Original Article

Appendicitis with Antibiotics and Appendectomy

An Experience of Treatment Outcome in Acute Appendicitis with Antibiotics and Appendectomy at a Tertiary Care Hospital

Gulshan Ali Memon[1], Amir Iqbal Memon[2], Syed Kashif Ali Shah[1], Rafiq Ahmed Sahito[1], Habib-ur-Rehman[1], Shahnawaz Leghari[1] and Shahida Baloch[1]

ABSTRACT

Objective: The present study was designed with an objective to assess the outcomes of antibiotics as primary treatment versus appendectomy in uncomplicated acute appendicitis (UAA).
Study Design: Observational study
Place and Duration of Study: This study was conducted at the Department of Surgery, PUMHSW Nawabshah from 2014 to April 2016.
Materials and Methods: A sample of 227 diagnosed cases of acute appendicitis of both genders, age 16 - 60 years, clinical history and clinical signs of appendicitis with positive findings on Ultrasonography and increased leukocyte counts were the inclusion criteria. Study subjects were divided into group A and B on the basis of modified Alvarado score. Patients <4 score Alvarado score was exclusion criterion. Data was analyzed on SPSS 22.0 ($P \leq 0.05$).
Results: During of pain and analgesic consumption was significantly higher in the group B as compared to group A in initial 2 days after surgery (p=0.001). However, the intensity of pain started decreasing after 2 days in group A and 4 days in group B, and this difference disappeared at one-month follow up. Hospital stay was lengthy in group B and surgical site infections were comparatively higher in group A patients. Mean cost therapy was expensive in group B compared to group A.
Conclusion: The present study concludes the antibiotic therapy as safe and effective alternate to appendectomy in uncomplicated acute appendicitis with low recurrence rate and cost.
Key Words: Acute appendicitis, Appendectomy, Antibiotic treatment

Citation of article: Memon GA, Memon AI, Shah SKA, Sahito RA. Rehman H, Leghari S, Baloch S. An Experience of Treatment Outcome in Acute Appendicitis with Antibiotics and Appendectomy at a Tertiary Care Hospital. Med Forum 2017;28(3):136-140.

INTRODUCTION

The trail blazing innovations through rigorous researches have put a medicine as an ever changing science with new understanding in pathophysiology of disease and new trends of evidence – based treatments to achieve the complete cure with minimal most time and costs. Nevertheless, the etiology of acute appendicitis is yet poorly understood and hence over the century, it has been thought that acute appendicitis invariably progress to perforation.[1, 2] Hence this mis-perceived dogma has continuously been instigating and making appendectomy as the most preferred and common traditional treatment vis-à-vis, about 300,000 appendectomies are performed in United State each year, drawing off extreme health care system[1].

[1.] Department of Surgery, PUMHSW, Nawabshah.
[2.] Department of Surgery, LUMHS, Jamshoro.

Correspondence: Dr. Amir Iqbal Memon, Associate Professor of Surgery, Liaquat University of Medical and Health Sciences Jamshoro.
Contact No:
Email: dr_amiriqbalmemon@yahoo.com

Received: January 14, 2017; Accepted: February 30, 2017

AA has a common occurrence with life time incidence of approximately 9%.[3] While 20% of patients with complicated and 80% with UAA having great diathesis of resolution,[4] and this vast majority of patients presenting with UAA have propelled, both surgeons and public to shift the traditional surgical approach towards non-operative management.[5,6] In this regard nearly one – quarter of surgeons in Ireland routinely treat patients of UAA non-operatively.[7] In recent years, the management approach of UAA has been changing with antibiotic therapy[8] and many randomized control trials have inferenced the vignette that antibiotic management is an efficacious treatment with lower complications than surgical intervention.[9] While the important question in comparing the two treatment option needs the answer with the fact that, "Does antibiotic treatment draw substantial certainty of security, can antibiotic embrace subsequent morbidities". And in this context, acute appendicitis have been divided in complicated (associated with abscess or phlegmon) and uncomplicated. While the complicated appendicitis almost always needs surgery, UAA needs to be strictly scrutinized for surgical or non- surgical treatment.[10] While the use of Alvarado scoring system with high quality ultra-sonography have

depicted a sufficiently high accuracy in treatment decision.[11-14] Many published meta-analyses on this topic[15-17] have concluded that antibiotics first strategy of treatment is probably a safe approach, but the definitive conclusions about its effectiveness compared with appendectomy cannot be made. All of the studies have focused on analysis of the clinical outcomes.[15,17] But it remains to be determined whether the benefits of avoiding an operation with the antibiotics-first approach will outweigh the burden to the patient related to future appendicitis episodes, more days of antibiotic therapy, lingering symptoms, and uncertain sense of security affecting quality of life. The present study was designed with an objective to assess the outcomes of antibiotics as primary treatment versus appendectomy in uncomplicated acute appendicitis (UAA).

MATERIALS AND METHODS

A sample of 227 patients of both genders from 16 to 60 years in age having no H/O previous episode of appendicitis, surgery or co-morbidities presented with typical history and clinical signs of appendicitis with positive findings on Ultrasonography and increased leukocytes (WBC) levels on two occasions within 24 hours at our surgical unit one from April 2014 to April 2016, were enrolled in this Observational study - randomized and quasi-randomized prospective study. Patients of complicated appendicitis with an appendicolith, perforation, abscess or phlegmon were excluded. All patients gave written informed consent to participate in this study. Study population was divided into two A and B groups on the basis of modified Alvarado score, and patients below 4 score of Alvarado were not included. Group A: Alvarado-score 5 – 7 were allocated with antibiotics and observation and Group B: Alvarado-score 8 – 10 underwent Surgery. After keeping NPO, Intravenous fluids + antibiotics (ciprofloxacin 500mg x BD) plus metronidazole (500mg x 8hmly) and analgesics with diclofenac sodium (50-75mg I/V daily) were administered for two days to group A. Daily follow up of these patients were done with clinical examination, fever and CBC. Patient resistant and refractive to antibiotherapy with worsening symptoms confirmed on US were taken to appendectomy. Patient with clinical improvement confirmed on CBC and US were discharged on third day and received oral treatment with ciprofloxacin (500mg) twice a day and metronidazole (400mg) thrice a day for 07 days. All the appendixes of patients converted (cross over) in surgery were examined for Histopathology. With prophylactic antibiotics-Cephalosporin 3rd generation I/V 30 minutes before the start of incision. Patients underwent standard open appendectomy through Mc Burney right lower quadrant muscle-splitting incision. Post-operative antibiotics were given in all patients for 2 days. All resected Appendixes were biopsied. Appendicitis was termed with histological evidence of transmural neutrophil invasion at the muscular layer of appendix. Duration of pain, hospital stay, wound infection, recurrence, costs, adhesions / incisional hernia and non- working days were studied for analyzing outcome. Routine follow up was taken on days 15, 30, 90 180 and 360. The study was approved by ethics committee. Informed written consent was signed by patients or legal attendant. Data analysis was performed on statistical package for social science (SPSS) 22.0 for windows was used to have statical evaluation ANOVA and chi-square test with subset Fisher's exact test were used and $P \leq 0.05$ was considered as statically significant.

RESULTS

Under screening through strict inclusion and exclusion criteria, 227 patients were found eligible for randomized recruitment in two different groups A and B. While after having Alvarado score (8-10), CBC and Ultrasound reports, 120 patients were assigned in group B for instant appendectomies. While remaining 107 patients having Alvarado score (5-7) were randomized to group A. Further 11 and 18 patients were lost in follow up from group A and B leaving behind 96 and 102 patients respectively in each cohort available for objective analysis of this study. The demographics base line characteristics of group A and B are shown in following Table 1.

Table No. 1: Demographic characteristics of study subjects

Particulars	Group A		Group B	
	Male	Female	Male	Female
Sex	61	35	60	42
Male Female ratio				
Age range	16 – 60	20 – 55	16 - 58	20 -50
Median age	26	24	27	26
Median, pain score on NRS (0-10)	4	5	7	8
No. of patients discharged satisfactory	57	29	60	42

During of pain and analgesic consumption were significantly higher in the group B as compared to group A in initial 2 days after surgery. However, the intensity of pain started decreasing after 2 days in group A and 4 days in group B, and this difference disappeared at one-month follow up and no significant difference in pain score was noted in subsequent follow up in both groups. However, the mean number of days

in which patient felt abdominal pain was 5 in group A and 8 in group B.

Table No.2: Findings in groups of study subjects

	Male	Female
No. of patients, worsened in symptoms during hospital stay.	04	06
Conversion to surgery / cross-over during hospital stay	04	06
cross-over during follow up	04	07
Range of hospital stay	1 - 15	1 - 20
Mean length of hospital stay	3 ± 1	4 ± 1
Adverse effects on antibiotics / Diasshan	02	04
No. of days not worked by patients (Mean)	03	04
Recurrent appendicitis	06	10
Total cross – over from antibiotics to surgery	08	13
Negative appendectomies	02	03
Wound infection	02	03
Mortality	00	00

Table No.3: Treatment outcomes comparing Group A and B

Particulars	Group A		Group B	
	Male	Female	Male	Female
Duration of pain in hours	22±15.7	20±10.5	36±15.10	37±16.5
Median, pain score on NRS (0-10)	4	5	7	8
Hospital Stay days (mean)	4±1	5±1	3.3±0.5	4.1±1.4
Wound infection	02	03	5	6
Costs	7000	7000	20,000	24,000
Adhesions / incisional hernia			1	2
No. of days not worked during illness (median)	06 (6-12)	07 (6-12)	14 (12-20)	20 (14-21)
Conversion to surgery	08	13	60	42
Negative appendec-tomies	02	03	07	09

There was higher length of stay in group B as comparison to group A in general. But the length of stay including re-admission was higher in patients of group A, who underwent for appendectomy after failure of antibiotic treatment. Surgical site infections were comparatively higher in group A patients underwent for appendectomy after failure of antibiotic treatment in comparison to group B patient who instantly underwent appendectomy. However, 07 patients of group B developed more severe wound infections. Among these 4 had delayed healing by secondary intention and 3 developed incisional hernia as complication in follow up period. So the complication rate was 0% and 3% in group A and B respectively. The mean cost of therapy was Rs. 7,000/- in the antibiotic / non-operative (A) group, including all lab and Ultrasonologic investigations and recurrent admission without operation. While all expenses of surgical material, anesthesia drugs, analgesics, antibiotics, dressings amounting about 22,000/- in group B. In this study the length of days not worked by patients during illness in group A was significantly low in comparison to group B. (median 6 days versus 18 days in group A & B respectively). From group A, 21(22%) patients have not responded to antibiotic therapy. In this study, 24% (5/21 patients) and 15.6% (16/102 patient) negative appendectomies were encountered in group A and Group B.

DISCUSSION

Unfortunately, the exact pathophysiology of appendicitis is not entirely clear, but major reason is obstruction of lumen[18, 19]. Clinically, appendicitis may present in different ways while some studies report that non–complicated and complicated (perforated) appendicitis are different entities and that in many cases acute appendicitis may resolve spontaneously.[20] Consequently, treatment option of acute appendicitis should be based on either complicated or uncomplicated[21]. Despite the fact that surgical appendectomy is the standard treatment of acute appendicitis, but several investigators have studied the conservative antibiotic treatment with good results.[22, 23] For this reason UAA with conservative antibiotic treatment was become a very attractive alternate to surgery.[24] While the use of Alvarado scoring system with Ultrasonography is help full in detection of complicated or UAA.[25] Hence, this study reflects the outcomes of antibiotic treatment versus appendectomy in UAA. Although we were not sure about effectiveness of antibiotic first strategy in comparison to appendectomy for UAA before start of study, but we found that 83 of (86.45%) of 96 patients were success fully treated with antibiotic therapy and this corresponding to studies of Hansson et al and Barry VC et al.[26, 24] However, despite success of antibiotics for more advanced infections it has not yet been accepted as a standard treatment for UAA.[27] In comparison, the treatment efficacy rate for appendectomy, this study found that 86 (84%) of 102 patients were successfully treated, and this inference is nearly similar to studies shown in table no. 4 ranged between 85 and 100% with overall efficacy rate 88%[28, 29]. The number of patients who developed post-operative complications like incisional hernia was significantly higher) in the surgery group B as shown in table no. 3, the relative

number of surgical site infection was more in percentage in group A (antibiotic treated) patients, which somehow corresponding to three studies as referred fine studies of table No. 4 plus Malik AA et al[19]. In perspective to objective of comparison between two modalities of treatment, this study finds the antibiotic treatment with longer hospital stay due to intra venous antibiotics and monitoring of patient to ensure safety before discharge. These results are corresponding to studies of Wiliams IM et al[15]. We have found a significant reduction in overall costs for group A in comparison to group B. and this in government hospital, which even otherwise indicates that antibiotic treatment achieves significant cost-saving and is most suitable and affordable option of treatment for our downtrodden major strata of society, so we can predict this treatment for every UAA for outpatient setting as the common practice in near future. So for the number of days not worked during these two types of treatments, this study finds that patients treated with antibiotics were associated with significant less days not worked as compared with appendectomy (6-12 versus 12-21) and this corresponds to study of Salminen as shown in table-4. While in group A the failure of antibiotic treatment was (22%) among them again there was 05 patients (5%) with negative appendectomies, which otherwise concludes as (22 - 5 = 17%) failure or recurrence with of treatment. Again, there were 16(16.6%) patients with negative appendectomies in group B. Hence if we combine both groups A & B patients it comes to be 198 study population having negative appendectomies of 21, which makes about (11%). This otherwise expresses the goodness of antibiotics, which we lost with negative appendectomies with poor pre-operative detection by Alvarado and ultrasounds, these findings are very relative with many studies suggested that each year over 300,000 appendicitis are performed in United State with 15% negative appendectomies.[29,30]

CONCLUSION

The present study reports, with unapproving quality of diagnosis for UAA by using Alvarado scoring system in addition to Ultrasonography and complete blood counts, it can be n successfully treated with antibiotics and rate of negative appendectomies may be decreased. Antibiotic therapy is safe and effective alternative to appendectomy in UAA, with reasonably low recurrence rate and cost.

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Leung TT, Dixon E, Gill M, Mador BD, Moulton KM, Kaplan GG, et at. Bowel obstruction following appendectomy: what is the true incidence?. Annals Surg 2009; 250(1):51-3.
2. Fitz R. Perforating inflammation of vermifrorm appendix. Am J Med Sci 1886;92:321-46.
3. Anderson JE, Bickler SW, Chang DC, Talamini MA. Examining a common disease with unknown etiology: trends in epidemiology and surgical management of appendicitis in California, 1995–2009. World J Surg 2012;36(12):2787-94.
4. Andersson RE, Hugander A, Thulin AJ. Diagnostic accuracy and perforation rate in appendicitis: association with age and sex of the patient and with appendicectomy rate. Eur J Surg Acta Chirurgica 1992;158(1):37-41.
5. Flum DR. Clinical practice: Acute appendicitis—Appendectomy or the “antibiotics first” strategy. N Engl J Med 2015; 2015(372):1937-43.
6. Kolata G. Antibiotics resurface as alternative to removing appendix. The New York Times 2015. Accessed November 24, 2015.
7. Kelly ME, Khan A, Ur Rehman J. A National evaluation of the conservative management of uncomplicated acute appendicitis: How common is this and what are the issues? Dig Surg 2015; 32: 325-330.
8. Di Saverio S, Sibilio A, Giorgini E, Biscardi A, Villani S, Coccolini F, et al. The NOTA Study (Non Operative Treatment for Acute Appendicitis): prospective study on the efficacy and safety of antibiotics (amoxicillin and clavulanic acid) for treating patients with right lower quadrant abdominal pain and long-term follow-up of conservatively treated suspected appendicitis. Annals Surg 2014; 260(1):109-17.
9. Can Appendicitis be treated with antibiotics? Retraction muddies the water. Published 2011. Accessed June 2, 2015.
10. Theilen LH, Mellnick VM, Longman RE, Tuuli MG, Odibo AO, Macones GA, et al. Utility of magnetic resonance imaging for suspected appendicitis in pregnant women. Am J Obstet Gynecol 2015;212(3):345-e1.
11. Ohle R, O'Reilly F, O'Brien KK, Fahey T, Dimitrov BD. The Alvarado score for predicting acute appendicitis: a systematic review. BMC Med 2011 Dec 28;9(1):139.
12. Alvarado A. A practical score for the early diagnosis of acute appendicitis. Annals Emerg Med 1986;15(5):557-64.
13. Jones RP, Jeffrey RB, Shah BR, Desser TS, Rosenberg J, Olcott EW. Journal Club: the Alvarado score as a method for reducing the number of CT studies when appendiceal ultrasound fails to visualize the appendix in adults. Am J Roentgenol 2015; 204(3):519-26.
14. Tan WJ, Pek W, Kabir T, Goh YC, Chan WH, Wong WK, et al. Alvarado score: a guide to

computed tomography utilization in appendicitis. ANZ J Surg 2013; 83(10):748-52.
15. Wilms IM, de Hoog DE, de Visser DC, Janzing HM. Appendectomy versus antibiotic treatment for acute appendicitis. The Cochrane Library 2011;(9): 23-7.
16. Varadhan KK, Neal KR, Lobo DN. Safety and efficacy of antibiotics compared with appendicectomy for treatment of uncomplicated acute appendicitis: meta-analysis of randomised controlled trials. BMJ 2012; 344:e2156.
17. Mason RJ, Moazzez A, Sohn H, Katkhouda N. Meta-analysis of randomized trials comparing antibiotic therapy with appendectomy for acute uncomplicated (no abscess or phlegmon) appendicitis. Surgical Infect 2012;13(2):74-84.
18. Ditillo MF, Dziura JD, Rabinovici R. Is it safe to delay appendectomy in adults with acute appendicitis?. Annals Surg 2006;244(5):656-60.
19. Malik AA, Bari SU. Retracted article: Conservative Management of Acute Appendicitis. J Gastrointestinal Surg 2009;13(5):966-70.
20. Singh JP, Mariadason JG. Role of the faecolith in modern-day appendicitis. Annals Royal Coll Surgeons Engl 2013;95(1):48-51.
21. Andersson RE, Schien M. Antibiotics as first-line therapy for acute appendicitis: evidence for change in clinical practice. World J Surg 2012:36(9): 2037-2038.
22. Eriksson S, Granström L. Randomized controlled trial of appendicectomy versus antibiotic therapy for acute appendicitis. Bri J Surg 1995;82(2): 166-9.
23. Salminen P, Paajanen H, Rautio T, Nordström P, Aarnio M, Rantanen T, et al. Antibiotic therapy vs appendectomy for treatment of uncomplicated acute appendicitis: the APPAC randomized clinical trial. JAMA 2015;313(23):2340-8.
24. Vons C, Barry C, Maitre S, Pautrat K, Leconte M, Costaglioli B, et al. Amoxicillin plus clavulanic acid versus appendicectomy for treatment of acute uncomplicated appendicitis: an open-label, non-inferiority, randomised controlled trial. The Lancet 2011;377(9777):1573-9.
25. Mason RJ. Appendicitis: is surgery the best option?. The Lancet 2011;377(9777):1545-6.
26. Hansson J, Körner U, Khorram-Manesh A, Solberg A, Lundholm K. Randomized clinical trial of antibiotic therapy versus appendicectomy as primary treatment of acute appendicitis in unselected patients. Bri J Surg 2009;96(5):473-81.
27. Humes DJ, Simpson J. Acute appendicitis. BMJ: Bri Med J 2006;333(7567):530.
28. Styrud J, Eriksson S, Nilsson I, Ahlberg G, Haapaniemi S, Neovius G, et al. Appendectomy versus antibiotic treatment in acute appendicitis. a prospective multicenter randomized controlled trial. World J Surg 2006;30(6):1033.
29. Cuschieri J. Florence M, Flum DR, Jurkovich GJ, Lin P, Steele SR, et al. SCOAP collaborative. Negative appendectomy and imaging accuracy in the Washington state surgical care and outcomes assessment program. Annals Surg 2008; 248(4): 557-63.
30. Flum DR, Koepsell T. The clinical and economic correlates of misdiagnosed appendicitis: nationwide analysis. Archives Surg 2002; 137(7): 799-804.