

# Comparison of Early Outcome between Patients of Open Appendectomy with and without Drain for Perforated Appendicitis

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## ABSTRACT

**Objective:** To compare the early outcome between patients of open appendectomy with and without drain for perforated appendicitis.

**Methods:** This 6-months randomized control trial was carried out Department of General Surgery, Sir Ganga Ram Hospital, Lahore. Total 68 patients of perforated appendicitis were recruited for this study after taking written informed consent. They were randomly divided into two equal groups. Group-A underwent open appendectomy with abdominal drainage while, Group-B underwent open appendectomy without abdominal drainage. A written informed consent was taken from all the patients.

**Results:** The mean age of the patients was 26 years. In Group-A, 58.8% patients were male and 41.2% were female while in Group-B, 47.1% patients were male and 52.9% were female ( $p=.331$ ). Post-operatively, the mean length of hospital stay was significantly shorter ( $p<0.001$ ) in Group-B (3.38 days) as compared to Group-A (5.97 days). Frequency of wound infection was also significantly lower ( $p=0.001$ ) in Group-B (14.7%) as compared to Group-A (52.9%).

**Conclusion:** Omission of abdominal drainage after appendectomy in patients of perforated appendix significantly decreased the mean length of hospital stay and post-operative wound infection.

**Key Words:** Perforated appendix, abdominal drainage.

## INTRODUCTION

Acute appendicitis is one of the most common causes of abdominal pain, with surgical appendectomy being the standard choice of treatment, and is still considered a clinical emergency. Appendicitis is most frequent in children and young adults<sup>(1)</sup>.

Contrary to previous believe, there is now evidence that obstructions in the organ are unlikely to be the primary cause of appendicitis and bacterial infection is central to appendix inflammation<sup>(2)</sup>. Also it has been hypothesized that the human appendix functions as a reservoir of beneficial microbes that can be used for recovery following events of pathogen colonization, diarrheal disease, or antibiotic treatment<sup>(3,4)</sup>. Therefore, in patients in whom treatment is delayed, there is risk of appendicular perforation and resulting peritoneal contamination and peritonitis. Owing to this risk of peritonitis, abdominal drainage in such patients is a common practice<sup>5</sup>. However; there are studies which show

that this routine use of drain in patients with perforated appendix is of no added benefit. Rather it is associated with increased complications.

Jani et al. in 2011 in a randomized controlled trial showed that omission of drain was associated with decreased frequency of post-operative wound infection (16.67% vs. 83.33%;  $p=0.002$ )<sup>(6)</sup>. Ezer et al. in 2010 showed that no drain groups was better in terms of post-operative wound infection (16% vs. 50%;  $p=0.000$ ) and length of hospital stay ( $2.25\pm 2.02$  vs.  $5.66\pm 6.78$  days;  $p=0.001$ ) than drain group<sup>(7)</sup>. Gustafsson et al. in 2012 showed that postoperative ileus is associated with the presence of intraperitoneal drain due to direct irritant effect of the drain on gut serosa and the recovery of peristalsis, or by indirect effect through reduced patient's mobility because of drain<sup>(8)</sup>. Akkoyun et al. in retrospective case-control study, 2012 showed that operation time was 8 minutes longer in patients in which drain was placed<sup>(9)</sup>. Al-Shahwany et al. in 2012 in randomized controlled

study showed that hospital stay in patients with intraperitoneal drains is increased<sup>(10)</sup>.

Nevertheless, these intraperitoneal drains, apart from causing infections, may also induce anastomotic leakage and damage by mechanical pressure<sup>(11)</sup>. In the light of above mentioned studies, it is clear that the conventional practice of abdominal drainage in patients with perforated appendix is not superior and is associated with increased risk of post-operative wound infection and increased length of hospital stay. However, at the moment, no such study has been done in Pakistan. Due to poor personal hygiene, socio-economic and nutritional status of the patients<sup>(12)</sup>, geographical variance in the spectrum of microbial infection and availability of antimicrobials<sup>(13)</sup>, there is need to repeat this trial in local population to confirm the results. If the results of this study prove the safety and added benefit of no drain in such patients, the results of this study will bring a change in conventional practice, thus avoiding unnecessary hospital stay and wound infection, thus reducing patient's morbidity as well as economic burden over the society.

## PATIENTS AND METHODS

Ethical approval was taken from Institutional Ethical Review Board, Fatima Jinnah Medical University, Lahore. This six months randomized control trial was carried out at Department of General Surgery, Unit-I, Sir Ganga Ram Hospital, Lahore during 29-Nov 2014 to 28-May-2015. Total 68 patients reported with acute appendicitis with perforated appendix was recruited for this study. Written informed consent was taken from all the patients willing to participate in this study. Patients with generalized peritonitis (perforated appendix with pus in three or more quadrants of the abdominal cavity visible per-operatively), immunocompromised patients (i.e. known diabetics, HIV positive and those with history of steroids intake) and those who refused to participate in this study were excluded from the

study. Patient's demographic details were also noted on a predesigned questionnaire. The patients were then randomly divided into following two groups using lottery method: Group-A included conventional group with drainage (34 cases) and Group-B experimental group without Drainage (34 cases).

Pre-operatively all the patients were given single dose of Inj. Ciprofloxacin (200mg/100ml) and injection Metronidazole (500mg/100ml). These two antibiotics were continued post-operatively (inj. Ciprofloxacin 12 hourly, inj. Metronidazole 8 hourly) for 5 days. Patient's demographic details along with post-operative wound infection and post-operative length of hospital stay were entered into the proforma. All the patients were managed by consultant incharge of the unit.

Data analysis: All the collected data was entered into SPSS version 10. Numerical variables i.e. age, post-operative length of hospital stay have been presented by mean±SD. t-test has been applied for comparison of mean length of hospital stay between the two groups taking  $p \leq 0.05$  as significant. Categorical variables i.e. gender and wound infection have been presented by frequency and percentage and chi-square test has been used for comparison of frequency of wound infection between the two groups taking  $p \leq 0.05$  as significant. Sample size of 68 patients (34 in each group) was calculated by WHO sample size calculator with 80% power of test and 95% confidence interval (two sided) while taking mean post-operative length of hospital stay to be  $2.25 \pm 2.02$  days without drain and  $5.66 \pm 6.78$  days with drain in patients undergoing appendectomy for perforated appendix.

## RESULTS

Table 1 summarizes general characteristics of the participants in both groups. The age of the patients ranged from 18 years to 39 years with a mean of  $26.00 \pm 5.57$  years.

**Table 1:** Characteristics of the participants.

| Characteristics          | Group A <sup>1</sup> (%) | Group B <sup>2</sup> (%) | p-value |
|--------------------------|--------------------------|--------------------------|---------|
| Age (+SD)                | 26±6.25                  | 26±4.9                   | 1.00    |
| Gender                   |                          |                          |         |
| Male                     | 20 (58.8)                | 16 (47.1)                | 0.331   |
| Female                   | 14 (41.2)                | 18 (52.9)                |         |
| Length of stay (days±SD) | 5.97±1.337               | 3.38±0.954               | 0.000   |
| Wound infections         | 18 (52.9)                | 5.0 (14.7)               | 0.001   |

<sup>1</sup>Conventional group with drainage

<sup>2</sup>Experimental group without drainage

Among them, 52.9% of the patients were male and 47.1% were females. The mean age of the patients was  $26.00 \pm 6.257$  years in Group-A and  $26.00 \pm 4.89$  years in Group-B, In Group-A, 58.8% patients were male and 41.2% were female while in Group-B, 47.1% patients were male and 52.9% were female. Group-A had post-operative drain and Group-B was closed without drain. Post-operatively, the mean length of hospital stay was significantly shorter in Group-B ( $3.38 \pm 0.954$  vs.  $5.97 \pm 1.337$  days;  $p=0.000$ ) as compared to Group

A. The frequency of post-operative wound infection was significantly lower in Group-B as compared to Group-A (14.7% vs. 52.9%;  $p=0.001$ ).

## DISCUSSION

Human appendix functions as a reservoir of beneficial microbes that can be used for recovery following events of pathogen colonization, diarrheal disease, or antibiotic treatment<sup>(3,4)</sup> Therefore in patients of acute appendicitis in whom treatment is delayed, there is risk of appendicular perforation and resulting peritoneal contamination and peritonitis. Owing to this risk of peritonitis, abdominal drainage in such patients is a common practice<sup>(5)</sup>.

However, there are studies which show that this routine use of drain in patients with perforated appendix is of no added benefit. Rather it is associated with increased complications. Jani et al. in 2011 in a randomized controlled trial showed that omission of drain was associated with decreased frequency of post-operative wound infection (16.67% vs. 83.33%;  $p=0.002$ )<sup>(6)</sup>. Ezer et al. in 2010 showed that no drain groups was better in terms of post-operative wound infection (16% vs. 50%;  $p=0.000$ ) and length of hospital stay ( $2.25 \pm 2.02$  vs.  $5.66 \pm 6.78$  days;  $p=0.001$ ) than drain group<sup>(7)</sup>. However, no such study was available in Pakistan. Due to poor personal hygiene, socio-economic and nutritional status of the patients<sup>(8)</sup>, geographical variance in the spectrum of microbial infection and availability of antimicrobials<sup>(9)</sup>, there was need to repeat this trial to confirm the safety of omitting abdominal drainage in local population undergoing appendectomy for perforated appendix.

This study involved 68 patients of perforated appendicitis who were randomly allocated into 2 groups. Group-A underwent open appendectomy with abdominal drainage and Group-B underwent open appendectomy without abdominal drainage. The mean age of the patients was  $26.00 \pm 6.26$

years in Group-A and  $26.00 \pm 4.89$  years in Group-B ( $p=1.00$ ). In Group-A, 58.8% patients were male and 41.2% were female while in Group-B, 47.1% patients were male and 52.9% were female ( $p=.331$ ). Thus there was no significant difference between the two groups in terms of age ( $p=1.00$ ) and gender ( $p=.331$ ) which shows effective randomization. Post-operatively, the mean length of hospital stay was significantly shorter in Group-B ( $3.38 \pm 0.954$  vs.  $5.97 \pm 1.34$  days;  $p=0.000$ ) as compared to Group-A. Our results match with those of Ezer et al. in 2010 ( $2.25 \pm 2.02$  vs.  $5.66 \pm 6.78$  days;  $p=0.001$ ). Frequency of wound infection was also significantly lower in Group-B as compared to Group-A (14.7% vs. 52.9%;  $p=0.001$ ). Our results again match with those of Ezer et al. (16% vs. 50%;  $p=0.000$ )<sup>(7)</sup>.

Thus omission of abdominal drainage after appendectomy in patients of perforated appendix significantly decreases the mean length of hospital stay and post-operative wound infection. A very important limitation of present study was that it did not consider other important aspects of patient management like need for redo-surgery, mortality, post-operative intra-abdominal collection etc. which cannot be ignored and must be considered before adopting this approach in routine.

## CONCLUSION

Omission of abdominal drainage after appendectomy in patients of perforated appendix significantly decreased the mean length of hospital stay and post-operative wound infection.

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