

ORIGINAL RESEARCH

A comparative study between modified Alvarado score and Tzanakis score in diagnosing acute appendicitis

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ABSTRACT

Difficulties in diagnosis especially arise in very young, elderly patients and females of reproductive age because they are more likely to have an atypical presentation, and many other conditions may mimic acute appendicitis in these patients. Many surgeons advocate early surgical intervention for the treatment of acute appendicitis to avoid perforation accepting a negative appendectomy rate of about 15- 20%. Removing normal appendix is an economic burden on both patients and health resources. Misdiagnosis and delay in surgery can lead to complications like perforation and finally peritonitis. Patients were either subjected to emergency laparotomy at the time of admission or after few hours of conservative management. Emergency appendicectomy was done by open method under spinal or general anesthesia in all cases. Final diagnosis to be confirmed by Histopathological Examination of the specimen by the pathologist. Data was analyzed to compare the efficacy of both scoring systems in diagnosing Acute appendicitis. The sensitivity & specificity of Modified Alvarado Score was 95.81% & 94.11% with a positive predictive value of 98.75% & negative predictive value of 80%. The positive likelihood ratio was 16.18 and negative likelihood ratio was 0.05. The sensitivity and specificity of Tzanakis score was 97.59% and 94.11% respectively with a positive predictive value of 98.78% and negative predictive value of 88.88%. The positive likelihood ratio was 16.59 and negative likelihood ratio was 0.03.

Key words: Modified Alvarado Score, Tzanakis Score, Acute Appendicitis

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INTRODUCTION

Acute appendicitis is one of the most common cause of Abdominal surgical emergencies with lifetime prevalence of approximately 1 in 7 worldwide. It is associated with high morbidity and occasional mortality related to failure of making an early diagnosis.¹

Acute appendicitis is still a clinical diagnosis. Abdominal pain being the most common symptom. In the classic presentation, the patient describes the pain as beginning in the periumbilical or epigastric region and then migrating to right iliac fossa. This is associated with fever, anorexia, nausea, and vomiting.²

The clinical presentation of acute appendicitis varies widely owing to variable degree of involvement by inflammatory process, different positions of appendix and varying age of the patient. The inconsistent clinical presentation often leads to misdiagnoses of

acute appendicitis in 1 out of 5 cases and negative appendicectomy rates in the range of 15 - 40%. Adding to this the "classic" symptomatology only occurs in 50-60% of cases making the diagnosis difficult.³

Difficulties in diagnosis especially arise in very young, elderly patients and females of reproductive age because they are more likely to have an atypical presentation, and many other conditions may mimic acute appendicitis in these patients.⁴

Many surgeons advocate early surgical intervention for the treatment of acute appendicitis to avoid perforation, accepting a negative appendectomy rate of about 15- 20%.

Removing normal appendix is an economic burden on both patients and health resources. Misdiagnosis and delay in surgery can lead to complications like perforation and finally peritonitis.⁵

Many scoring systems for the diagnosis of acute appendicitis have been tried. The Modified Alvarado Score is a easy, simple and cheap diagnostic tool for supporting the diagnosis of acute appendicitis. Tzanakis score is another scoring is a combination of clinical evaluation, inflammatory markers and ultrasound. Our study compares the efficacy of Modified Alvarado Score and Tzanakis Score in diagnosing acute appendicitis.⁶

METHODOLOGY

100 patients between the age of 12 to 75 who presented to the General Surgery with clinical diagnosis of acute appendicitis and underwent emergency open appendicectomy were included in the study

INCLUSION CRITERIA

- Patients aged more than 12 of both genders
- Patients with suspected acute appendicitis based on history and cl inical examination

EXCLUSION CRITERIA

- Patients with age less than 12 and more than 75.
- Patient with alternate diagnosis during surgery with or without inflamed appendix
- Those with appendicular abscess, appendicular mass, generalized peritonitis

This prospective non randomized study includes 100 patients admitted in the Department of General Surgery with clinical suspicion of acute appendicitis and underwent open appendicectomy

- After approval by local bioethics committees, informed consent was obtained
- All cases had undergone thorough history and detailed cl inical examination at the time of admission as part of routine management.

- Total and differential leucocyte count was measured using a autoanalyser
- As USG is technician dependent, only those patient who underwent abdominal USG by Consultant Radiologist were included in the study to exclude observer bias. He is blinded to the results of physical examination and blood report of the patients.
- Well established ultrasonographic criteria were applied to discriminate an acutely inflamed appendix from a normal one. Those with radiologist's opinion of findings suggestive of acute appendicitis, based on these criteria were taken as USG positive
- Both Modified Alvarado Score and Zanakis score are done for all the patients at the time of admission and prior to surgery
- Even the patients with scores below the cutoff values were subjected to surgery based on clinical assessment and judgment.
- Patients were either subjected to emergency laparotomy at the time of admission or after few hours of conservative management. Emergency appendicectomy was done by open method under spinal or general anesthesia in all cases
- Final diagnosis to be confirmed by Histopathological Examination of the specimen by the pathologist.
- Data was analyzed to compare the efficacy of both scoring systems in diagnosing Acuteappendicitis
- The observations were analyzed using descriptive statistical methods and scores compared applying ""Z"test and computing confidence interval and p value.

RESULTS

Table 1: Alvarado score post op correlation with hpe report

	Hpreport		Total
	N	AA	
More than 7	1	79	80
Less than 7 Total	16	4	20
	17	83	100

Table 2: Tzanakis score-postop correlation with HPE report

	Hpreport		Total
	N	AA	
More than 8	1	81	82
Less than 8	16	2	18
	17	83	100

Table 3: Comparison between alvarado and tzanakis scoring systems

	Alvarado >7	Tzanakis >8	p-value
Sensitivity	95. 18% (87.45- 98.44)	97.59% (90.75-99.58)	<0.001
Specificity	94.11%(69.23-99.62)	94.11% (69.23-99.69)	

Positive predictive value	98.75%(92.27 -99.93)	98.78% (92.45 -99.93)	
Negative predictive value	80.00%(55.73-93.38)	88.88% (63.92-98.05)	<0.001
Diagnostic accuracy	95%(88.72-98.36)	97(91.48-99.38)	

- The sensitivity & specificity of Modified Alvarado Score was 95.81% & 94.11% with a positive predictive value of 98.75% & negative predictive value of 80%. The positive likelihood ratio was 16.18 and negative likelihood ratio was 0.05.
- The sensitivity and specificity of Tzanakis score was 97.59% and 94.11% respectively with a positive predictive value of 98.78% and negative predictive value of 88.88%. The positive likelihood ratio was 16.59 and negative likelihood ratio was 0.03
- The diagnostic accuracy of Alvarado score was 95% and that of Tzanakis score was 97%.
- Thus our study shows that Tzanakis scoring has improved sensitivity and Diagnostic accuracy, though specificity remains the same

DISCUSSION

- Despite the advances in the diagnostic field, the diagnosis of acute appendicitis remains an enigma for the attendant surgeon. Many investigative modalities like CT and MRI are not easily available at many centres and are costly. With this background, many eminent surgeons and physicians have been adopting different scoring systems in order to decrease negative appendectomy rates.
- Many diagnostic scores have been advocated, but most are complex and difficult to implement in a clinical situation.
- Tzanakis *et al* have reported that its scoring system had sensitivity and specificity of 95.4% and 97.4% respectively. This is comparable to our study with sensitivity and specificity of 97.59 & 94.11 respectively.⁷
- Sigdel GS *et al* reported sensitivity and specificity of 91.48% and 66.66% respectively. They maintained that low specificity was due to low sensitivity rate of USG (63.82%) due to individual bias. Ultrasound examination is operator dependent and has variable levels of sensitivity and specificity (75-90% and 86-100%).⁸
- Sigdel GS *et al* also observed positive and negative predictive values of 97.27% and 33.33% respectively while the same were 98.78% & 88.88% respectively in our study. The high negative predictive value is again due to the reduction of observer bias of radiology in our study.⁸
- Harsha BK *et al* reported a sensitivity of 98.8% and a specificity of 93.3% for Modified Alvarado score.¹⁹ They further reported PPV of

89.3% and NPV of 83.3% while the same were found to be 98.75% and 80% respectively. The higher PPV in our study is due to larger sample size as against 45 in the study done by Harsha BK *et al*. Sensitivity (95%) of Modified Alvarado score in our study is little lower than that reported by Harsha BK *et al* but the difference is not significant.^{9,10}

CONCLUSION

Acute appendicitis is a common surgical emergency. Good clinical judgment aided by investigation scoring system can help to reduce the negative appendectomy rate.

Ultrasound scan has now become easily available, even in developing countries and it can immensely aid the surgeon in diagnosis.

This study shows that Tzanakis scoring system can be used as an effective modality in the establishment of accuracy in diagnosis of acute appendicitis. There is increased sensitivity and diagnostic accuracy in Tzanakis scoring when compared to modified Alvarado score

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