foreign body reaction to the suture material resulting in more post-operative pain. This study aims to evaluate the role of no peritoneal closure technique in reduction of post-appendectomy pain. **Objective:** To compare the postoperative pain levels on visual analogue scale in closure versus non-closure of peritoneum in open appendectomy. **Materials and Methods:** This was a randomized control trial conducted at department of Surgery, Creek General Hospital Karachi, Pakistan during March 2016 till July 2018. A total of 32 patients diagnosed as having acute appendicitis presented to emergency department were included in study. Patients were randomly divided into two groups. Post-operative pain after appendectomy was measured by visual analogue score after 48-hours. **Results:** Mean pain scores were significantly low in group with non-closure group as compared to peritoneum closure group ( $p < 0.005$ ). **Conclusion:** Not suturing the peritoneal layers together at appendectomy has beneficial effects on post-operative pain.

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#### INTRODUCTION

Appendectomy for acute appendicitis is the most common urgent abdominal surgical procedure (O'Connell, 2008 and Lowry, 2012). It is considered as a safe procedure but potential for complications exist. Most common among them are post operative pain and superficial wound infection (Khan, 2007). Skin and peritoneum are richly supplied by nerve fibers and their repair and edema causes pain (Knowles, 2008 and Rafique, 2002). Skin closure is necessary for reconstruction of epithelial barrier but the closure of peritoneum does not affect the strength of wound and peritonization of the exposed surface occur within 24 to 48 hours (Knowles, 2008). Closure of peritoneum tends to cause ischemia, necrosis, inflammation and foreign body reaction to the suture material resulting in more post-operative pain and discomfort (Ghondemath 2011; Bamigboye, 2005 and Kucuk, 2001). Pain free patient can mobilize earlier with shortened hospital stay, reduced hospital costs, and increased patient satisfaction (Suresh, 2012 and Apfelbaum, 2003).

Peritoneal closure is done as a routine along with muscle and fascial closure after appendectomy. Non-closure technique is being successfully practiced to reduce post operative pain after cesarean sections, so this study aims to apply this simple no peritoneal closure technique to reduce post-operative pain after appendectomy.

#### MATERIALS AND METHODS

This was a randomized controlled trial conducted at general surgery department of Creek General Hospital Karachi, Pakistan during March 2016 till July 2018 after approval from institutional review board. Patients between 12-60 years of age, either gender admitted through emergency department, diagnosed as having acute appendicitis on the basis of Alvarado score 7 and above, and duration of symptoms less than 24 hours were included in the study. Patient with complications of appendicitis including appendicular abscess, perforation and gangrene found pre-operatively and those who didn't consent for participation were excluded from the study. Cases of appendicitis which were managed conservatively and

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those with diagnosis of appendicular lump were also not included. All patients were allocated into two groups by non-probability consecutive sampling. Group A were patients with peritoneal non-closure and group B was peritoneal closure group. Both received initial resuscitation and analgesia followed by appendectomy by a single surgeon. After removing the appendix, the parietal peritoneum was left open in group A patients and closed in group B patients. Both groups received standard post-operative management including intravenous ceftriaxone for 3 days, and intravenous ketorolac and paracetamol for pain relief according to patient's age. Post-operative pain was measured by visual analogue scale after 48-hours of surgery. Zero end of the line was represented "no pain" while ten end "worst possible pain". To minimize bias, all patients were examined by a single person who was unaware of the study groups. Any additional analgesic taken on the day of examination was also recorded. The unpaired student t-test was used to compare the mean pain scores between the groups after 48-hours of surgery. The p-value  $\leq 0.05$  was considered statistically significant.

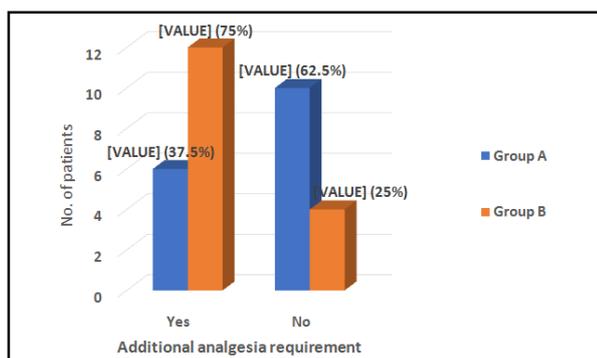
## RESULTS

A total of 39 patients presented to us with acute appendicitis during the specified time period. Out of these 6 had either perforation or gangrene of appendix and one didn't consent to participate and hence were excluded from the study. Therefore, a total of 32 patients (16 in each group) were left for analysis. The mean age of patients in group A was  $36.28 \pm 6.13$  years while in group B mean age was  $31.53 \pm 8.78$  years.

**Table 1. Comparison of mean pain scores between groups at 48 hours**

	Group A n=16	Group B n=16	* P-Value
	Mean $\pm$ SD	Mean $\pm$ SD	
Pain Score	2.83 $\pm$ 1.21	4.40 $\pm$ 1.07	0.0005

\* = Independent t test



**Figure 1. Additional Analgesic requirement at 48 hours**

**Table 2. Comparison of mean pain scores between groups at 48 hours with gender stratification**

Gender	Groups	N	Pain scores (Mean $\pm$ SD)	*P-Value
Male	Group A	9	3.78 $\pm$ 0.66	0.03
	Group B	8	5.00 $\pm$ 1.22	
Female	Group A	7	2.43 $\pm$ 1.16	0.0005
	Group B	8	4.28 $\pm$ 1.02	

\*=Independent t-test

Gender wise group A consisted of 9 male and 7 female patients, while group B had 8 male and 8 female patients. The mean pain scores were significantly low in group A as compare to group B (see Table – I). Similarly, additional

analgesia requirement was high in group B than group A (See Figure – I). Stratification analysis showed that average pain score was significant between groups (A vs. B) for either gender as presented in Table – II.

## DISCUSSION

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 (Nagale, 1996; Kapur, 1979 and Hugh, 1990). 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 a study, Suresh et al compared postoperative pain scores after appendectomy and showed that mean pain scores in patients without peritoneal closure are reduced as compared to peritoneal closure group (Suresh, 2012). Our results are also comparable to a study by Hajsedvadi and Rasekh (Hajsedvadi, 2006) 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 mefenamic acid whereas in the closure group it was 112.9mg of diclofenac and two capsules of diclofenac and two capsules of mefenamic acid. The difference between two groups was statistically significant. Similar findings are in conformity with the study by Ghongdemath (Ghongdemath, 2011). Contrary to our findings, in study done by Rafique et al (Rafique, 2002) and Demirel et al (Demirel, 2005) 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. Xiong et al (Xiong, 2010) 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. Nagele et al. (Nagale, 1996), in a randomized trial of 549 women, reported less use of post-operative analgesia when the peritoneum was not sutured at caesarean section. The CORONIS trial (CORONIS, 2007), 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. However, the studies identified here were either small or the methodology was not always strong.

## Conclusion

In conclusion, not suturing the peritoneum at the appendectomy has beneficial effects on post operative pain. Non-closure technique is being successfully practiced to reduce post operative pain after cesarean sections. Therefore, we recommend non-closure of peritoneum at appendectomy.

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