



A STUDY ON MEDICAL MANAGEMENT OF UNCOMPLICATED ACUTE APPENDICITIS IN CHILDREN

General Surgery

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ABSTRACT

Objective :- To evaluate the safety and outcome of antibiotic treatment of uncomplicated acute appendicitis in children. **Methods :-** We used antibiotics to treat 35 children of aged 5 -16 yrs who were diagnosed with uncomplicated acute appendicitis, non responders underwent lap appendectomy. **Result :-** The success rate of medical management was 80%, most of the case showed improvement on 2nd day of management. Seven case (20%) failed and were operated laparoscopically. Readmission cases with relapse were 3 cases out of which 2 underwent lap appendectomy. **Conclusion:-** Using antibiotic treatment in uncomplicated acute appendicitis in child is safe and reduce the negative appendectomy rate and is cost effective.

KEYWORDS

INTRODUCTION

Laparoscopic appendectomy is considered to be gold standard treatment for acute appendicitis, however medical management of uncomplicated appendicitis was established to be safe in past few years. Both laparoscopic and open appendectomy being regarded as low risk and effective procedure but operative management may still be associated with complications such as hemorrhage, injury to surrounding structure, SSI, intestinal obstruction in future due to band and adhesion.

Non operative management requires strict observation of patient to reduce the chance of progression from uncomplicated acute appendicitis to complicated one.

AIM

The main purpose of this study was to evaluate the outcome of medical management and safety profile of medical management in acute uncomplicated appendicitis in children.

METHODS

This study was conducted on children aged 5 to 16 years with complain of acute right lower abdominal pain, with diagnosed uncomplicated acute appendicitis who were managed at the Surgery Department, Jawahar Lal Nehru Medical College and Hospital, Bhagalpur, Bihar between May 2022 till January 2023. We included children with uncomplicated acute appendicitis, with or without positive USG for acute appendicitis, and excluded Children with evidence of complicated appendicitis, chronic abdominal pain, immunocompromised children or those previously treated conservatively for suspected appendicitis.

Children were assessed clinically using laboratory investigations including total and differential leucocytic count and CRP, and USG.

Conservative Treatment

Conservative treatment consisted of: Nil per oral for those patients having GI symptoms like nausea or vomiting. IV fluids were prescribed according to age and weight of the patients. Oral liquids were allowed to those patients who could tolerate it. Third generation cephalosporins i.e. Injection Ceftriaxone were given in a dose of 100 mg/kg BW/day in two divided doses along with injection metronidazole in a dose of 7.5mg/kg every 8 hourly. Analgesics were used to control pain, starting with paracetamol and then adding NSAIDs if required. Once the child is clinically well and tolerating oral intake, oral antibiotics are continued with third generation cephalosporins e.g., cefdinir 8mg/kg/day and oral metronidazole 30 mg/kg in three divided doses for 5 days.

Patient was followed up at least twice daily for temperature, pulse rate, pain and abdominal examination, daily total & differential leucocytic count and CRP, and USG re-examination after 48hrs of admission.

If patient underwent deterioration of symptoms and signs of appendicitis or persistence for a maximum of 3 days, laparoscopic appendectomy was done. The resected appendix was sent for histopathological examination.

Patients were discharged after improvement of clinical and laboratory data on a 5 days course of oral antibiotic combination.

RESULTS

Our study included 35 patients with a mean age of 10.23 ± 2.89 , 57.14 % of them were males and 42.85 % were females.

Analysis of the incidence of symptoms & signs showed that nausea presented in 24 children (20 of successful conservative group and 4 of failed conservative group, vomiting presented in 18 children (13 of successful conservative group and 5 of failed conservative group), 30 patients had tender McBurney point (23 of successful conservative group (82.14%) and 7 of failed conservative group (100%), 28 have fever ≥ 38 (22 of successful conservative group (78.57%) and 6 of failed conservative group (85.71%). The duration of symptoms ranged from 1-7 days (mean 2-3 days). Migration of pain was found in 21 (16 of successful conservative group (57.1%) and 5 of failed conservative group (71.42%).

As per laboratory data; Leucocyte count more than 12000 was found in 17 (13 of successful conservative group (46.42%) and 4 of failed conservative group (57.14%). 5 patients at admission had a normal CRP count, all of them fell in the successful conservative group, while 30 children had a CRP count more than 6 (23 of Successful conservative group and all patients of Failed conservative group).

On admission, there was no USG signs of Acute Appendicitis in 1 patient, 21 patients showed signs of Acute Appendicitis (15 in the successful conservative group and 6 in the failed conservative group), while a rim of intraperitoneal free fluid with mesenteric lymphadenitis was found in 13 patients. On follow up USG after 48 hrs, no signs of appendicitis were found in 20 children, 5 children showed signs of acute appendicitis while 10 children showed a rim of free fluid with mesenteric lymphadenitis.

Histopathological examination of the removed appendix, showed that, 1 case had acute catarrhal appendicitis, while 5 appendices showed acute suppurative appendicitis while 1 case had a normal appendix.

After 6 weeks, 2 cases of initially successful conservative was re-admitted and failed to respond to conservative for three days and was operated laparoscopically. In the next 3 months, 1 cases was admitted and responded to conservative management.

DISCUSSION

Cases of acute uncomplicated appendicitis may be managed conservatively using only antibiotics and analgesics with rest of

gastrointestinal tract if required. Minneci et al showed that children with successful conservative management had fewer disability days and returned to school more quickly. They concluded that conservative management is safe and maintains a good quality of life.

During our study we performed only 7 laparoscopic appendectomies out of 35 patients. They recovered without any operative or postoperative complications. While children who underwent conservative management returned to normal activities after a mean of 5 days.

Georgiou et al. reported a success rate of conservative management in 97% of all included children. There was no statistical significance of the rate of complications in both conservative group and failed conservative group.

Our study included 35 children aged 5-16 years, diagnosed with Acute Uncomplicated Appendicitis. Lee et al. included 51 children aged 3-17 years [11]. Steiner et al. Included 362 children with an age range of 3-16 years [12]. We think that children below 5 years will not be able to accurately express some symptoms specifically migrating pain.

Diagnosis was based on clinical examination and laboratory investigations; in addition to USG.

In our study the duration of symptoms was 1-7 days with a mean of 2-3 days. However, there was no statistical significance between success of treatment and duration of symptoms. Lee et al excluded patients with symptoms ≥ 5 days. Steiner et al. excluded cases that had duration of symptoms ≥ 36 h. Isani et al., reported that the success of conservative management was not affected by the duration of symptoms whether $>$ or < 4 days. Moreover, the duration of symptoms didn't relate to the readmission rate, hospital stay or the development of complications.

In conservative management We depended mainly on intravenous (IV) 3rd generation cephalosporin in a dose of 100 mg/kg BW/day in two divided doses and metronidazole in a dose of 7.5mg/kg every 8hrly. Shifting to oral 3rd generation cephalosporin and oral metronidazole at home for 5 days after discharge. Lee et al, used IV ceftriaxone and metronidazole and discharged his patients on oral amoxicillin/clavulanic acid, while Steiner et al used ciprofloxacin and metronidazole during conservative management and discharged their patients on ciprofloxacin and metronidazole or cefdinir and metronidazole for 10 days.

Minneci et al. prescribed IV piperacillin/ tazobactam or ciprofloxacin and metronidazole for their patients for 3 or 4 days of in hospital treatment. Then oral amoxicillin/ clavulanic acid or ciprofloxacin and metronidazole to complete 10 days after discharge. Svensson et al. used IV meropenem and metronidazole regimen in hospital for at least 2 days. As soon as the children were tolerating oral intake, they were given oral ciprofloxacin and metronidazole for a total of 10 days treatment.

Analgesics were prescribed according to severity of pain, starting with paracetamol. If there was still pain a non-steroidal antinflammatory analgesic was added. We didn't need opioid analgesics in any patient. Lee et al, and Steiner et al used analgesia with their patients when needed, they used non-steroidal anti-inflammatory drugs.

Oral intake was restricted only in patients who had severe GIT symptoms such as vomiting, abdominal colics for at least 24hr. Once the patient can tolerate oral intake, feeding was gradually introduced. Starting with fluids then semi-solids and full oral feeding before or after discharge. In Lee et al and Steiner et al studies, oral intake was restricted for at least 48h. Once patients tolerated they were shifted to oral intake and oral antibiotics. Svensson et al, and Minneci et al restricted oral intake during the first 24h of management. They discharged patients when they became afebrile for at least 24h, abdominal pain free, and tolerated oral intake.

During conservative management, we stressed on frequent examination and meticulous observation of patients, daily LC & CRP were performed; all to detect any deterioration or complications early. Conservative management was practiced for a maximum 3 days, if patients didn't improve after this period, or if deterioration occurred before that time limit, we decided to operate the patient. During Lee et

al study, a patient showing signs of clinical worsening or failure to show clinical improvement within 24 hours was considered treatment failure and resulted in prompt laparoscopic appendectomy.

In Mahida JB, et al study Patients showing improvement, as decreased pain and tenderness were advanced on their diet. Those patients, who continued to show improvement and were tolerating a regular diet at 24 h after initiation of IV antibiotics, then started oral antibiotics and then they passed smoothly. Patients who worsened clinically as increasing pain or tenderness, or showing new or persistent signs of systemic inflammatory response, or persistent nausea or vomiting were confirming failure of non-operative management. All patients who had failure of nonoperative management underwent urgent appendectomy. Max Knaapen et al reported that appendectomy was decided once there was deterioration of symptoms and signs.

The mean duration of hospital stay in our study was 2.5 days in patients who had successful conservative management and 3.5 days in those who failed conservative management. Max Knaapen et al reported that the median duration for hospital stay was 2.5 days. While In Jeff Armstrong et al study the mean duration of hospital stay in patients who succeeded NOM was 1.5 days and 1.3 days in operated patients. In Minneci et al, study the mean duration of hospital stay was 37 hr in conservative group and 20 hr in the operated group.

In our study we had a high initial success rate of conservative management of 80 % and a low relapse & readmission rate within 6 months. In a meta-analysis of randomized controlled trials including 5 studies and 1430 patients with uncomplicated acute appendicitis, the success rate of conservative management during the initial hospitalization was 80%. Overall, treatment with antibiotics was associated with a 39% risk reduction in complications compared with those undergoing appendectomy. The main drawback of this meta-analysis study was inclusion of adult patients only.

We operated 7 patients (20%) after failure of conservative management. Histopathological examination of resected appendices revealed that only one case showed no signs of inflammation. This means that only one case out of 35 cases had a negative appendectomy. In Lee et al, study the recurrence rate for patients with initial success following non-operative therapy was 26% (9/35 patients) with a median time to recurrence of 2 months. One of the nine recurrences was successfully treated with another course of antibiotics, and the remaining 8 were treated with laparoscopic appendectomy. For those patients who underwent a laparoscopic appendectomy, 1 was treated at an outside hospital and 7 returned to their institution and were found to have uncomplicated appendicitis. Overall, 26 of 51 patients who underwent non operative therapy (51%) avoided appendectomy during their study period. In Bachur RG, et al study NOM cases, forty-six percent had a subsequent appendectomy within the first year. They concluded that there was a potential increase in the total number of cases of AA due to the implementation of NOM [19]. From our study, it is clear that antibiotic treatment of AUA can reduce the rate of negative appendectomy.

The total cost in our series, there was a higher total cost of operated cases compared to conservative patients. The median cost in conservative children was 4800 (3000 – 6000), while that of operated cases was 8300 (7000 – 9000). The randomized trial of Sippola et al revealed that the overall costs were 1-6 times higher in the children subjected to appendectomy when compared with children who had successful conservative management.

CONCLUSION

Using antibiotic management for Acute Uncomplicated Appendicitis among children aged 5-16 years, proved to be safe, effective and having a low rate of complications. It reduced the negative appendectomy rate. It is associated with a low relapse rate and significantly reduced the treatment cost. However, a controlled randomized trial on a bigger number of cases is needed to validate these results.

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