

Original Research Article

A comparative study to assess efficacy of Tzanakis score and Alvarado score for effective diagnosis of patients with acute appendicitis at a tertiary care centre in North Karnataka: a one-year prospective analytical study

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ABSTRACT

Background: Acute appendicitis standouts amongst the most widely recognized reasons for intense stomach torment. There is no ideal symptomatic assessment apparatus to distinguish acute appendix if indications are ambiguous, bringing about longer analytic procedure and it might prompt deferring of medical procedure and related increment in morbidity and fatality. In the meantime, speedy management may prompt negative appendectomy with expanded morbidity and consumption of healthcare resources.

Methods: A Hospital based one year prospective study was conducted at KLEs Dr Prabhakar Kore Hospital Belagavi, Karnataka from 1st January 2018 to 31st December 2018 and required data was collected from 100 patient who were clinically diagnosed to have acute appendicitis and all patients were assessed using Alvarado score and Tzanakis score and HPR for all patients were used as gold standard to evaluate the efficacy of both scoring systems.

Results: The sensitivity and specificity of Tzanakis score was 80.6% (at score >8) and 100% (at score >8) respectively. positive predictive value in present study being 100% and negative predictive value being 41.3%. The sensitivity and specificity of Alvarado score was 11.3% (at score >8) and 100% (at score >8) respectively.

Conclusions: Tzanakis Score outperformed Alvarado score displaying higher sensitivity with similar specificity.

Keywords: Acute appendicitis, Tzanakis score, Alvarado score

INTRODUCTION

Acute appendicitis (AA) standouts amongst the most widely recognized reasons for acute abdomen. This condition warrants quick health care and treatment.^{1,2} Due to dietary propensities for the Asians the frequency of acute appendix is low when contrasted with western populace.³ There is no ideal symptomatic assessment apparatus to distinguish acute appendix if indications are ambiguous it might lead to delay in intervention and increased morbidity. In the meantime, speedy management may prompt negative appendectomy.⁴

Aim

Aim of the study was to establish the diagnosis of AA in a more efficacious manner by using Tzanakis score and Alvarado scoring system and evaluate the efficacy of both scoring system by comparison.

METHODS

The study design was a hospital based prospective analytical study and was done for the period of one year from January to December 2018 at KLEs Dr. Prabhakar

Kore Hospital Belagavi, Karnataka. A total of 100 patients who were admitted with acute appendicitis were included in the study.

Patients ≥ 18 years of age attending general surgery outpatient department and have been diagnosed and getting admitted for acute appendicitis were included in the study. Patients who were medically unfit patients, not willing to give consent for the study, having perforation of appendix, mass formation were excluded from study prior to the beginning, the study was approved by the Institutional Ethics Committee. The patients who fulfilled the selection criteria were informed about the nature of study and a written informed consent was obtained.

The demographic data of the patients was noted along with the history of presenting illness and other comorbid conditions. Further these patients underwent clinical examination followed by systemic examination. Patients were evaluated for body temperature, blood pressure, heart rate, respiratory rate, per abdomen examination on admission. All these findings were noted on a predesigned and pretested proforma. All patients were subjected to total leukocyte count, differential leukocyte count, ultrasound abdomen. Total 100 samples were taken and both Alvarado and Tzanakis scores were applied to each case.^{5,6}

Patients having score in between one to four were observed. Patients having score of 5-8 were observed for next 24 hours, reevaluated. At any time if clinical condition of patient worsens then he/she was subjected to surgery. Both scoring systems were compared with final Histopathology analysis report. The collected data were entered into an excel sheet and was analysed and tabulated.

RESULTS

In this study male patients (54) were more than female patients with most of the patients were aged between 18-40 years (83%). Ultrasound could diagnose appendicitis in 70 patients. In this study, pain in RLQ was most common symptom, presenting in 100 individuals. Anorexia was present in 61 patients, vomiting was present in 48 patients, fever was present in 43 patients (Table 1).

Maximum number of patients were present in score range of >8 , with 71 patients being grouped by Tzanakis score and 10 patients grouped by Alvarado score (Table 2).

Alvarado score (at score >8) correctly diagnosed in 10 individuals with zero false positive cases where as Tzanakis score could diagnose 71 cases of acute appendicitis (at score >8) with no false positive cases as tabulated in (Table 3 and 4) respectively. An attempt was made to evaluate the efficiency of Tzanakis score and compare it with Alvarado score as shown in (Table 6).

Table 1: Distribution of the study population according to the frequency of signs/symptoms.

S. No.	Sign/symptoms	Number	%
1	Nausea/vomiting	48	48.00
2	Anorexia	61	61.00
3	Pain in right iliac fossa	100	100.00
4	Migrating pain	38	38.00
5	Rebound tenderness	32	32.00
6	Temperature ($>37.3^{\circ}\text{C}$)	43	43.00

Table 2: Distribution of the study population according to scores.

Score	Alvaro	Tzanakis
≤ 4	31	20
5-8	59	9
>8	10	71
Total	100	100

Table 3: Alvarado with HPR.

Score	Acute appendicitis	Chronic appendicitis	Total
>8	10	0	10
≤ 8	78	12	90
Total	88	12	100

Table 4: Tzanakis with HPR.

Score	Acute appendicitis	Chronic appendicitis	Total
>8	71	0	71
≤ 8	17	12	29
Total	88	12	100

Table 5: Distribution of the study population according to HPR.

HPR	Number
Acute appendicitis	88
Chronic appendicitis	12
Total	100

Table 6: Comparison between Tzanakis and Alvarado scoring.

Variables	Tzanakis (%)	Alvarado (%)
Score	>8	>8
Sensitivity	80.6	11.3
Specificity	100	100
Positive predictive value	100	100
Negative predictive value	41.3	13.3

DISCUSSION

There are many scoring frameworks that have been defined for powerful conclusion of acute appendicitis. Alvarado and Tzanakis scoring frameworks are among one of many. The Alvarado scoring framework for diagnosing acute appendix incorporates eight factors with aggregate of 10. Tzanakis scoring utilizes four factors and complete score of 15 for analysis of acute appendix.^{7,8}

Both scores are mix of clinical assessment, ultrasonography and laboratory marker of inflammatory reaction. The Alvarado score nowadays is considered as old system for diagnosing acute appendicitis. Tzanakis score being a triple evaluation scale; two clinical examinations, one radiological (USG examination), and one blood investigation (total leukocyte count). Surgeon's great clinical appraisal is viewed as most significant essential in analysis of appendicitis. A few other conditions can emulate this clinical condition. Even after the advent of various imaging modalities diagnosis of acute appendicitis still remains a daunting task.^{9,10}

The utilization of ultrasound or computed tomography (CT) in associated patients with appendicitis is normal. CT ought to be utilized specifically to limit introduction to ionizing radiation. False negative outcomes may defer medical procedure and associated morbidity.¹¹

Choice to surgically intervene depending on physical assessment, resulted in higher negative appendectomies which can lead to financial burden and morbidity. Tzanakis score can be utilized to avert negative appendectomy. It was created in 2005 in Greece dependent on tentatively gathered information of factors with autonomous prognostic worth utilizing a numerically increasingly suitable strategy for the development. A scoring framework ought to be of straightforward structure so as to help in basic formulation of diagnosis and aid in treatment of patients when there is doubt regarding the certainty of diagnosis.¹² The sex distribution pattern and age group range was consistent with a single center comparative observational study conducted by Atreya et al.¹³

In this study pain in right lower quadrant was the most common presenting complain (100%) followed by anorexia (61%) and nausea/vomiting (48%). In a similar single center comparative observational study conducted by Shashikala et al, majority of study population presented with pain abdomen (90%) followed by fever (58%) and vomiting (36%).¹⁴

The sensitivity and specificity of Tzanakis score was 80.6 % (at score >8) and 100% (at score >8) respectively in the present study, was similar to study conducted by Malla et al, single center comparative observational study where the sensitivity was 86.95% and specificity was 75%. The positive predictive value (PPV) and negative predictive value (NPV) among these two studies are also

comparable, with PPV in present study being 100% and NPV being 41.3%. The PPV in the study done by Malla et al, was 97.5% and NPV 33.3%. Original study conducted by Tzanakis et al forwarded 95.4% sensitivity and specificity of 97.4% which is again comparable with present study. The sensitivity and specificity of Alvarado score was 11.3 % (at score >8) and 100% (at score >8) respectively in the present study similar to Castro et al, where sensitivity was 29% and specificity was 95%. Whereas PPV and NPV among these two studies are not comparable, with PPV in present study being 100% and NPV being 13.3%. The PPV in the study done by Castro et al, was 77% and NPV 70%. In the study done by Malla BR et al. PPV and NPV of Alvarado score are comparable with the present study with PPV being 97.2% and NPV being 21.42%.¹⁵

Overall, Tzanakis scoring system is a safe, quick and effective modality of diagnosing acute appendicitis, which not only avoids delay in surgical procedure but also play a role in reducing negative appendectomy rate. Despite all its benefits, the efficiency of Tzanakis scoring is limited by observational skills and training of radiologist as it encompasses ultrasonography of abdomen and pelvis as a content of scoring system. Most of the results of this study was comparable with the similar studies performed earlier. However, this is a single center study with a small sample size; hence, multi-centric studies with a larger sample size are required to validate the current findings.

CONCLUSION

Although acute appendicitis is commonest surgical emergency, its management is still challenging. Tzanakis Score outperformed Alvarado score displaying higher sensitivity with similar specificity and ultrasound plays a useful role in diagnosing patients of AA.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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