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# Tzanakis Score versus Alvarado Score in the Diagnosis of Acute Appendicitis: A Comparative Study

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**Abstract:** Acute appendicitis is most common surgical emergency. The study was conducted to compare the efficacy of Tzanakis score and Alvarado score in diagnosing acute appendicitis. The study was designed as a non randomised, prospective, observational, clinical study, conducted at Patna Medical College and Hospital, Patna, over a period of 6 months between July 2016 and December 2016. It included 98 clinically diagnosed cases of acute appendicitis who underwent emergency open or laparoscopic appendectomy. Final diagnosis of acute appendicitis was based on histopathological examination report of resected appendix. The sensitivity, specificity, positive predictive value and negative predictive value of Tzanakis score was 93.83%, 52.94%, 90.48% and 64.29% respectively and the sensitivity, specificity, positive predictive value and negative predictive value of Alvarado score was 86.42%, 47.06%, 88.61% and 42.11% respectively. The negative appendectomy rate in the study was found to be 17.35%. To conclude, clinical diagnosis of acute appendicitis can be complemented with Tzanakis scoring system for more accurate diagnosis of acute appendicitis.
**Keywords:** Acute appendicitis, Alvarado score, Tzanakis Score

## INTRODUCTION

Acute appendicitis with estimated lifetime risk of 6.7% and 8.6% for female and male respectively [1-3], is the most common abdominal emergency requiring surgery [4-7].

The diagnosis of appendicitis remains challenging despite high prevalence and it embodies Sir William Osler's spirit when he stated, "Medicine is a science of uncertainty and an art of probability." Most often the clinical presentation is atypical and the diagnosis is difficult because of overlapping symptoms of other conditions [8]. Literature has stated clinical examination to be helpful in only 70-87% of the cases in making a diagnosis of acute appendicitis [9, 10].

In suspected appendicitis, the critical decision is whether to operate or not and ideally, the goal is to judiciously and expeditiously treat all cases of appendicitis with minimum negative appendectomies. In a study published in 2001 negative appendectomy rates were reported between 15% and 34% with approximately 15% being commonly accepted as appropriate to reduce the incidence of perforation [2, 11].

Alvarado score with a sensitivity and specificity ranges from 73-90% and 87-92% respectively, has been widely used in diagnosing acute appendicitis [8,12,13]. A score equal to or greater than 7 is considered diagnostic indicating surgery [14]. Tzanakis score is a combination of clinical evaluation, ultrasonography and white cell count [15]. There are 4 variables with 15 points and a score of more than 8 is diagnostic for appendicitis requiring surgery. The sensitivity and specificity are 95.4% and 97.4% respectively [15].

This study compares the efficacy of Alvarado and Tamakis scoring in the diagnosis of acute appendicitis and hence to reduce the rate of negative appendectomy.

## MATERIAL AND METHOD

This non randomised, prospective, observational, clinical study was conducted at Patna Medical College and Hospital, Patna, over a period of 6 months between July 2016 and December 2016. Patients admitted with provisional diagnosis of acute appendicitis were included in the study and Tamakis

and Alvarado scores were obtained at the time of admission. Postoperatively the resected specimen of appendix was sent for histopathological examination and the final diagnosis of acute appendicitis was established by the histopathological report.

**Alvarado scoring**

Parameters: Migratory abdominal pain-1, Anorexia-1, Nausea/vomiting-1, Rebound tenderness-1, Leucocytosis-2, Shift of white blood cell count to left-1, Elevated temparature-1, Tenderness in right lower quadrant-2

**Interpretation**

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

**Tzanakis scoring**

Parameters: Presence of right lower abdominal tenderness- 4, Rebound tenderness- 3, White blood cells count >12,000/$mm^3$– 2, Positive ultrasound scan findings of appendicitis- 6.

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

**Inclusion Criteria**

- Patients clinically diagnosed with acute appendicitis undergoing surgery

**Exclusion Criteria of the study:**

- Intra operative finding of appendicular perforation, abscess or mass
- Patients < 18 years
- Patient who denied informed consent to participate in the study

**RESULT**

A total of 98 patients who were clinically diagnosed as a case of acute appendicitis on presentation at Patna Medical College and Hospital and who underwent surgery both open and or laparoscopic were included in the study.

**Table-1: Age, sex, presenting symptom distribution and comparison of Alvarado and Tzanakis Score**

| **Sex Distribution of the Patients** | | | |
|---|---|---|---|
| Male | 56 | | |
| Female | 42 | | |
| **Age Distribution of the Patients** | | | |
| *Age Group* | *No of Patients* | | |
| 18 - 20 Years | 14 | | |
| 20 - 29 Years | 30 | | |
| 30 - 39 Years | 28 | | |
| 40 - 49 Years | 14 | | |
| 50 - 59 Years | 9 | | |
| > 59 Years | 3 | | |
| **Presenting Complain** | | | |
| *Symptom* | *No of Patients* | | |
| Pain abdomen | 89 | | |
| Fever | 61 | | |
| Nausea/Vomiting | 43 | | |
| **Alvarado Score** | | | |
| Alvarado Score | *Histopathology proven appendicitis* | | Total |
| | Yes | No | |
| Suggestive of Appendicitis | 70 (TP) | 9 (FP) | 79 |
| Not Suggestive of Appendicitis | 11 (FN) | 8 (TN) | 19 |
| **Tzanakis Score** | | | |
| Tzanakis Score | *Histopathology proven appendicitis* | | Total |
| | Yes | No | |
| Suggestive of Appendicitis | 76 (TP) | 8 (FP) | 84 |
| Not Suggestive of Appendicitis | 5 (FN) | 9 (TN) | 14 |
| **Comparison of Sensitivity, Specificity, PPV, NPV of Alvarado & Tzanakis Score** | | | |
| | *Alvarado Score (in %)* | *Tzanakis Score (in %)* | |
| Sensitivity | 86.42 | 93.83 | |
| Specificity | 47.06 | 52.94 | |
| Positive Predictive Value | 88.61 | 90.48 | |
| Negative Predictive Value | 42.11 | 64.29 | |

(TP: True Positive, FP: False Positive, FN: False Negative, TN: True Negative)

57.14% of patients (56 out of 98) were male and 42.86% of patients were female (42 out of 98). A majority of patients were in the age group of 20-29 years and pain abdomen was the most common presenting chief complains amongst the patients. Histopathological examination of resected specimen of appendix revealed a total of 17 out of 98 normal appendix denoting negative appendicectomy (17.35%). The sensitivity and specificity of Alvarado versus Tzanakis score were 86.42% and 47.06% versus 93.83% and 52.94%. The positive and negative predictive value of Alvarado and Tzanakis score were 88.61% and 42.11% versus 90.48% and 64.29%.

## DISCUSSION

Despite acute appendicitis being most common surgical emergency the accurate pre-operative diagnosis remains a challenge for the attending clinician [16]. Investigatory modalities have failed to provide a confirmatory diagnosis in all suspected cases of acute appendicitis [17]. Numerous scoring systems like Alvarado, Modified Alvarado, RIPASA, Ohman, Tzanakis have been developed to help the clinician in decision making in doubtful cases and in order to decrease negative appendectomy.

The sensitivity and specificity of Tzanakis scoring system has been reported to be 95.4% and 97.4% respectively [15]. In our study, the sensitivity of Tzanakis scoring system was 93.83% which is comparable to Tzanakis *et al*. but the specificity of the scoring system was low in comparison with the original study by Tzanakis *et al*. It is also quite low in comparison with other studies which had shown the sensitivity rate of 85-96% [12-14]. however on contrary, study done by Sigdel G, Malla BR, Mallik AA has demonstrated low specificity of Tzanakis score in the range of 66.66% to 75% [18-20] The low specificity of Tzanakis score in our study could be attributed to low sensitivity rate of ultrasonography (USG) which has 68% sensitivity rate. The difference might be due to different expertise level of radiologists who were involved in this study and hence the individual disparity could not be avoided.

The sensitivity, specificity, positive and negative predictive value of Tzanakis score demonstrated an edge over that of Alvarado score in the diagnosis of acute appendicitis and the result is in line with result of studies done by other investigators [18-20].

Though negative appendectomy rate of 20-40% has been reported in literature yet early surgical intervention for the treatment of acute appendicitis has been advised by surgeons to avoid complications, a negative appendectomy rate of about 15-20% is considered acceptable [2,11]. The overall negative appendectomy rate in our study was 17.35% which is comparable to various studies reported in the literature [14,21,22].

## CONCLUSION

Despite the diagnosis of acute appendicitis being classically described as clinical, Tzanakis score which is simple, applicable and superior to Alvarado score in term of sensitivity, specificity, positive and negative predictive values can complement the clinical diagnosis. The specificity of the scoring system can be increased if the sensitivity rate of the USG is increased by involving experienced ultrasonologist.

## REFERENCE

1. Al-Omar M, Mamdam M, Mcleod RS. Epidemiolocal features of acute appendicitis in Ontario, Canada. *Can J Surg*. 2003, 46:263-268.
2. Flum DR, Koepsell T. The clinical and economic correlates of misdiagnosed appendicitis. *Arxh Surg*. 2002; 37:799-804.
3. Rothrock SG, Pagane J. Acuet appendicitis in children: emergency department diagnosis and management. *Ann Emerg Med*. "006; 6:39- 51.
4. Shelton T, Mckinlay R, Schwartz RW. Acute appendicitis: current diagnosis and treatment. *Curr Surge*. 2003; 60:502-505.
5. Baker MS, Wille M, Goldman H, Kim HK. Metastatic Kaposi Sarcoma presenting as acute appendicitis. *Mil Med*.1986; 151:45-47.
6. Ohene-Yeboah M. Acute Surgical Admissions for abdominal Pains in adult in Kumasi, Ghana. *ANZ Surg*. 2006; 76:898-903.
7. Lui CD, Mcfadden DW, Acute abdomen and appendix. Surgery: Scientific principles and Practice. Edited by: Greenfield LJ, Mulholand MW, Zelenock GB, Oldham KT, Lillemoe KD. Philedelphia: Lippencott-Raven; 1997.pg 1246-1261.
8. Andersson RE. Meta-analysis of the clinical and laboratory diagnosis of appendicitis. Br J Surg. 2004;91(1):28–37
9. John H, Neff U, Kelemen M. Appendicitis diagnosis today: clinical and ultrasound deduction. *World J Surg*. 1993; 17:243-9.
10. Saidi RF, Ghasemi M Role of Alvarado score in diagnosis and treatment of suspected acute appendicitis. *Am J Emerg Med*. 2000; 18:230-1.
11. Bergeron E. Clinical judgment remains of great value in the diagnosis of acute appendicitis. Can J Surg.2006; 49(2):96–100.
12. Fenyo G. Routine use of scoring system for decision making in suspected acute appendicitis in adukt. *Acta Chir Scand*. 1987; 153:545-1.
13. MCox MR, Mc Call 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.
14. 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. Anderrsson RE, Mata analysis of the clinical and laboratory diagnosis. *Br J Surg*. 2004; 91:28-37.
15. 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 journal of surgery. 2005 Sep 1;29(9):1151-6.
16. Jones K, Penna AA, Dunn EL, Nadalo L, Mangram AJ. Are negative appendectomies still acceptable? Am J Surg. 2004; 188:748-754.
17. Hansen AJ, Young SW, De Petris G, Tessic DJ. Histologic severity of appendicitis can be predicted by computed tomography. Arch Surg. 2004; 139:1304-1308.
18. Sigdel GS, Lakhey PJ, Mishra PR. Tzanakis score Vs. Alvarado score in acute appendicitis. JNMA J Nepal Med Assoc. 2010; 49:96-99.
19. Malik AA, Mir MF, Khurshid SU, Imtiaz W, Riyaz D. Modified Alvarado Score Versus Tzanakis Score for Diagnosing Acute Appendicitis in Changing Clinical Practice. International Journal of Clinical and Experimental Medical Sciences. 2016; 2(5): 90-93.
20. Malla BR, Batajoo H. Comparison of Tzanakis score vs Alvarado score in the effective diagnosis of acute appendicitis. Kathmandu Univ Med J (KUMJ). 2014 Jan-Mar; 12(45): 48-50.
21. Alvarado A. A practical score for the early diagnosis of acute appendicitis. Ann Emerg. 1986; 11:557–565.
22. Harsha BK, Bhaskaran A, Prasad CSBR, Basavarajappa M, Ambikavathy M, Vasanth Kumar G. Evaluation of Modified Alvarado Score in the diagnosis of acute appendicitis and its correlation with ultrasonography and histopathology. J Clin Biomed Sci. 2011; 1: 149-157.