

APPLICATION OF APPENDICITIS INFLAMMATORY RESPONSE (AIR) SCORING SYSTEM FOR DIAGNOSIS OF ACUTE APPENDICITIS AND ITS COMPARISON WITH ALVARADO SCORE

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Abstract

Background: The appendicitis inflammatory response (AIR) score is recently developed diagnostic tool that uses seven scored variables to stratify patients into low-, intermediate and high risk group.

Methods: The present study was conducted in the department of surgery. 100 patients presenting with pain in the right lower quadrant of abdomen, who after clinical examination were provisionally diagnosed to have acute appendicitis and warranted surgery for the same.

Results: AIR (98.00%) were more sensitive than Modified alverdo score (90.00%). Specificity (100%) and positive predict value (100%) were same in MAS & AIR.

Conclusion: To conclude, AIR scoring performed well almost equally with Alvarado system with high specificity and high negative predictive value preventing unnecessary negative appendectomies.

Keywords: AIR, MAS, Acute appendicitis

Introduction

Acute appendicitis is the most common surgically correctable cause of abdominal pain, the diagnosis of which remains difficult in many instances. Some of the signs and symptoms can be subtle to both the clinician and the patient and may not be present in all instances. Arriving at the correct diagnosis is essential, however, a delay may allow progression to perforation and significantly increased morbidity and mortality. Incorrectly diagnosing a patient with appendicitis although not catastrophic often subjects the patient to an unnecessary operation¹

The appendicitis inflammatory response (AIR) score is recently developed diagnostic tool that uses seven scored variables to stratify patients into low-, intermediate and high risk group. Low risk group could be discharged unless any indication of appendicectomy warranted. Whereas high risk patients are likely to require reevaluation with focus on timely surgical intervention along with diagnostic imaging. Intermediate risk classification identifies patients likely to benefit from observation and systematic diagnostic imaging.²

The AIR score has been validated and found to outperform older Alvarado score. This may be because the AIR score relies less on subjective symptoms such as anorexia or nausea, includes C-reactive protein and employs graded parameters, compared with the dichotomized variables in the Alvarado score. This prospective observational study in a prospective cohort aimed to assess the discriminatory performance of the AIR score and evaluate whether it could

safely guide decision making to reduce emergency admissions, optimize diagnostic imaging and prevent negative surgical explorations.³

Material & Methods

Study Setting: The present study was conducted in the department of surgery. The population consists of 100 patients presenting with pain in the right lower quadrant of abdomen, who after clinical examination were provisionally diagnosed to have acute appendicitis and warranted surgery for the same.

Study Population: All patients above 12 year of age with suspected acute appendicitis.

Inclusion criteria: All patients above 12 year with suspected acute appendicitis that consented to be included in the study.

Exclusion criteria

1. Patients with generalized peritonitis
2. Patients with previous abdominal surgery
3. Patients with blunt and penetrating abdominal trauma
4. Patients with declined to give consent
5. Patients < 12 year at age
6. Pregnant female

Study design: prospective observation study.

Results

In present study mean age of patients Was 26.32 ± 7.65 Yrs. Male patients (76.00%) contributed to larger proportion of our study population as compared to females (24%).

Table 1: Distribution of cases according to Modified Alvarado Scoring

Modified Alvarado Scoring(MAS)	No.	Percentage
1-4	4	4.00%
5-6	22	22.00%
7-9	74	74.00%

In present study, out of total 100 patients 74.00% were have MAS score 7-9, 22.00% were have 5-6 and 4.00% have MAS score 1-4.

Table 2: Distribution of cases according to appendicitis inflammatory response (AIR) score

Appendicitis inflammatory response (AIR) score	No.	Percentage
1 to 4	3	3.00%
5 to 8	7	7.00%
>8	90	90.00%

In present study, out of total 100 patients 90.00% were have AIR score score more than 8, 7.00% were have 5 to 8 and 3.00% were have AIR score 1-4.

Table 3: Distribution of cases according to histopathological finding (HPE)

HPE finding	No.	Percentage
Positive	92	92.00%
Negative	8	8.00%

In present study, out of total 100 patients 92.00% were have positive HPE finding and 8.00% were have negative HPE finding.

Table 4: Comparison of diagnostic variables of MAS and AIR

	MAS	AIR
Sensitivity	90.00%	98.00%
Specificity	100%	100%
Positive predict value	100%	100%
Negative predict value	44.44%	88.89%

AIR (98.00%) were more sensitive than Modified alverdo score (90.00%). Specificity (100%) and positive predict value (100%) were same in MAS & AIR.

Discussion

Acute appendicitis is a common surgical emergency with an incidence of 1.17/1000 population and a lifetime risk of 8.6% in men and 6.7% in women, with highest incidence in adolescent age.⁴ Most of the conditions which mimic appendicitis may create confusion in accurate diagnosis and management. Hence most of the surgeons rely on imaging studies which provides valuable information regarding the diagnosis. But as mentioned in many studies, tomographic studies are associated with increased radiation hazard and increased cost in low income countries. Hence false diagnosis and delay in diagnosis may result in unnecessary appendectomies and increased complications and morbidity.⁵

Most of the cases of diagnosis in acute appendicitis relies upon surgeon's knowledge and experience with similar cases. Hence the drawbacks could be overcome by using a clinical scoring system which can help in diagnosis as well as prognosis of the current patient from those presenting with similar clinical scenario. In developing countries and low-income countries, a simple and effective scoring system without tomographic or imaging studies could help in preventing misdiagnosis and decrease the rate of negative appendectomies.

The present study was conducted to compare the AIR score with Alvarado scoring system in cases suspected with acute appendicitis. Another advantage in AIR scoring is not only in accurate diagnosis but also in discriminating objectively the necessity to operate or not to operate with a follow up. In our study there was a good statistical correlation of AIR score in cases of acute appendicitis when compared to Alvarado scoring system. The same was validated in many studies prior by Sudhir et al and Kim BS et al in their studies.^{6,7} Few of the studies which used Alvarado scoring system did not include C reactive protein in the study group and found no difference in the rates of perforated appendix, negative appendectomies and complications between the groups. They also found a delayed appendectomy rate (2 vs 8%) and a lower delayed discharge rate (11 vs 22%) in the group.⁸

In the present study, Sensitivity of AIR scoring system was 98.00%. Findings of our study were similar with findings of Castro et al.⁹

Present study clearly validates that AIR scoring system performs well than Alvarado scores. This would clearly help in selecting patients who require surgical intervention and follow up in cases of low score individuals. This also helps the cases to avoid hospitalization and to prevent costly investigations in which the diagnosis is unlikely. Hence a prospective randomized control trial should be done on large scale population to evaluate the effect of AIR scoring system and to compare the results.¹⁰

Conclusion

To conclude, AIR scoring performed well almost equally with Alvarado system with high specificity and high negative predictive value preventing unnecessary negative appendectomies.

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