ORIGINAL ARTICLE

Comparison of Early Outcome between patients of open Appendectomy with and without Drain for Perforated Appendicitis

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ABSTRACT

Aim: To compare the early outcome between patients of open appendectomy with and without drain for perforated appendicitis.
Design: It was a randomized controlled trial.
Place and duration of study: This study was conducted at the Department of Surgery Unit-I, Ghurki Trust Teaching Hospital, Lahore over 1 year period from March 2015 through April 2016.
Methods: This study involved 68 patients presenting at emergency department of Ghurki Trust Teaching Hospital, Lahore with migratory right lower quadrant abdominal pain, anorexia, nausea, vomiting with an Alvarado score ≥7. Diagnosis was made on perforation of the appendix itself or caecum near the appendicular base with leakage of the intestinal contents confirmed per-operatively by direct visualization of the perforation. Immunocompromised patients and those with generalized peritonitis were excluded from this study. These patients were randomly allocated into 2 treatment groups using lottery method. Group-A (34 cases) underwent appendectomy with drain while Group-B (34 cases) underwent appendectomy without drain. Outcome measures included post-operative wound infection, and length of hospital stay. A written informed consent was obtained from every patient.
Results: The age of the patients ranged from 18 years to 39 years with a mean of 26.57±5.60 years. Majority 31(45.6%) of the patients were aged between 18-25 years. There were 36(52.9%) male and 32(47.1%) female patients in the study group. There was no significant difference between the two groups in terms of mean age (p=0.814) and gender distribution (p=0.814). Post-operatively, the mean length of hospital stay was significantly shorter in Group-B (3.50±0.96 vs. 5.82±1.40 days; p=.000) as compared to Group-A. This difference was significant across all age and gender groups. Also the frequency of post-operative wound infection was significantly lower in Group-B as compared to Group-A (14.7% vs. 52.9%; p=.001) irrespective of patient's age and gender.
Conclusion: Omission of abdominal drainage after appendectomy for perforated appendix significantly decreased the mean length of hospital stay and post-operative wound infection.
Keywords: Perforated Appendicitis, Appendectomy, Abdominal Drainage, Hospital Stay

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[1].

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[2]. 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[3,4]. 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[5]. 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 risk of post-operative wound infection and increased length of hospital stay[6,7].

However, at the moment, there was no such local published material available. Due to poor personal hygiene, socio-economic and nutritional status of the patients[8], geographical variance in the spectrum of microbial infection and availability of antimicrobials[9], there was need to repeat this trial in local population to confirm the safety and added benefit of no drain in such patients with a hope that the results of this study may bring a change in

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conventional practice of post-operative abdominal drainage in such patients with its associated un-necessary hospital stay and wound infection, thus reducing patient's morbidity as well as economic burden over the society.

PATIENTS AND METHODS

It was a randomized controlled trial conducted at the Department of Surgery Unit-I, Ghurki Trust Teaching Hospital, Lahore over 1 year period from March 2015 through April 2016.

This study involved patients presenting at emergency department of Ghurki Trust Teaching Hospital, Lahore with migratory right lower quadrant abdominal pain, anorexia, nausea, vomiting with an Alvarado score≥7. Diagnosis was made on perforation of the appendix itself or caecum near the appendicular base with leakage of the intestinal contents confirmed per-operatively by direct visualization of the perforation. Sample size of 68 patients (34 in each group) was calculated with 80% power of test and 95% confidence interval (two sided) while taking mean post-operative length of hospital stay to be 2.25±2.02 days without drain and 5.66±6.78 days with drain in patients undergoing appendectomy for perforated appendix[7].

Immunocompromised patients (known diabetics, HIV +ve, and those with history of steroids intake in the preceding 6 months period) and those with generalized peritonitis (perforated appendix with pus in three or more quadrants of the abdominal cavity visible per-operatively) were excluded from this study.

These patients were randomly allocated into 2 treatment groups using lottery method. Group-A (34 cases) underwent appendectomy with drain while Group-B (34 cases) underwent appendectomy without drain. 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.

Outcome measures included post-operative wound infection, and length of hospital stay. Post-operative wound infection was labeled clinically by the consultant within 14 days of surgery, if any of following two criteria were met (1) Redness around wound, (2) Serosangious discharge (3) Fever >100°F. Length of post-operative stay was measured in days from the day of operation till the patient was discharged home. The discharge criteria was (1) Patient who was able to tolerate oral fluids and diet and has passed wind and stools. (2) Patient who was pain free on oral analgesics; 2 Tab. Paracetamol given 8hourly (3) Patients who had no signs of wound infection (as per operational definition). A written informed consent was obtained from every patient.

RESULTS

The age of the patients ranged from 18 years to 39 years with a mean of 26.57±5.60 years. Majority 31(45.6%) of the patients were aged between 18-25 years. There were 36(52.9%) male and 32(47.1%) female patients in the study group. There was no significant difference between the two groups in terms of mean age (p=0.814), age groups (0.765) and gender distribution (p=0.814). These findings have been summarized in Table 1. Post-operatively, the mean length of hospital stay was significantly shorter in Group-B (3.50±0.96 vs. 5.82±1.40 days; p=.000) as compared to Group-A. This difference was significant across all age and gender groups as shown in Table 2. Also the frequency of post-operative wound infection was significantly lower in Group-B as compared to Group-A (14.7% vs. 52.9%; p=.001) irrespective of patient's age and gender as shown in Table 3.

Table 1: Baseline Characteristics of the Study Population

Characteristics	Overall	Appendectomy with Drain (n=34)	Appendectomy without Drain (n=34)	P value
Age (years)	26.57±5.60	26.41±6.24	26.74±4.97	0.814
Age Groups				
• 18-25 years	31 (45.6%)	17(50.0%)	14(41.2%)	0.765
• 26-33 years	26 (38.2%)	12(35.3%)	14(41.2%)	
• 34-39 years	11 (16.2%)	5(14.7%)	6(17.6%)	
Gender				
• Male	36 (52.9%)	20(58.8%)	16(47.1%)	0.331
• Female	32 (47.1%)	14(41.2%)	18(52.9%)	

Independent sample t-test and chi-square test, Observed difference was statistically insignificant

Table 2: Comparison of Mean Length of Hospital Stay (days) between Study Groups

	Mean Length of Hospital Stay in days (mean±sd)		P value
	Appendectomy with Drain (n=34)	**Appendectomy without Drain (n=34)**	
Overall	5.82±1.40	3.50±0.96	0.000*
Age Groups			
• 18-25 years	5.76±1.44	3.71±1.20	0.000*
• 26-33 years	5.92±1.68	3.36±0.84	0.000*
• 34-39 years	5.80±0.45	3.33±0.52	0.000*
Gender			
• Male	5.70±1.42	3.56±0.89	0.000*
• Female	6.00±1.41	3.44±1.04	0.000*

*Independent sample t-test, * Observed difference was statistically significant*

Table 3: Comparison of Frequency of Post-Operative Wound Infection between Study Groups

	Post-operative Wound Infection		P value
	Appendectomy with Drain (n=34)	**Appendectomy without Drain n=34**	
Overall	18 (52.9%)	5 (14.7%)	0.001*
Age Groups			
• 18-25 years	9 (52.9%)	2 (14.3%)	0.025*
• 26-33 years	6 (50.0%)	2 (14.3%)	0.049*
• 34-39 years	3 (60.0%)	1 (16.7%)	0.137
Gender			
• Male	10 (50.0%)	2 (12.5%)	0.018*
• Female	8 (57.1%)	3 (16.7%)	0.017*

Chi-square-test, * Observed difference was statistically significant

DISCUSSION

Despite the routine use of prophylactic antibiotics against both aerobic and anaerobic organisms, infection of the operative incision is the most common cause of morbidity after appendectomy[10].

In patients with non-perforated appendicitis, the reported frequency of wound infection is still around 10%[10,11,12]. The frequency of wound infection is higher among perforated cases; 15% to 20% and is even higher in patients with diffuse peritonitis (35%)[10]. Therefore measures which can reduce this frequency of wound infection among patients of perforated appendicitis are actively pursued. Recent trials have shown that omitting routine abdominal drainage can effectively reduce post-operative wound infection in such patients. However, the existing evidence contained conflicting results. Moreover, the results of these studies couldn't be applied to local population as mentioned earlier. In the present study, the age of the patients ranged from 18 years to 39 years with a mean of 26.57±5.60 years. A similar mean age among patients of acute appendicitis was previously reported by Rather et al.[13] in 2013 (26±11 years) in India and Al-Shahwany et al[14] in 2012 (27±12 years) in Iraq. Tsai et al. in 2015 reported much higher mean age of 33.0±22.0 years in Taiwan[15]. There were 36 (52.9%) male and 32 (47.1%) female patients in the study group. A similar male predominance (53% vs. 47%) was observed by Beek et al. (2015) in Netherlands[16].

Post-operatively, the mean length of hospital stay was significantly shorter in Group-B (3.38±.954 vs. 5.97±1.34 days; p=.000) as compared to Group-A. Our results match with those of Ezer et al[7] in 2010 (2.25±2.02 vs. 5.66±6.78 days; p=.001), Tsai et al.[15] in 2015 (4.74±1.38 vs. 5.90±3.45 days; p=0.003) and Tander et al. in 2003 (5.6±1.9 vs. 7.4±5.0 days; p<0.05). A similar benefit of omitting abdominal drainage in terms of mean length of hospital stay (36±3 vs. 58±4 hours; p<0.05) was reported by Al-Shahwany et al[14]. However, Beek et al.[17] in 2015 (p=0.643) and Rather et al.[13] in 2013 (p>0.05) observed insignificant difference in French and Indian such patients respectively.

Frequency of wound infection was also significantly lower in Group-B as compared to Group-A (14.7% vs. 52.9%; p=.001). Our results again match with those of Ezer et al[7] (16% vs. 50%; p=0.000) and Jani et al. (16.67% vs. 83.33%; p=0.002)[6]. Tsia et al[15] (p=0.835), Tander et al.[16] (p=0.385), Beek et al[17] (p>0.05), Rather et al. (p>0.05) and Al-Shahwany et al[14] (p>0.05) also observed insignificant difference between the two groups in terms of frequency of wound infection confirming no abdominal drainage to be as safe as abdominal drainage in terms of frequency of wound infection.

The results of the present study are comparable to the existing studies in other populations confirming the advantage of no drain in terms of significantly shorter length of hospital stay irrespective of patient's

age and gender. It also shows that omitting abdominal drainage didn't increase the frequency of wound infection rather it significantly decreased it. Therefore the hypothetical advantage of abdominal drain after appendectomy for perforated appendix in terms of wound infection is not valid. It can be advocated on the basis of results of the present study, that abdominal drain can be avoided when there is only localized peritonitis in patients of perforated appendicitis upon surgery. A very important limitation of the present study was that it didn't 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. Future studies considering these parameters are therefore recommended.

CONCLUSION

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

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