

ORIGINAL ARTICLE

Comparison of Non-Operative Treatment and Appendectomy in Non-Perforate Appendicitis in Children

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ABSTRACT

Objective: Comparison of non-operative treatment and appendectomy in non-perforate appendicitis in children.**Study Design:** Comparative analytical study**Place and Duration of Study:** Department of Surgery, DHQ Teaching Hospital, Sargodha from 1st January 2022 to 31st March 2023.**Methodology:** Two hundred children within the age of 5-15 years were enrolled. The children were included on the basis of their clinical presentation of appendicitis which was correlated with their biochemical ultrasound findings. The children included in the non-operative group were tagged as group 1 while those in operative group were labelled as Group 2. Children within non-operative treatment group 1 were administered IV meropenem as a 10 mg per kg dose 8 hourly as well as metronidazole in 20 mg per kg once a day IV divided dosage as 8 hourly for 48 hours. Children in the operative treatment group 2 were administered 3 antibiotic doses and were operated for through modified laparoscopic procedure, however where required open appendectomy was conducted through modifies McBurney's incision followed by muscle-splitting.**Results:** 85% of the participants were recovered without any surgery for appendicitis. Highest success rate was observed in 5-8 years of age group. In present study, age and baseline variables of both study groups are almost same. No significant difference in either group was observed in terms of temperature, age, TLC, neutrophils, CRP and weight.**Conclusion:** Non-operative study group demonstrated high success rate in which 85% of the participants were recovered without any surgical intervention.**Keywords:** Appendectomy, Conservative, Surgical intervention, Modifications.

INTRODUCTION

Non-operative treatment, also known as conservative or non-surgical treatment, refers to a medical approach that focuses on managing and treating various health conditions without resorting to surgical intervention. This approach may involve a combination of therapies, lifestyle modifications, medications, and other non-invasive techniques to achieve healing, pain relief, and improved quality of life. Non-operative treatment is often considered as a first-line approach for many conditions, and surgery is typically reserved for cases where conservative measures have failed to provide sufficient relief or improvement.¹⁻⁵

Musculoskeletal Injuries, Back Pain, Arthritis, obesity, digestive disorders, respiratory conditions, cardiovascular/neurological conditions and cancer are some examples of conditions where non-operative treatment might be employed. It's important to note that the appropriateness of non-operative treatment depends on the specific condition, its severity, and individual patient factors. Medical professionals will assess each case and recommend the most suitable treatment approach, which may include non-operative measures or, if necessary, surgical intervention.⁴⁻⁷

Appendicitis is a common medical emergency and requires prompt treatment to prevent complications such as a perforated appendix, which can lead to serious infection. In cases of non-perforated appendicitis in children, where the appendix has become inflamed but has not yet ruptured, surgical removal of the appendix (appendectomy) is usually the preferred treatment. The procedure can be performed using open surgery or minimally invasive techniques such as laparoscopy.⁵⁻⁸

In a recent study based on a meta-analysis the success rate of non-operative treatment was reported as 92% post analyzing previous literatures. Within the meta-analysis 16% cases later underwent appendectomy.⁹ Another study elaborated the non-operative treatment success rate as 90.5% for acute and uncomplicated appendicitis.¹⁰

The present study was conducted for comparing the outcomes of acute appendicitis cases treated through non-

operative treatment with the cases of children having operative intervention for their appendicitis treatment. The results of this study provided the outcomes of non-operative treatments and its impact on patient's overall health.

MATERIALS AND METHODS

This study was conducted at Department of Surgery, DHQ Teaching Hospital, Sargodha from 1st January 2022 to 31st March 2023. The study enrolled 200 children within the age limit of 5-15 years. The children were included on the basis of their clinical presentation of appendicitis which was correlated with their biochemical (TLC), PAS scoring and radiological (Ultrasound) findings. Their appendicitis score was observed as PAS ≥ 7 . The exclusion criteria were based upon previous abdominal operative history, peritonitis, as well as appendicular mass, abscess on ultrasound findings, appendicolith or having peri-appendiceal fluid formation or may also be having high level of C reactive proteins. The sample size was calculated as 200 children using 5% margin of error and 80% power of test with a success rate of non-operative treatment group as 89.6% and 100% in operative group. The children included in the non-operative group were tagged as group 1 while those in operative group were labelled as Group 2. The random selection in each group was conducted for group allotment. The clinical assessments of each enrolled participants were done through a well-structured questionnaire. An informed consent was taken from the parent/guardian of each child prior to their enrolment in the study group. Children within non-operative treatment group 1 were administered IV meropenem as a 10 mg per kg dose 8 hourly as well as metronidazole in 20 mg per kg once a day IV divided dosage as 8 hourly for 48 hours. As soon as the child developed tolerance towards oral intake with other clinical improvement signs the treatment regime was shifted to oral intake of ciprofloxacin as 10 mg per kg/dose for twice daily in addition to metronidazole in 20 mg per kg per day (two divided doses) for additional 8 days. Children in the operative treatment group 2 were administered 3 antibiotic doses and were operated for through modified laparoscopic procedure, however where required open appendectomy was conducted through modifies McBurney's incision followed by muscle-splitting. Rutherford Morrison-extension was only conducted in complicated cases of

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appendicitis. Intravenous antibiotics were continued upto 5 days in perforated cases. All the cases were monitored for their improvement throughout the procedure. Failure in non-operative treatment was termed in cases of formation of abscess or periappendiceal fluid observed through ultrasound. Recurring appendicitis was meant for surgical interventions. Patients on tolerating the light food intake were discharged and were kept on oral pain killers (analgesics). A follow up was performed in each case up to a duration of six months. Data was analyzed using SPSS version 26.0 wherein chi square test was used for analyzing the variable with a p-value of 0.05 as significant.

RESULTS

The success rate of non-operative treatment was calculated. A total of 85% of the participants were recovered without any surgery for appendicitis. Highest success rate was observed in 5-8 years of age group in which 40 children out of 85 were recovered without any surgical intervention (Fig. 1)

The mean age of study participants was 9.47 ± 1.83 . Total leukocyte count was raised and its value appeared to be as 10761 ± 2357.2 . Mean value for the duration of the symptoms was almost 20 hours and pediatric appendicitis score value was 7.66 ± 0.77 (Table 1). The age and baseline variables of both study groups are almost same. No significant difference in either group was observed in terms of temperature, age, TLC, neutrophils, CRP and weight (Table 2).

Table 1: Age and baseline variables of study participants

Variable	Mean \pm SD
Age (years)	9.47 ± 1.83
Duration of symptoms (hours)	20.84 ± 10.67
Total leukocyte count ($10^9/l$)	10761 ± 2357.2
C reactive protein (mg/dl)	7.7 ± 1.9
Pediatric Appendicitis Score	7.66 ± 0.77

Table 2: Comparison of variables in operative and non-operative group

Variable	Group A (N=100)	Group B (n=100)	Total (n=200)
Age in years	9.65 ± 1.83	9.89 ± 1.84	9.77 ± 1.83
Duration of symptoms (hours)	21.69 ± 10.7	19.01 ± 11.83	20.35 ± 11.26
Temperature ($^{\circ}F$)	99.85 ± 1.31	99.88 ± 1.29	99.86 ± 1.3
TLC ($10^9/l$)	11311.12 ± 2696.84	11322.23 ± 2697.7	11316 ± 2697.27
Neutrophil (cells/ μl)	63.77 ± 13.16	63.63 ± 13.05	63.7 ± 13.10
CRP (mg/dl)	7.76 ± 1.9	7.78 ± 1.75	7.77 ± 1.82
PAS	7.73 ± 0.91	7.80 ± 0.93	7.76 ± 0.92
Weight (kg)	17.53 ± 4.64	18.48 ± 5.12	18.0 ± 4.88

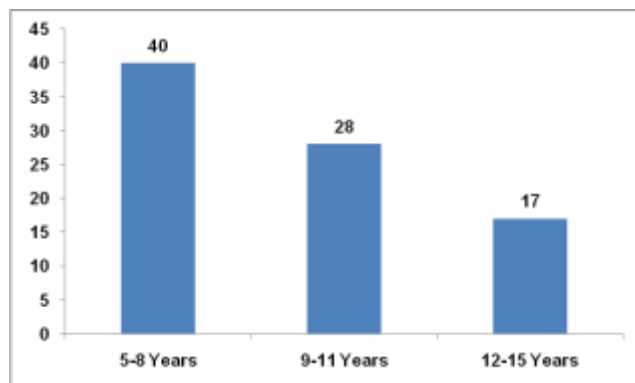


Fig. 1: Success rate of non-operative treatment in children

DISCUSSION

Non operative surgical treatment is usually first-line approach for the treatment especially among children. Surgical protocols are avoided until it is vital for the survival and health of the patients. Conservative methods are usually employed and surgical interventions are generally avoided in children. Many different studies have reported high success rate of non-surgical protocols even for serious conditions including cancer, arthritis, obesity, cardiovascular and neurological conditions by lifestyle

modifications and adequate drug treatment.¹¹⁻¹³ Present study was specifically designed for the estimation of success rate of non-operative methods for the treatment of appendicitis. A comparative study was conducted for the evaluation of non-operative treatment and appendectomy in non-perforated appendicitis in children.

In the present study, high success rate was observed in non-operative treatment group. Eighty-five percent of the children recovered without any surgical interventions. Results of the present study was in line with already published data.^{14,15} Other studies showed variable results with 84% and 58% of the success rate in their respective study groups.^{16,17} This study showed that no difference in success rate was observed in either study groups. Few studies also demonstrated need of appendectomy despite initial success of conservative methods in a small number of patients.^{18,19}

In present study, baseline study variables are also not significantly deviating in both study groups. Same TLC, age, weight, temperature and neutrophils was observed. On the other hand, studies have highlighted the fact that total leukocyte count and CRP value is frequently associated with the failure of conservative methods.^{20,21} However, in present study, no such difference was observed in operative and non-operative group. Different researches have highlighted the success rate in children less than 6 years of age.^{22,23} Similar result was observed in present study in which 47% of the children of successful non-operative group were in the age group of 5-8 years.

CONCLUSION

Non-operative study group demonstrated high success rate in which 85% of the participants were recovered without any surgical intervention. Highest success rate was observed in children of 5-8 years of age group. No significant difference in terms of baseline variables was observed in either of the study groups.

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