

Conservative approach versus emergency appendectomy as primary treatment of acute appendicitis

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Abstract:

Background: In this retrospective study, conservative and operative managements of acute appendicitis were evaluated regarding their safety, complications and cost effectiveness.

Methods: We have undertaken an observational, retrospective study of patients with a clinical and radiological diagnosis of acute appendicitis, treated in our hospital between January 2015 and January 2020. A study group of 60 patients with acute appendicitis underwent conservative treatment. One hundred and six patients who underwent emergency appendectomy during the same period constituted the control group. Routine follow-up was done on the 7th day, at the 1st and 3rd months and at the first year after discharge in both the groups. Both groups were compared regarding age, gender, mean hospital stay, modified Alvarado score, morbidity, mortality, and cost effectiveness.

Results: Analysis of results showed higher morbidity in control group than in the study group, though the hospital stay was more in study group, complications and the cost effectiveness was more in control group with no mortality in both the groups. Major complications such as enterocutaneous fistula was present in study group and surgical site infection were present in control group.

Conclusion: With the availability of effective antibiotics, advances in patient care and cost effectiveness, conservative non surgical therapy can be considered as primary management modality in acute appendicitis in select patients.

Keywords: Acute appendicitis, Antibiotics, Appendectomy, Alvarado score.

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I. Introduction:

Acute appendicitis is one of the frequent surgical emergencies encountered in surgical practices across the world. Although appendectomy is often the first emergency surgical procedure performed by the young surgeon in training, the diagnosis of acute appendicitis can be challenging and requires a high index of suspicion on the part of the examining surgeon to facilitate prompt treatment of this condition and avoid the substantial morbidity (and even mortality) associated with it. It is estimated that as much as 6% to 7% of the general population will develop appendicitis during their lifetime, with the incidence peaking in the second decade of life².

Acute appendicitis classically managed by early appendectomy since its introduction in 1880. Conservative non operative management reported to be associated with high morbidity (and mortality) with perforation, abscess formation and other complications. But population based studies have reported significant long time risks following surgical intervention for appendicitis: small bowel obstruction requiring surgical intervention has been shown to occur in 1.3% by 30 years, and 30-day mortality to be 0.24% with increased standard mortality ratio^{3,4}. On opening the abdomen, finding a normal appendix is always a concern⁵.

In 1959 Coldrey¹ et al. studied 471 patients who received antibiotics as single treatment for acute appendicitis, although this did not receive much attention. In recent years there is renewed interest in primarily treating appendicitis⁶ with antibiotics, and some studies have indicated that perforated appendicitis in children can be treated with antibiotics⁷⁻⁹. In addition, retrospective studies in adults with perforated appendicitis treated conservatively suggested that late recurrences exhibited a mild clinical course¹⁰⁻¹¹.

In this retrospective study, the effectiveness of medical therapy in acute appendicitis is compared to the traditional emergency appendectomy procedure.

II. Materials And Methods

This retrospective study of Acute appendicitis management was undertaken at Medciti Institute of Medical Sciences (MIMS), Hyderabad between the years 2015–2020. Acute appendicitis is diagnosed by the attending surgeon according to the established practice basing on the clinical findings, laboratory investigations and ultrasound of the abdomen. In some cases CT scan of the abdomen is performed depending upon the requirement. Patients who were managed by conservative non surgical treatment are placed in the study group while the patients who underwent appendectomy in the same period were placed in the control group.

The study group received intravenous fluids, cessation of oral feeding and antibiotics (cefuroxime 1 gm IV twice a day and metronidazole 1.5 gm IV once a day) along with analgesics. Regular monitoring of these patients was undertaken with clinical examination, monitoring of vitals and temperature, basic investigations like complete blood picture and USG. Patients whose clinical condition showed improvement were discharged to continue oral antibiotics of total 10 days. For patients whose clinical condition did not show improvement the intravenous treatment is prolonged with follow up radiologically. Patients with clinical deterioration and worsening symptoms were taken up for surgery.

Open or laparoscopic appendectomy is performed for the control group as well as for those in study group who did not improve on conservative management. The appendix was sent for histopathological examination and specimens for bacteriological culture were collected if pus is found during surgery.

Patients allocation

One hundred and fifty six patients presenting to our Emergency Department of MIMS between January 2015 and January 2020, who were diagnosed to have acute appendicitis were included in this retrospective study. Among these 106 patients underwent appendectomy and 60 patients were treated primarily by conservative management. Informed consent was obtained after verbal and written information had been given to the patients.

Inclusion criteria

- a. Patients with ages between 12 years to 70 years.
- b. Patients with classical clinical findings of acute appendicitis with Alvarado score of >5, and having features of inflamed appendix on ultra-sonography of abdomen

Exclusion criteria

- a. Patients below 12 years and above 70 years.
- b. Patients who had severe sepsis.
- c. Pregnant women.
- d. Patients who had clinical, radiological or intra operative evidence of diffuse peritonitis.

Data collection and follow-up

Peri operative patient data is collected from the case records. Routine follow-ups data on the 7th day, at the 1st and 3rd months and at the first year after discharge is noted. Both groups were compared regarding age, gender, mean hospital stay, modified Alvarado score, morbidity, mortality, and cost effectiveness.

Outcomes of the treatments in both groups in terms of success of treatment (No recurrence of symptoms and no need for appendectomy within one year) major or minor complications were tabulated. The parameters analyzed were complications like abscess formation, intestinal obstruction, need for reoperation, wound rupture, hernia formation and anaesthesia related complications apart from length of antibiotic treatment, length of hospital stay and costs of treatment in both groups.

Statistical analysis

Statistical analysis was done with statistical package for social sciences (SPSS) applying chi square test. The χ^2 test was used to check for differences between proportions. Student's t test or ANOVA was used for comparisons of continuous variables between groups. P value < 0.050 was considered significant in two-tailed tests.

III. Results:

A total of 166 eligible patients were included in the study conducted between January 2015 and January 2019: 60 patients in the study group (conservative management) and 106 patients in the control group (appendectomy). The male to female ratio of study group was 38:12, mean age: 30.98±1.30; (range: 16-65). In control group, the male to female ratio was 75:31, mean age: 26.25±0.79; (range: 13-59). Open appendectomy was performed in 80 patients, whereas the remaining 26 patients had laparoscopic appendectomy. Perforated appendix was observed during surgery in 21 of the open and two of the laparoscopic appendectomies. In study group three has to undergo appendectomy due to perforation while on observation, with deterioration of clinical condition for which immediate emergency open appendectomy was done. In study group one of these patients, entero cutaneous fistula, in three patient intra-abdominal abscess and whereas, in control group after

appendectomy twenty-two patients wound infection occurred as a complication. Mean hospital stay in study group was 6.14 ± 0.10 days (4-7), and the mean follow-up period was 11.91 ± 0.35 (09-18) months, whereas, in control group mean hospital stay was 4.40 ± 0.14 (3-15) days. During the follow-up period, recurrences were seen in ten patients and eight of them were treated surgically, whereas two were re-treated medically. Among these two patients, recurrence occurred in one and he was operated. All of the patients operated in study group had acute appendicitis during surgery but none of them had perforated appendicitis. In five of the operated patients, wound infection occurred. Mean cost of the therapy in the study group including all radiological investigations and recurrent admissions without operation was Rs.7650, whereas, in control group was Rs.12,650.

Regarding mean hospital stay, study group had a statistically significantly longer hospital stay than control group ($p=0.0003$). Mean modified Alvarado scores of patients were 5.57 ± 0.12 (4-9) and 6.43 ± 0.07 (3-9) in study and control group, respectively. There was no statistically significant difference between groups regarding modified Alvarado scores ($p=0.01$). Morbidity rates were 16.26% and 23.55% in study and control groups, respectively, and there was no statistically significant difference between groups ($p=1.55$). No mortality occurred in either group.

Table 1. comparison between study group and control group

	Study group	Control group
Total number of patients	60	106
Mean age	30.98 ± 1.30	26.25 ± 0.79
Mean hospital stay	6.14 ± 0.10 days	4.40 ± 0.14 (3-15) days
Mean cost of therapy	Rs.7650	Rs.12,650
Mean modified Alvarado scores	5.57 ± 0.12 (4-9)	6.43 ± 0.07 (3-9)
Morbidity	16.66%	23.55%
Mortality	0%	0%

IV. Discussion:

The treatment of acute appendicitis traditionally is early appendectomy since the basis for the treatment is established by Fitz and Mc Burney¹³. Concerns like risk of perforation of appendix and peritoneal sepsis lead to the trend of early operative intervention rather than a conservative approach. But presently we have newer and effective antibiotics and modern imaging and other investigative modalities for effective follow-up of conservatively managed cases and there is a need to review the traditional approach of Acute Appendicitis^{1,14} management.

The earliest prospective randomized trial to study the conservative approach as treatment for acute appendicitis is conducted by Eriksson and Granstrom¹⁵ in 1995. In that trial 20 patients of a study group were compared to the 20 patients of control group who had appendectomy. All patients in the study group with conservative management were discharged in two days except one patient who required appendectomy with in twelve hours of symptom onset. In their one year of follow up seven patients were re admitted for recurrence of appendicitis and were operated. The authors suggested conservative therapy for appendicitis could be an option for high risk surgical patients. In another prospective randomized multi-centered study performed by same authors in 2006, 252 male patients with acute appendicitis were randomized into two groups. Those randomized to antibiotic therapy were treated intravenously for two days, followed by oral therapy for 10 days. In 15 patients (12%), symptoms persisted for 24 hours, and appendectomy was performed. In seven of these (5%), perforated appendicitis was observed. The remaining 113 patients were successfully treated with antibiotics. The other group of patients was operated on with open or laparoscopic surgery. In their one-year follow-up period, there were 16 recurrences (15%) in the medical therapy group. They concluded that antibiotics may be offered in high-risk surgical patients and obese patients. Their recurrence rate was marginally (that is 1.7%) higher compared to our study. In both studies, patients with recurrences were offered medical therapy again. In both studies, patients with recurrences were considered for medical therapy again.

In our study comparing conservative management and surgical management for appendicitis both groups had comparable treatment efficacy, in fact conservative group showed better results. Ten patients who had medical therapy had recurrence after a median follow-up of one year (nine of which are ultimately required appendectomy) on the other hand, major complications were 6.89% more in those who had an appendectomy. Complication rate in study group is 16% whereas, in control group is 23.55%. Difference in hospital stays 2-3 days with negligible significance (p value 1.23). Cost of medical therapy was Rs.7,650 (including admissions for recurrences, whereas cost of appendectomy was Rs.12,650. This difference is significant and suggests that medical therapy is more advantageous regarding cost effectiveness.

Other advantages of conservative therapy are lack of surgery and anaesthesia related risks. Operative complication rates for appendectomy are reported to be 17%, with the most common complication being wound infection followed by postoperative intestinal obstructions. It is suggested that each year over 250,000

appendectomies for presumed appendicitis are performed in the United States with a 15% negative appendectomy rate. With the adoption of medical approach, negative appendectomy rates may be decreased, thereby avoiding possible complications.

Finally, our study suggests, taking into account the rate of complications, hospital stay, cost advantages and with reasonably low recurrence rates, conservative medical therapy could be an alternative to a routine emergency appendectomy in select patients. However, more wide spread studies need to be conducted to replace early appendectomy as gold standard therapeutic procedure for treating acute appendicitis.

References:

- [1]. Coldrey E. Five years of conservative treatment of acute appendicitis. *J Int Coll Surg* 1959; 32: 255–261.
- [2]. Tingstedt B, Johansson J, Nehez L, Andersson R. Late abdominal complaints after appendectomy – readmissions during long-term follow-up. *Dig Surg* 2004; 21: 23–27.
- [3]. Andersson RE. Small bowel obstruction after appendectomy. *Br J Surg* 2001; 88: 1387–1391.
- [4]. Blomqvist PG, Andersson RE, Granath F, Lambe MP, Ekbohm AR. Mortality after appendectomy in Sweden, 1987–1996. *Ann Surg* 2001; 233: 455–460.
- [5]. Andersson RE. The natural history and traditional management of appendicitis revisited: spontaneous resolution and predominance of prehospital perforations imply that a correct diagnosis is more important than an early diagnosis. *World J Surg* 2007; 31: 86–92.
- [6]. Liu K, Ahanchi S, Pisaneschi M, Lin I, Walter R. Can acute appendicitis be treated by antibiotics alone? *Am Surg* 2007; 73: 1161–1165.
- [7]. Levin T, Whyte C, Borzykowski R, Han B, Blitman N, Harris B. Nonoperative management of perforated appendicitis in children: can CT predict outcome? *Pediatr Radiol* 2007; 37: 251–255.
- [8]. Aprahamian CJ, Barnhart DC, Bledsoe SE, Vaid Y, Harmon CM. Failure in the nonoperative management of pediatric ruptured appendicitis: predictors and consequences. *J Pediatr Surg* 2007; 42: 934–938.
- [9]. Abes, M, Petik B, Kazil S. Nonoperative treatment of acute appendicitis in children. *J Pediatr Surg* 2007; 42: 1439–1442.
- [10]. Dixon MR, Haukoos JS, Park IU, Oliak D, Kumar RR, Arnell TD et al. An assessment of the severity of recurrent appendicitis. *Am J Surg* 2003; 186: 718–722.
- [11]. Andersson RE, Petzold MG. Nonsurgical treatment of appendiceal abscess or phlegmon: a systematic review and meta-analysis. *Ann Surg* 2007; 246: 741–748.
- [12]. 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: 1033–1037.
- [13]. Oliak D, Yamini D, Udani VM, Lewis RJ, Vargas H, Arnell T, et al. Nonoperative management of perforated appendicitis without periappendiceal mass. *Am J Surg* 2000; 179: 177–81.
- [14]. Campbell MR, Johnston SL 3rd, Marshburn T, Kane J, Lugg D. Nonoperative treatment of suspected appendicitis in remote medical care environments: implications for future spaceflight medical care. *J Am Coll Surg* 2004; 198: 822–30.
- [15]. Eriksson S, Granström L. Randomized controlled trial of appendectomy versus antibiotic therapy for acute appendicitis. *Br J Surg* 1995; 82: 166–9.

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