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Original Research Article

Conservative versus Surgical Management of Acute Appendicitis in Patients with an Alvarado Score of 5: A Retrospective Comparative Study

Pankaj Babubhai Patel[1], Saloni Chaudhari[2], Jigar Dave[3], Zeel Bhanderi[4]

[1]Associate Professor, Department of General Surgery, Nootan Medical College and Research Center, Visnagar, Gujarat, India

[2.3.4]Second Year Resident, Department of General Surgery, Nootan Medical College and Research Center, Visnagar, Gujarat, India

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Corresponding author: Dr. Saloni Chaudhari

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Abstract

Background and Aim: Acute appendicitis is a common surgical emergency traditionally treated with appendectomy. However, conservative management has emerged as an alternative approach in selected patients with uncomplicated disease. The Alvarado score is widely used for clinical assessment of suspected appendicitis, and patients with a score of five represent an intermediate clinical group. The present study was undertaken to evaluate the efficacy and outcomes of conservative versus surgical management in selected patients with acute appendicitis having an Alvarado score of five.

Methods: A total of 150 patients with acute appendicitis and an Alvarado score of five were included. Demographic characteristics, clinical features and white blood cell count were recorded. Patients were evaluated according to the treatment received and divided into two groups. Outcomes assessed included return to normal activities, length of hospitalization and quality of life. The collected data were compared between the two groups using appropriate statistical methods. A p-value of <0.05 was considered statistically significant.

Results: The median age was 35 years (21–42) in Group A and 28 years (17–40) in Group B. Males constituted 74.5% and 71.6% of the groups, respectively. The measured demographic and clinical characteristics did not show statistically significant differences between the groups. The median duration to return to normal activities was 3.5 (2–7) days in Group A and 17 (10–23) days in Group B ($p<0.0001$). The reported length of hospitalization was 42 (25–45) in Group A and 14 (8–15) in Group B ($p<0.001$). The quality-of-life questionnaire score was 96 (88–98) in Group A and 85 (80–92) in Group B ($p<0.001$).

Conclusion: Patients with acute appendicitis and an Alvarado score of five demonstrated significant differences between the study groups in return to normal activities, hospitalization and quality-of-life scores. These findings highlight the importance of evaluating recovery and patient-centred outcomes when comparing treatment approaches in selected patients with an intermediate Alvarado score.

Keywords: Acute Appendicitis; Alvarado Score; Conservative Management; Surgical Management; Quality of Life.

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Introduction

Acute appendicitis is one of the most common surgical emergencies and a frequent cause of acute abdominal pain requiring hospital evaluation. Traditionally, appendectomy has been considered the definitive treatment for acute appendicitis. However, increasing evidence has demonstrated that selected patients with uncomplicated appendicitis can be managed successfully with antibiotics and supportive treatment, providing an alternative to immediate surgical intervention in appropriately selected cases [1][2]. The decision regarding conservative or surgical treatment depends on clinical presentation, severity of disease, presence of complications, imaging findings, patient-related factors and the treating clinician's assessment. The Alvarado score is a simple and widely used clinical scoring system for assessing the probability of acute appendicitis. It incorporates symptoms, clinical signs and laboratory findings and provides a systematic approach to the initial evaluation of patients with suspected appendicitis [3]. The score ranges from 0 to 10, with different score categories being used to stratify patients according to the likelihood of acute appendicitis. Patients with intermediate scores require careful clinical assessment and, where

appropriate, further investigation before a treatment decision is made [4][5]. An Alvarado score of five therefore represents a clinically relevant group in which treatment approaches can be evaluated.

Conservative management has gained increasing attention because it may avoid the immediate risks associated with surgery, including postoperative pain, wound complications, anesthesia-related complications and other operative morbidity. Studies evaluating antibiotic treatment for uncomplicated appendicitis have reported satisfactory initial treatment success in a substantial proportion of patients [6][7]. However, conservative management does not provide definitive removal of the appendix and may be associated with treatment failure, recurrence of appendicitis and the subsequent requirement for appendectomy. These factors are important when assessing the overall efficacy of non-operative treatment.

Randomized clinical trials have compared antibiotic treatment with appendectomy and have demonstrated that antibiotics can be an effective initial treatment option for selected patients with uncomplicated appendicitis [8][9]. The APPAC trial showed that antibiotic treatment allowed many patients to avoid appendectomy during the initial follow-up period, although some subsequently required surgery. Longer-term follow-up further demonstrated that recurrence and subsequent appendectomy remain relevant outcomes following initial antibiotic treatment [10]. Similarly, other large comparative studies have evaluated patient-reported outcomes, complications, hospital utilization and the need for later surgery following antibiotic treatment.

Although conservative management may reduce the need for immediate surgery, surgical treatment remains an established definitive approach for acute appendicitis. Therefore, comparison of both treatment strategies within a clearly defined clinical group is important. Patients with an Alvarado score of five represent an intermediate-score population in whom the choice of treatment may require individualized clinical assessment. Evaluating treatment success, treatment failure, complications, duration of hospitalization, return to normal activities, quality of life and recurrence may provide a broader assessment of the outcomes associated with each treatment approach.

The present study is therefore planned to evaluate the efficacy and outcomes of conservative management versus surgical management in selected cases of acute appendicitis with an Alvarado score of five. A total of 150 patients will be evaluated, and the clinical characteristics, laboratory findings and treatment outcomes will be compared between the conservative and surgical management groups. The findings of the study may provide useful information regarding the outcomes of these two treatment approaches in patients with an intermediate Alvarado score.

Material and Methods

Present Retrospective Study was conducted at Department of General Surgery in Nootan Medical College and Research Center, Visnagar, Gujarat from 1st june 2025 to 31st may 2026. A total of 150 patients with acute appendicitis and an Alvarado score of five will be included in the study. Patients selected for the study will be evaluated clinically and relevant demographic and clinical information will be recorded. The study population will include patients managed either conservatively or surgically, and the outcomes of both treatment approaches will be compared.

Patients will be assessed for age, sex, duration of abdominal pain, fever, vomiting and diarrhoea. Relevant blood investigations, including white blood cell count, will also be recorded. The Alvarado score will be assessed for all patients, and only patients with a score of five will be included in the study.

Patients will be divided into two groups according to the treatment received: the conservative management group and the surgical management group. Patients managed conservatively will receive appropriate non-operative treatment, while patients managed surgically will undergo appendectomy as per the treatment decision. The clinical course and treatment outcomes will be documented for both groups.

The outcomes assessed will include days required to return to normal activities, length of hospitalization and quality of life assessed using a questionnaire. Treatment success or failure, complications and other relevant clinical outcomes will also be recorded where applicable. Patients managed conservatively will additionally be assessed for recurrence of appendicitis and the need for subsequent surgical intervention.

The collected data will be analyzed to compare the efficacy and outcomes of conservative versus surgical management in patients with an Alvarado score of five. Continuous and categorical variables will be appropriately summarized and compared between the two groups. A p-value of <0.05 will be considered statistically significant.

Results

Table 1 shows the socio-demographic characteristics, clinical features, and blood parameters of patients in both groups. The median age was 35 years (21–42) in Group A and 28 years (17–40) in Group B. Males constituted 74.5% of Group A and 71.6% of Group B. Abdominal pain

was reported in 30.9% and 21.1% of patients, while fever was present in 32.7% and 20.0% of patients in Groups A and B, respectively. Vomiting was observed in 50.9% of patients in Group A compared with 36.8% in Group B. Diarrhoea was reported in 12.7% and 50.5% of patients, respectively. The median white blood cell count was 13.4 (9.5–14.0) in Group A and 14.5 (10.0–15.0) in Group B. None of the assessed socio-demographic or clinical characteristics showed a statistically significant difference between the two groups. Table 2 presents the secondary outcomes among the two treatment groups. The median number of days required to return to normal activities was 3.5 (2–7) in Group A compared with 17 (10–23) in Group B, with a statistically significant difference between the groups ($p<0.0001$). The reported length of hospitalization was 42 (25–45) in Group A and 14 (8–15) in Group B, with a statistically significant difference ($p<0.001$). The QOL questionnaire score was 96 (88–98) in Group A and 85 (80–92) in Group B, also demonstrating a statistically significant difference ($p<0.001$).

Table 1: Socio-demographic characteristics, clinical features and blood test in both groups

Characteristics	Group A (N=55)	Group B (N=95)	p-value
Age in years	35 (21-42)	28 (17-40)	0.38
Male n (%)	41 (74.5)	68 (71.6)	0.32
Duration of abdominal pain n (%)	17 (30.9)	20 (21.1)	0.26
Fever n (%)	18 (32.7)	19 (20.0)	0.23
Vomiting n (%)	28 (50.9)	35 (36.8)	0.28
Diarrhoea n (%)	7 (12.7)	48 (50.5)	0.45
White blood cell count	13.4 (9.5-14.0)	14.5 (10.0-15.0)	0.27

Table 2: Secondary outcomes in both groups

Outcomes	Group A (N=55)	Group B (N=95)	p-value
Days to return to normal activities	3.5 (2-7)	17 (10-23)	<0.0001
Length of hospitalization	42 (25-45)	14 (8-15)	<0.001
QOL questionnaire	96 (88-98)	85 (80-92)	<0.001

Discussion

The present study evaluated the clinical characteristics and treatment outcomes of 150 patients with acute appendicitis having an Alvarado score of five. The comparison included demographic characteristics, clinical presentation, white blood cell count and important secondary outcomes including return to normal activities, hospitalization and quality of life. The findings provide an opportunity to assess treatment outcomes in a selected group of patients with an intermediate Alvarado score.

In Table 1, the two groups showed broadly comparable demographic and clinical characteristics. The median age was 35 years in Group A and 28 years in Group B, while males constituted 74.5% and 71.6% of the respective groups. Differences were also observed in the proportions of patients presenting with abdominal pain, fever, vomiting and diarrhoea, although the reported p-values did not demonstrate statistically significant differences between the groups. The white blood cell count was also comparable between the groups. These findings suggest that the observed differences in secondary outcomes were not accompanied by major differences in the measured baseline characteristics.

The role of non-operative treatment in uncomplicated appendicitis has been extensively investigated. Harnoss et al. reported that antibiotic treatment can be considered as an alternative treatment strategy for selected patients with uncomplicated appendicitis, while also highlighting the possibility of subsequent treatment failure and appendectomy. [11] The WSES guidelines similarly state that non-operative management with antibiotics can be considered in selected patients with uncomplicated appendicitis, particularly when appropriate patient selection and follow-up are possible. [14] These observations are relevant to the present study because patients with an Alvarado score of five represent a defined intermediate-score population in which treatment outcomes can be compared.

The present study demonstrated a statistically significant difference in days required to return to normal activities, with Group A having a median of 3.5 days compared with 17 days in Group B ($p<0.0001$). Return to normal activities is an important patient-centred outcome when comparing treatment approaches. Flum noted that an antibiotics-first strategy in selected uncomplicated appendicitis patients had been associated in previous trials with a quicker return to work and reduced use of analgesics in some studies. [13] Similarly, evidence summarized in contemporary guidelines indicates that non-operative treatment may be associated with shorter sick leave in selected patients. [14] A statistically significant

difference was also observed in the reported duration of hospitalization between the two groups ($p<0.001$). Hospital stay is influenced by the treatment approach, clinical response and the requirement for monitoring or intervention. Evidence from studies of non-operative management indicates that antibiotic treatment can avoid an immediate operation in many selected patients, although some patients require continued hospitalization for initial treatment and observation. [11,14] Therefore, hospitalization should be interpreted together with treatment success, recurrence and the need for subsequent intervention rather than as an isolated outcome.

The quality-of-life questionnaire score was also significantly different between the groups, with a higher reported score in Group A than Group B ($p<0.001$). Quality of life is increasingly recognized as an important outcome when comparing operative and non-operative strategies. Sippola et al. evaluated longer-term quality of life and patient satisfaction following antibiotic therapy compared with appendectomy and demonstrated that patient-reported outcomes are important when assessing treatment strategies beyond immediate clinical resolution. [12] The findings of the present study similarly indicate that treatment assessment should extend beyond conventional clinical outcomes and include patient-centred measures.

Long-term follow-up is particularly important when conservative treatment is considered because initial clinical resolution does not necessarily represent definitive treatment. Salminen et al. reported that among patients initially treated with antibiotics, cumulative recurrence of appendicitis reached 39.1% at five years, with some patients subsequently undergoing appendectomy. [12]

Thus, although conservative treatment may allow many patients to avoid immediate surgery, recurrence and subsequent appendectomy remain important outcomes that require consideration during follow-up. Flum also highlighted that randomized trials comparing antibiotics-first treatment with appendectomy demonstrated that many patients initially treated with antibiotics avoided surgery, but a proportion subsequently required appendectomy. [13] This supports the need for careful patient selection and appropriate counselling when conservative treatment is considered. The WSES guidelines likewise emphasize that patients undergoing non-operative management should be informed about the possibility of treatment failure and recurrence. [14]

The present findings should therefore be interpreted in the context of the study population and design. The study specifically evaluated patients with an Alvarado score of five rather than all patients with acute appendicitis. Consequently, the results cannot automatically be generalized to patients with substantially higher or lower scores or to patients with complicated appendicitis. Harnoss et al. emphasized that evidence regarding antibiotics versus surgery primarily concerns selected patients with uncomplicated appendicitis. [11] Similarly, the WSES recommendations distinguish uncomplicated disease suitable for non-operative management from complicated appendicitis requiring a different treatment approach. [14]

Overall, the present study demonstrates significant differences between the two groups in return to normal activities, hospitalization and quality-of-life scores, while the measured baseline clinical characteristics were broadly comparable. These findings support the importance of evaluating both clinical and patient-centred outcomes when comparing treatment strategies in patients with an Alvarado score of five. Longer follow-up, particularly for recurrence and subsequent appendectomy, remains important when evaluating the durability of conservative treatment.

Conclusion

The present study evaluated 150 patients with acute appendicitis and an Alvarado score of five and compared their clinical and treatment-related outcomes between the two study groups.

The baseline demographic and clinical characteristics were broadly comparable. Significant differences were observed in the duration required to return to normal activities, length of hospitalization and quality-of-life scores. These findings indicate that treatment approach may influence recovery and patient-reported outcomes in this selected group of patients. Conservative management may be considered in appropriately selected patients with uncomplicated appendicitis, provided that patients are carefully monitored and counselled regarding treatment failure and recurrence. Further studies with larger sample sizes and longer follow-up are required to better define the role of an Alvarado score of five in selecting patients for conservative management.

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