



Original Article

A Prospective Observational Study to Evaluate Diagnostic Efficacy of Fenyo Linberg Scoring System in Patients of Acute Appendicitis in Tertiary Care Centre

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 OPEN ACCESS

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Received: 20-05-2026

Accepted: 10-06-2026

Available online: 25-06-2026

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Medical and Pharmaceutical Research

ABSTRACT

Background: Acute appendicitis is one of the most common surgical emergencies and continues to pose diagnostic challenges because of its variable clinical presentation. The Fenyo-Lindberg Scoring System integrates clinical and laboratory parameters and may improve diagnostic accuracy in patients with suspected acute appendicitis.

Objective: To evaluate the diagnostic efficacy of the Fenyo-Lindberg Scoring System in patients with acute appendicitis attending a tertiary care centre.

Materials and Methods: This prospective observational study was conducted in the Department of General Surgery, JLN Medical College and Associated Group of Hospitals, Ajmer, from June 2024 to December 2025. A total of 100 patients aged 12–65 years with suspected acute appendicitis were included. Detailed history, clinical examination, laboratory investigations, and ultrasonography were performed. Fenyo-Lindberg scores were calculated for all patients. Patients underwent open or laparoscopic appendectomy, and operative findings were recorded and analyzed.

Results: The majority of patients belonged to the 21–40 years age group (58%), with a mean age of 31.08 ± 12.14 years. Males constituted 58% of the study population. Aggravation of pain with cough, vomiting, and rebound tenderness were observed in 65%, 64%, and 42% of patients, respectively. Fenyo-Lindberg scores ≥ -2 were observed in 51% of patients, while 49% had scores < -2 . Most patients in both score categories belonged to the 21–40 years age group, indicating that acute appendicitis predominantly affects young adults.

Conclusion: Acute appendicitis was more common in young adult males. The Fenyo-Lindberg Scoring System was found to be a simple, practical, and useful adjunct in the evaluation of suspected acute appendicitis. It can aid clinical decision-making and serve as a cost-effective tool alongside routine clinical and radiological assessment in tertiary care settings.

Keywords: Acute appendicitis, Fenyo-Lindberg score, appendectomy, diagnostic efficacy, clinical scoring system.

INTRODUCTION

Appendicitis is the most common intra-abdominal condition requiring emergency surgery, with a lifetime risk of 6%. Appendectomy continues to be one of the commonest procedures in general surgery, accounts for approximately 1% of all surgical operation¹. The year 1986 was the 250th anniversary of the first successful removal of appendix (appendectomy) and the 100th anniversary of the word of appendicitis being used in the surgical literature. It was the Reginald Fitz who presented a first paper on vermiform appendix in 1886 and McBurney described the clinical manifestations of acute appendicitis. Appendicitis is more common in teens and equal in both sexes. In United States of America incidence of

appendicitis is 250000 per year, with 70-80% occurring in patients less than 30 years of age. The overall mortality is less than 1% but more in cases of perforations and in elderly cases. The importance of specific elements in clinical diagnosis of appendicitis is controversial and appendicitis continues to present challenges for surgeons even today². The clinical diagnosis of appendicitis is controversial, and appendicitis continues to present challenges for surgeons even today³. Appendicitis is a common surgical emergency and appendectomy is a common abdominal surgical procedure done for appendicitis⁴. These advantages include reduced operative time, lower operative morbidity, early discharge from hospital, reduced postoperative pain and associated sympathetic over activity⁵.

Acute appendicitis is an acute inflammatory condition of appendix. Failure in early diagnosis of disease can result in progression and increased severity of disease. It is a very common surgical emergency seen in clinical practice⁶.

The Fenyo-Lindberg Scoring System, an amalgamation of clinical, laboratory, and imaging parameters, emerges as a promising tool for enhancing diagnostic precision in cases of acute appendicitis. Despite theoretical advantages, the diagnostic efficacy of the Fenyo-Lindberg Scoring System in diverse patient populations over an extended period remains a subject warranting comprehensive investigation⁷.

The diagnosis of acute appendicitis has evolved from purely clinical judgment to a more structured approach using scoring systems, laboratory support and imaging. The Alvarado score laid the foundation for clinical risk scoring, while Fenyö and later Fenyö-Lindberg introduced a more refined model that included demographic and broader clinical parameters. Newer scores such as AIR, RIPASA and AAS have also shown promising results, yet no scoring system has completely replaced the need for careful clinical judgment and local validation.

The study's rationale lies in its embrace of a diverse patient population, considering variables such as age, gender, and comorbidities, to ensure a comprehensive assessment of the Fenyo-Lindberg Scoring System's diagnostic capability. The longitudinal nature of the investigation allows for an exploration of seasonal variations and trends in acute appendicitis presentations, contributing to a nuanced understanding of the system's performance over time.

OBJECTIVES: To evaluate Diagnostic Efficacy of Fenyo Linberg Scoring System in Patients of Acute Appendicitis.

MATERIALS AND METHODS

This prospective observational study was conducted in the Department of Surgery, JLN Medical College and Associated Group of Hospitals, Ajmer, from June 2024 to December 2025. A total of 100 patients aged 12–65 years, of either sex, presenting with right lower quadrant pain and diagnosed with acute appendicitis were included. All patients underwent open or laparoscopic appendectomy.

Patients younger than 12 years, pregnant women, those unfit or unwilling for surgery, and patients with appendicular perforation, peritonitis, appendicular abscess, appendicular mass, or those who did not provide consent were excluded from the study. Clinical assessment was done using the Alvarado score along with blood investigations and ultrasonography of the abdomen.

Patients diagnosed with acute appendicitis and fulfilling the inclusion criteria underwent either open or laparoscopic appendectomy. In open appendectomy, the inflamed appendix was removed through a McBurney incision, whereas laparoscopic appendectomy was performed using a standard three-port technique with endloop or clip ligation of the appendiceal base. Operative findings and histopathological examination were recorded and analyzed.

TABLE 1 : AGE AND SEX

	No. of patients	Percent	P Value
Age Range (years)			0.0001 (S)
< 20	19	19	
21-40	58	58	
41-60	20	20	
61-80	3	3	
Sex			0.109 (NS)
Male	58	58	
Female	42	42	

TABLE 2 : SYMPTOMS

	No. of patients	Percent
Aggravation of pain with cough		
Yes	65	65
No	35	35

Rebound tenderness		
Present	42	42
Absent	58	58
Vomiting		
Yes	64	64
No	36	36

TABLE 3 : FENYO - LINBERG SCORE

Fenyo - Linberg Score	No. of patients	Percent	P Value
≥ -2	51	51	0.841 (NS)
< -2	49	49	

TABLE 4 : FENYO - LINBERG SCORE v/s Age

Fenyo - Linberg Score V/s Age Range	< 20		21-40		41-60		61-80	
	No. of patients	Percent	No. of patients	Percent	No. of patients	Percent	No. of patients	Percent
≥ -2	8	15.69	30	58.82	13	25.49	0	0.00
< -2	11	22.45	28	57.14	7	14.29	3	6.12

DISCUSSION

The mean age of patients in the present study was 31.08 ± 12.14 years, which was comparable to the findings of Kaleem A et al. (2025)⁸ (31.17 ± 12.82 years) and Bostanci MT et al. (2022)⁹ (31 ± 19.88 years). Slightly lower mean ages were reported by Verma N et al. (2025)¹⁰ (28.7 ± 12 years) and Uttej A et al. (2024)¹¹ (27.53 years). These findings indicate that acute appendicitis predominantly affects young adults, particularly in the third and fourth decades of life. In the present study, 58% of patients were males and 42% were females, demonstrating a male predominance. Similar findings were reported by Verma N et al. (2025)¹⁰ who observed 56% males and 44% females. Kaleem A et al. (2025)⁸ reported a slightly higher male predominance, with 68.5% males and 31.5% females. The overall similarity in age and gender distribution across these studies supports the established epidemiological pattern that acute appendicitis is more common in young adult males. (Table 1)

In the present study, aggravation of pain with cough was observed in 65% of patients, rebound tenderness in 42%, and vomiting in 64%. These findings are comparable to those reported by Verma N et al. (2025)¹⁰ who observed cough-induced pain in 68%, rebound tenderness in 45% and vomiting in 62% of patients. Similarly, Kaleem A et al. (2025)⁸ reported rebound tenderness in 48% and vomiting in 66%, while Uttej A et al. (2024)¹¹ documented rebound tenderness in 40% and vomiting in 60% of cases. The similarity of these findings highlights the importance of these clinical features in the diagnosis of acute appendicitis and their contribution to the Fenyo-Lindberg scoring system. (Table 2)

In the present study, 51% of patients had a Fenyo-Lindberg score ≥ -2 and 49% had a score < -2 , with the difference being statistically non-significant ($p = 0.841$). This suggests that patients were almost equally distributed between the high- and low-probability groups for acute appendicitis. Similar findings have been reported by Fenyo and Lindberg, who demonstrated that higher scores were associated with an increased likelihood of acute appendicitis. Verma N et al. (2025)¹⁰, Kaleem A et al. (2025)⁸ and Uttej A et al. (2024)¹¹ also observed that patients with scores above the diagnostic cut-off were more likely to have confirmed appendicitis. The present findings support the usefulness of the Fenyo-Lindberg scoring system as an adjunctive tool in the diagnosis of acute appendicitis when used along with clinical and radiological assessment. (Table 3)

In the present study, the majority of patients in both Fenyo-Lindberg score ≥ -2 (58.82%) and score < -2 (57.14%) groups belonged to the 21–40 years age group, followed by the 41–60 years age group. These findings indicate that acute appendicitis predominantly affects young adults. Similar observations were reported by Fenyo et al. (1997)¹², Enochsson et al. (2004)¹³, Sahu and Bellad (2020)¹⁴ and Uttej et al. (2024)¹¹, who found that most patients with suspected or confirmed acute appendicitis were in the second to fourth decades of life. The present study is therefore consistent with the literature, demonstrating that the Fenyo-Lindberg scoring system is most commonly applied in young adult patients presenting with acute appendicitis. (Table 4)

CONCLUSION

The present study showed that acute appendicitis was more common in young adults, particularly in the 21–40 years age group, with a male predominance. Aggravation of pain with cough, rebound tenderness, and vomiting were among the most frequent clinical features observed in patients with suspected acute appendicitis.

The Fenyo-Lindberg scoring system was found to be a useful and practical clinical tool in the evaluation of acute appendicitis. Its application facilitated structured assessment of patients and aided in identifying those with a higher

probability of appendicitis. Therefore, the Fenyo-Lindberg scoring system can be used as a simple, inexpensive, and effective adjunct to clinical examination in the diagnosis and management of patients with suspected acute appendicitis in a tertiary care setting.

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