Original article

Tzanaki's Score Vs Modified Alvarado's Score In Diagnosing Acute Appendicitis: A Comparative Study In A Tertiary Care Hospital

Ashok Kumar Rajpura, Dharmendra Choudhary, Bhagchand Khorwal, Shyam Bhutra, Dinesh Kumar Yadav, Kamal Bansal

Abstract

Introduction: Acute appendicitis is commonly diagnosed when a patient presents with pain in right iliac fossa. Various Scoring systems are used to diagnose acute appendicitis and mainly include the presenting signs and symptoms, but are not acceptable for patients. The purpose of this study was to assess effectiveness of modified Alvarado score and Tzanaki's Score in the diagnosis of acute appendicitis.

Methods: A prospective observational study was done in department of General Surgery JLN Medical College Hospital, Ajmer which incorporated 200 patients presenting with the signs and symptoms of acute appendicitis. Patients were evaluated by Modified Alvarado score and Tzanaki's Score during admission and based on the treating surgeon's decision, were operated. Finally, the score was compared with the diagnosis done by histopathological examination of the operated specimen.

Results: The sensitivity & specificity of Modified Alvarado Score was 84.26% & 72.7% respectively with a positive predictive value of 96.15% & negative predictive value of 36.3%. The sensitivity and specificity of Tzanaki's score was 88.2% and 72.7% respectively with a positive predictive value of 96.31% and negative predictive value of 43.24%. The diagnostic accuracy of Alvarado score was 83% and that of Tzanaki's score was 86.5%.

Conclusion: Tzanaki's scoring system can be used as an effective modality in the diagnosis of acute appendicitis. There is increased sensitivity and diagnostic accuracy in Tzanaki's scoring when compared to modified Alvarado score.

Keywords: Appendicitis; Alvarado score; Tzanaki score.

Author affiliations:

Department of General Surgery,
JLN Medical College, Ajmer, Rajasthan, India

Correspondence:

Dr. Ashok Kumar Rajpura
Department of General Surgery
JLN Medical College, Ajmer, Rajasthan, India PIN 305001

Email: drashokrajpura@gmail.com

Disclosures:

Ethical Clearance: Taken

Conflict of interest: None

Financial aid: None

How to cite this article:

Rajpura AK, Choudhary D, Khorwal B, Bhutra S, Yadav DK, Bansal K. Tzanaki's score vs modified Alvarado's score in diagnosing acute appendicitis: a comparative study in a tertiary care hospital. J Sosc Surg Nep. 2023;26(2):70-73.

DOI:
https://doi.org/10.3126/jssn.v26i2.63627

Introduction

Acute appendicitis is one of the most common causes of abdominal surgical emergencies worldwide with lifetime prevalence of approximately 1 in 7 worldwide.[1] Acute appendicitis is still a clinical diagnosis, abdominal pain being the most common symptom. In the classic presentation, the patient describes the pain beginning in the periumbilical or epigastric region and then migrating to right iliac fossa. This is associated with fever, anorexia, nausea, and vomiting. Due to the heterogenous presentation of acute appendicitis sometimes it becomes difficult to diagnosis and there are various other diseases which have similar presentation. Early diagnosis of acute appendicitis is very important to limit its progression to become complicated. Failure to make an early diagnosis is a primary reason for increase rate of morbidity and mortality.[2]

Sometime it is very difficult to diagnosis acute appendicitis, especially in very young, elderly patients and females of reproductive age because they are more likely to have an atypical presentation, and many other conditions that may mimic acute appendicitis in these patients. Due to many complications and the mortality associated with the complications, acute appendicitis is more often managed surgically than adapting a conservative management. The mortality associated with complications of acute appendicitis has been found to be between 0.2 and 0.8 %. The mortality rates can go up to 20% due to delay in diagnosing the condition and the treatment.[3]

Many surgeons advocate early surgical intervention for the treatment of acute appendicitis to avoid complications.[4] Literature has stated that clinical examination to be helpful in only 70-87% of the cases in making a diagnosis of acute appendicitis.[5,6] Negative appendectomy rates were reported between 15% and 34% with approximately 15% being commonly accepted as appropriate to reduce the incidence of complications.[7,8]

Many clinical scores were created over the decades for helping in the early diagnosis of acute appendicitis. A dependable scoring system should have high sensitivity, specificity and diagnostic accuracy and must be able to be applied over varied populations and must reproduce similar results in all situations. The scoring system by Alvarado was first elucidated in 1986 and is endorsed in adult surgical practice by various studies. By using Alvarado scoring systems, the rate of unnecessary appendicectomies can be reduced up to 5-10%.[4] Alvarado score with a sensitivity and specificity ranges from 73-90% and 87-92% respectively, has been widely used in the diagnosis of acute appendicitis over the last three decades.[9-11] A score equal to or greater than 7 is considered diagnostic of Acute appendicitis indicating surgery.[12]

Tzanaki's score is a combination of clinical evaluation, ultrasonography and white cell counts. There are four variables with 15 points and a score of more than eight is diagnostic of Acute appendicitis requiring surgery. The sensitivity and specificity are 95.4% and 97.4% respectively.[13]

Table 1. Modified Alvarado Score.

Symptoms	Score
Migratory right iliac fossa pain	1
Nausea/Vomiting	1
Anorexia	1
Signs	
Tenderness in right iliac fossa	2
Rebound tenderness in right iliac fossa	1
Elevated temperature	1
Laboratory findings	
Leukocytosis	2
Total	9

Interpretation: Total score – 10, 1-4: Appendicitis least likely, 5-7: Appendicitis likely (Observation), 8-9: Appendicitis (Surgery)

Table 2. Tzanaki's Scoring System.

Feature	Score
Right lower abdominal tenderness	4
Right lower abdominal rebound tenderness	3
Total Leukocyte count > 12000/dl	2
Ultrasonography suggestive of Acute Appendicitis	6
Total	15

Interpretation: Total score– 15, Score > 8 is diagnostic of acute appendicitis requiring surgery.

The aim of this study was to compare the sensitivity, specificity and diagnostic accuracy of Tzanaki's and Modified Alvarado scoring system in the diagnosis of Acute Appendicitis.

Methods

This prospective non randomized study includes 200 patients admitted in the Department of General Surgery, JLN Hospital during the period of JAN 2020 to DEC 2021 with clinical suspicion of acute appendicitis and underwent appendicectomy.

Inclusion criteria

1. Patients with clinical suspicion of acute appendicitis undergoing appendicectomy whether open or laparoscopic.
2. All male and female patients above 12 years of age up to 75 years.

Exclusion criteria

1. Children < 12 years.
2. Elderly patient's >75years.
3. Patients with other diagnosis during surgery with or without inflamed appendix.
4. Patients with appendicular mass, appendicular abscess, generalized peritonitis etc.

Sonographic Criteria's for Acute Appendicitis

1. Noncompressible appendix of size > 6 mm AP diameter.
2. Hyperechoic thickened appendix wall > 2 mm target sign.
3. Prescence of Appendicolith.
4. Interruption of submucosal continuity.
5. Peri appendicular fluid.

Statistical analysis

The study was done after approval of the Institutional Ethics Committee of the College . A total number of 200 participants were randomly selected with clinical suspicion of acute appendicitis with the age group of 12-75 years. Data was collected in the span of 2 years. They all were provided with a set of questionnaires to answer. The patients were explained about the details of the study and procedure in the language understandable by them. A written consent was obtained from these subjects who satisfies all the inclusion and exclusion criteria.

All data was collected in Microsoft-Excel sheet and was analysed with statistical software package SPSS version 26. Mean standard deviation and percentage was estimated.

Results

Table 3. Age Distribution

Age group	No of patients
11-20	73
21-30	67
31-40	38
41-50	14
51-60	4
61-70	4

Table 4. Modified Alvarado score and post operative correlation with HPE report

Modified Alvardo Score	HPE Report		Total
	AA	Normal	
>7	150	6	156
< 7	28	16	44
Total	178	22	200

AA – Acute appendicitis

Table 5. Tzanaki's score and post operative correlation with HPE report

Tzanaki's Score	HPE Report		Total
	AA	Normal	
>8	157	6	163
<8	21	16	37
Total	178	22	200

AA – Acute appendicitis

Table 6. Comparision- of modified Alvarado score and Tzanaki's score

	Alvarado >7	Tzanaki's >8
Sensitivity	84.26%	88.2%
Specificity	72.7%	72.7%
Positive predictive Value	96.15%	96.31%
Negative predictive Value	36.3%	43.24%
Diagnostic accuracy	83%	86.5%

Discussion

Study was done on 200 patients between age group 12 to 75 years of age who had undergone emergency appendicectomy.

The age group in which acute appendicitis occurred commonly was between 18 and 30 years. It is clear that incidence is less in younger and older age groups with peak incidence in 2nd and 3rd decade (**Table 3**).

There was slight male preponderance with 124 patients being males and 76 patients being females (Male: Female: 3:2). The mean age of patients was 26.45 years with a standard deviation of 11.09 years. Most common position of appendix intraoperatively was retrocecal. Eighty-nine percent of patients had histologically proven appendicitis. The sensitivity & specificity of Modified Alvarado Score was 84.26% & 72.7% respectively with a positive predictive value of 96.15% & negative predictive value of 36.3% (**Table 4**).

The sensitivity and specificity of Tzanaki's score was 88.2% and 72.7% respectively with a positive predictive value of 96.31% and negative predictive value of 43.24% (**Table 5**). The diagnostic accuracy of Alvarado score was 83% and that of Tzanaki's score was 86.5% (**Table 6**). Our study shows that Tzanaki's scoring has more sensitive and diagnostic accuracy is more than modified Alvarado score.

Malla et al[14] reported the sensitivity, specificity, positive predictive value and negative predictive value of Tzanaki's score as 86.9%, 75.0%, 97.5% and 33.3% respectively. In our study sensitivity, specificity, positive predictive value and negative predictive value of Tzanaki's score was 88.2%, 72.7% ,96.31% and 43.24% respectively which is comparable. Malik et al[15] reported the sensitivity, specificity, positive predictive value, negative predictive value of Tzanaki's score were 98.32%, 96.29%, 99%, and 92.85% respectively. Similarly Shashikala et al[16] reported the sensitivity, specificity, positive predictive value and negative predictive value of Tzanaki's score was 79.62%,83.3%,97.72% and 31.25% respectively. Our study results are comparable to these studies.

A negative appendectomy rate of 20-40% has been reported in the literature and many surgeons advocate early surgical intervention for the treatment of acute appendicitis to avoid

perforation, accepting a negative appendectomy rate of about 15-20%.[13] Overall negative appendectomy rate in our study was 11% which is comparable to various studies reported in the literature.

Negative appendectomy rate among females was higher than in males. The discrepancy may be due to high chances of alternate diagnosis in females of reproductive age group.[17]

Limitation of the study:

1. The study was conducted on a small size sample of 200 patients. A study with a larger sample size could have better results.
2. The study was conducted only for patients age group between 12 to 75 years.
3. Tzanaki's score includes USG examination which is operator dependent so individual bias may be present and has variable levels of sensitivity and specificity (75-90% and 86- 100%)[10]

Conclusion

This study shows that Tzanaki's 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 Tzanaki's scoring when compared to modified Alvarado score.

References

1. Mahmood FM, Garota SA. Comparison between modified alvarado score and Tzanakis score in diagnosing acute appendicitis in Erbil City. Med J Babylon. 2018;15:210-3.
2. Bharath B, Varma VA, Reddy GS. A comparative study of tzanaki's score versus alvarado score in acute appendicitis at a rural hospital. J Evid Based Med Healthc. 2020; 7(35), 1848-51.
3. Cuschieri A, Hanna G. Essential surgical practice: higher surgical training in general surgery. 5th edn. CRC Press 2015.
4. Kalan M, Talbot D, Cunliffe WJ, Rich AJ. Evaluation of the modified Alvarado score in the diagnosis of acute appendicitis: a prospective study. Ann R Coll Surg. 1994; 11:418–9.
5. Anupriya R, Babu CPG, Rajan KV. A comparison of Tzanaki's and Alvarado scoring system in the diagnosis of acute appendicitis. International Surgery Journal. 2019;6(6):2080-83.
6. Saidi RF, Ghasemi M. Role of Alvarado score in diagnosis and treatment of suspected acute appendicitis. Am J Emerg Med. 2000; 18:230-1.
7. Flum DR, Koepsell T. The clinical and economic correlates of misdiagnosed appendicitis. Arch Surg. 2002; 37:799-804.
8. Bergeron E. Clinical judgment remains of great value in the diagnosis of acute appendicitis. Can J Surg.2006; 49(2):96–100.
9. Andersson RE. Meta-analysis of the clinical and laboratory diagnosis of appendicitis. Br J Surg. 2004;91(1):28–37
10. Dharmarajan S, Arvindraj R. A study comparing modified Alvarado score and Tzanakis score for diagnosing acute appendicitis. IAIM, 2019; 6(5): 137-141.
11. MCox MR, McCall JL, Padbury RT, Wilson TG, Wattchow DA, Toouli J. Laparoscopic surgery in women with clinical diagnosis of acute appendicitis. Med J Aust. 1995; 162:130.
12. Fenyo G, Lindenberg G, Blind P, Enchsson L, Oberg A. diagnostic decision support in suspected acute appendicitis. Validation of simplified scoring system. 1997; 163(11):831-8.
13. Tzanakis NE, Efstathiou SP, Danulidis K, Rallis GE, Tsioulos DI, Chatzivasiliou A, Peros G, Nikiteas NI. A new approach to accurate diagnosis of acute appendicitis. World J Surg. 2005 Sep 1;29(9):1151-6.
14. Malla BR, Batajoo H. Comparison of Tzanaki's score vs Alvarado score in the effective diagnosis of acute appendicitis. Kathmandu Univ Med J (KUMJ). 2014;12(45):48-50.
15. Malik AA, Mir MF, Khurshid SU, Wani I, Dagga R. Modified Alvarado Score Versus Tzanaki's Score for Diagnosing Acute Appendicitis in Changing Clinical Practice. Int J Clin Exp Med Sci. 2016;2(5):90-3.
16. Shashikala V, Hegde H, Victor AJ. Comparative study of Tzanaki's score vs Alvarado score in the effective diagnosis of acute appendicitis. Int J Biomed and Adv Res 2016;7(9):418-20.
17. Yu SH, Kim CB, Park JW, Kim MS, Radosevich DM. Ultrasonography in the diagnosis of appendicitis: evaluation by meta-analysis. Korean J Radiol. 2005; 6(4):267-77.