

Original Research Article

A clinical study on conservative management of acute appendicitis in a tertiary care centre

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ABSTRACT

Background: Acute appendicitis is the most common clinical entity which is treated surgically by appendectomy. In recent years acute uncomplicated appendicitis can also be managed non surgically with antibiotic therapy. Aim and Objective was to assess the outcome of conservative treatment in the management of acute appendicitis.

Methods: All patients who were diagnosed as acute appendicitis radiologically were enrolled into the study considering inclusion and exclusion criteria. Modified Alvarado score (MAS) was calculated based on clinical symptoms, signs and laboratory investigations. Injection ceftriaxone and injection metronidazole was given for 48-72 hours. Patients who responded for i.v. antibiotics were switched to tablet ciprofloxacin and tablet metronidazole for 7 days and followed for 6 months. Patients who didn't respond to conservative treatment or had recurrence were classified as treatment failure/recurrence.

Results: Totally 100 patients were enrolled in the study, 43 males and 57 females with a ratio of 1:1.32. Majority were in age group of 21-30. Ultrasound was performed in 91 patients, CT scan in 9 patients. 28 patients had MAS between 4-6 and 72 had between 7-9. 82 patients were successfully managed conservatively. 12 patients had failure of conservative treatment and 6 patients had recurrence.

Conclusions: Success rate of conservative treatment in patients with MAS 4-6 was more than those with MAS 7-9 in this study. Complicated acute appendicitis should be managed surgically and uncomplicated acute appendicitis can be managed by conservative treatment provided they are strictly followed every month for 6 months to detect recurrences.

Keywords: Abdominal pain, Antibiotics, Appendicitis, Conservative treatment, Recurrence

INTRODUCTION

Acute appendicitis is the frequent cause of acute abdominal emergency. The first reported case of appendicitis dates back to 30 AD by Aretaeus the Cappadocean. In 1735, the first appendectomy was performed by Claudius Amyand. In 1886, Reginald Fitz, coined the term appendicitis. The point of maximal tenderness in cases of acute appendicitis was described by Charles McBurney. In 1988, Kurt Semm introduced laparoscopic appendectomy.¹

In the pre-antibiotic era, acute appendicitis progressed from uncomplicated to complicated appendicitis, so it prompted the surgeon McBurney to implement appendectomy for all the cases of acute appendicitis. But appendectomy has its own complications, morbidity and mortality. In the antibiotic era surgeons gave a trial of conservative treatment for acute appendicitis. The non-operative conservative management of uncomplicated acute diverticulitis and salpingitis has been well established but the non-operative management of acute appendicitis is yet to be explored.

Recent studies showed majority of patients with acute, uncomplicated appendicitis can be treated safely with an antibiotics-first strategy.² Antibiotics which are more effective is used in the treatment of acute appendicitis. Antibiotic therapy is not a complete substitute for surgery in the management of acute appendicitis. In this regard, we aimed to study the outcome of conservative treatment in acute appendicitis using antibiotic therapy.

METHODS

The present study was a prospective study conducted in Apollo Institute of Medical Sciences and Research, Chittoor for a period of 3 years from November 2017 to October 2020. Institutional Ethics committee approval was taken before start of this study.

Inclusion criteria

Radiologically diagnosed acute appendicitis cases with age > 10 years attending within 2 days of symptom onset with Modified Alvarado score (MAS) more than or equal to 4.

Exclusion criteria

Recurrent cases of appendicitis. Appendicitis treated elsewhere and referred to us. Patients with HIV. Patients on immunosuppressive therapy as they don't respond for conservative management. Pregnant women, as pregnancy is an immunosuppressive state. Appendicitis with complications. Patients who were allergic to antibiotics in the study protocol.

Methodology

All the patients attending our emergency department with pain in the lower abdomen were assessed clinically for signs of acute appendicitis. Ultrasound examination was done to diagnose acute appendicitis and to exclude other differential diagnosis and complications of acute appendicitis. All the patients who were diagnosed as acute appendicitis radiologically without any other complications were enrolled into the study considering the inclusion and exclusion criteria. The patients were counselled for conservative treatment of acute appendicitis, explaining all the pros and cons of the treatment. The patients who were willing to undergo conservative management were included in this study after taking written informed consent. All the demographic data like age, sex, occupation, contact details and address were recorded from the patient. Detailed history was taken and abdomen was examined thoroughly and signs of acute appendicitis were noted. The ultrasound findings were documented. MAS was calculated and documented.

Patients were advised nil by mouth for 24 hours and administered intravenous antibiotics ceftriaxone every 12 hours and metronidazole every 8 hours with dose

depending on age of the patient for 48-72 hours. Paracetamol infusion was given every 8 hours to relieve the pain of the patient. The clinical assessment was done every 12 hours. Patients who responded for i.v. antibiotics were switched over to oral antibiotics- tablet ciprofloxacin 500 mg with tablet metronidazole 400 mg thrice a day for a total of 7 days. In those patients, whose clinical condition were deteriorating or not improving, open or laparoscopic appendectomy was performed. The patients were followed at 10 days and every month for a period of 6 months. The disease recurrence would be managed either conservatively or surgically depending on the clinical presentation and upon patient preference. After completion of treatment and follow up for 6 months period, the patients were grouped into successful/failure of conservative treatment. Failure of conservative treatment again divided into treatment failure and recurrence. Treatment failure was clinical deterioration or lack of clinical improvement in admitted patients treated conservatively. Recurrence was defined as onset of appendicitis in a follow up patient successfully treated initially with conservative treatment. Mean and standard deviation was used in the representation of age. The clinicopathological features were represented in tabular form with numbers and frequency. MAS was represented in numbers and outcome of conservative treatment was represented in numbers and frequency.

RESULTS

In this present study, totally 110 patients were enrolled but 10 patients were lost for follow up, so finally 100 patients were included. The minimum and maximum age in the present study was 18 and 70 years. The mean age in this study was 34.82. 43 males and 57 females were included in this study. 84 patients had migratory abdominal pain in the present study. Anorexia was seen in 90 patients and absent in 10 patients. 87 patients had nausea and vomiting. Tenderness in the right inguinal fossa was seen in all the patients. Rebound tenderness was seen in 34 patients and absent in 66 patients. 94 patients in this study had leucocytosis and 45 patients had fever (Table 1).

Table 1: Distribution of clinicopathological factors in the present study.

Clinicopathological factors	Number	Frequency
Migratory abdominal pain	84	84
Anorexia	90	90
Nausea and vomiting	87	87
Tenderness	100	100
Rebound tenderness	34	34
Fever	45	45
Leucocytosis	94	94

CT scan was performed in 9 cases and ultrasound was done in 91 cases for diagnosis of acute appendicitis. MAS was in between 4-6 in 28 patients and was 7-9 in 72

patients with an average of 7.29. 12 patients had complicated acute appendicitis and 88 had uncomplicated acute appendicitis. In 12 cases with complicated acute appendicitis, 6 cases had appendicular mass, 4 cases had perforation and 2 cases had appendicular abscess. Acute appendicitis was resolved in 48 hours in 31 patients and in 57 cases it resolved in 72 hours. Conservative treatment failed in 12 cases in this study. In those 12 cases, 6 cases who had appendicular mass was treated with i.v. antibiotics for 5 days, 4 cases who had perforation was operated and in 2 cases who had abscess, extraperitoneal drainage was performed. 88 cases were followed for a period of 6 months and 6 cases recurred over a period of 6 months (Table 3). In 6 recurrent cases, all cases were performed appendectomy.

Table 2: Outcome of conservative treatment in the present study.

Conservative treatment outcome	Number	Frequency
Successful	82	82
Failure	12	12
Recurrence	6	6

Table 3: Table showing the outcome of conservative treatment with different MAS.

Conservative treatment	Modified Alvarado score	
	4-6	7-9
Successful	28	60
Failure	0	12
Total	28	88

DISCUSSION

In the general surgical practice, acute appendicitis is the commonest cause of acute abdominal pain. In 1889, McBurney reported that appendectomy was the mainstay of treatment for acute appendicitis. There was an assumption since long time that the acute appendicitis progress from uncomplicated to complicated if not operated. But only 20% of patient’s progress to complicated appendicitis, so 80% of patients can be managed non-operatively avoiding surgical complications. The mortality rate of appendectomy ranges from 0.07 to 0.7 and 0.5 to 2.4% in patients without and with perforation. The post appendectomy complication rates are around 10-19% and reach up to 30% for appendicitis without perforation and with perforation.^{3,4}

Advantages of conservative management over surgical management include: i) Antibiotics offer an alternate source of treatment for acute appendicitis when access to surgical areas are not easily available. ii) Antibiotic treatment offers a low cost treatment for acute appendicitis patients. Hansson et al, reported 25-50% reduction in the cost of hospital expenses among

conservatively treated patients than patients treated surgically.⁵ iii) Conservative treatment with antibiotics avoids the anaesthesia risks of surgery and also eliminate the morbidity and mortality associated with surgery. iv) In remote areas where the diagnostic facilities are lacking acute abdominal pain might be misdiagnosed as acute appendicitis leading to negative appendectomies. In such scenarios conservative treatment avoids unnecessary removal of appendix.

Advantages of surgical treatment over conservative treatment include: i) The risk of recurrence is reduced with surgical treatment as the chances of recurrence is there with surgical treatment. The present study had recurrence of 6%. All the recurrence cases where managed surgically. But according to literature there were few cases of stump appendicitis even after surgery.⁶ ii) Surgical intervention gives a chance to explore the possible aetiology of acute abdominal pain in cases of doubtful evidence of appendicitis. Carcinoid of appendix and colon cancer is found in few cases of exploration of abdomen.⁷ iii) Conservative treatment needs the administration of antibiotics for longer duration compared to surgery. So the chances of antibiotic resistance increases in conservative treatment patients.⁸

According to a study by Sebastiano, neuroproliferation is involved in the pathophysiology of acute abdominal pain even in the absence of inflammation of appendix. There is an increase in the neurotransmitters like substance P and vasoactive intestinal polypeptide in such cases of neuro immune appendicitis.⁹ This neuroimmune appendix might be the aetiology of acute abdominal pain in negative appendicitis.

In the present study, the mean age of presentation was 34.82±9.76. According to Gedam et al, the mean age in their study was 30.45±9.71 years.¹⁰ The majority of patients were seen in the age group of 21-30 years which was consistent with the study of Rajasekhar et al and Lohar et al.^{11,12} There was female predominance in this study with male to female ratio 1:1.32 which was compared to a study by Gedam et al, which was 1:1.09.¹⁰ In the present study, abdominal pain was seen in 84% of patients which was contrary to the study conducted by Ekka et al, which was seen in 100% of patients.¹³ Anorexia was seen in 90% of patients in the present study, whereas anorexia was seen in 61% of patients in a study by Berry et al.¹⁴ 87% of patients had nausea/vomiting in this present study, which was similar to a study by Kodliwadmath.¹⁵ 45% of patients had fever in this study, but Reddy et al reported fever in 76% of patients in their study.¹⁶ 94% of patients in this study had leukocytosis, but Ekka et al reported leukocytosis in 66.4% of patients in their study.¹³ Tenderness in right inguinal fossa was seen in all 100% of patients and rebound tenderness was seen in 34 patients. An eastern Indian study reported tenderness in right inguinal fossa in 89.6% and rebound tenderness in 72.8% of patients.¹³ Ultrasound was done in 91% of cases in the present

study. A normal appendix on ultrasound is seen as small, ovoid, easily compressible, concentrically layered, mobile, blindly ending, a peristaltic elongated tubular structure which arise from caecum from its posteromedial aspect.^{17,18} The appendicular lumen is collapsed with a central echogenic submucosa surrounded by hypoechoic muscularis mucosa. Normally the appendicular lumen contains gas, the absence of gas suggests inflamed appendix.^{19,20} The sonographic features of acute appendicitis include noncompressible, aperistaltic, blindly-ended, elongated tubular structure arising from base of caecum at ileo-caecal junction; bull's-eye appearance of appendix; appendix diameter greater than 6 mm; appendicolith; distended lumen with anechoic and hypoechoic material; circumferential loss of submucosal layer of appendix; loculated and prominent pericecal fluid and fat.

In the present study, ultrasound was performed in 91% of cases. CT scan was performed in the remaining 9% of cases in this study as ultrasound can't able to detect the features of acute appendicitis. In the present study, 28% of patients had MAS in between 4-6 and 72% had in between 7-9. The conservative treatment was successful in all the patients with MAS of 4-6 (Table 3). In the present study, 88 cases were recovered with antibiotic therapy in which 31 cases recovered in 48 hours and 57 cases recovered in 72 hours. According to the results of the present study, majority of patients recovered in 72 hours, so at least 72 hours should be awaited to detect the response for conservative treatment.

Table 4: Outcome of conservative treatment in various studies in comparison to the present study.

Outcome	Studies				
	Present study	Malik et al ²⁴	Gedam et al ¹⁰	Turhan et al ²⁵	Styrud et al ²⁶
Successful (%)	82	85	82	80	69
Failure (%)	12	5	10	11	15
Recurrence (%)	6	10	8	9	16

The conservative treatment failed in 12% of patients with MAS between 7-9 and successful in 60% of patients. 12% had complicated appendicitis in this study which showed appendicular mass in 6% cases, perforation in 4% and abscess in 2%. In the present study, conservative treatment failed in 12% of patients. In a study done by Mumtaz et al, 11.1% of patients had failure of conservative treatment which was similar to our present study.²¹ In a study done by Gedam et al the success rate was 74.65%, and failure rate was 14.08% which was similar to the present study.¹⁰ In a study done at Sahlgrenska University Hospital with a sample size of 442 patients, 342 patients (77.4%) treated conservatively had successful outcome and 100 patients (22.6%) didn't responded to conservative treatment.²² A similar study

done in Gandhinagar with a sample size of 30, showed a success rate of 70%.²³ In the present study the recurrence rate among successfully treated acute appendicitis cases was 6%. In a study done by Gedam et al, the recurrence rate was 13.11% which was higher than our present study.¹⁰ According to a study by Malik, the recurrence rate was 10% which was slightly higher than our present study (Table 4).²⁴ All the recurrent cases were surgically treated in our present study. In a study by Gedam et al, all the patients with recurrence were treated surgically except for single patient who was treated conservatively as patient refused surgery.¹⁰

Limitations

The sample size was less to draw a conclusion regarding management of acute appendicitis with conservative treatment. As the study was done in a tertiary rural center, all the doubtful patients were not undergone computed tomography due to their poor economic status. The follow up period was only 6 months in the present study. Studies with higher sample size is needed to draw a conclusion in the management of the acute appendicitis cases.

CONCLUSION

The overall success rate of conservative treatment according to the present study was 82%. However, there were 12% failures and 6% recurrences in the present study. The success rate of conservative treatment in patients with MAS 4-6 is more than the patients with MAS 7-9 according to the present study. Uncomplicated acute appendicitis can be managed by conservative treatment provided they were strictly followed every month for at least 6 months period to detect recurrences.

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