

# Comparison of Tzanakis Score vs Alvarado Score in the Effective Diagnosis of Acute Appendicitis

Malla BR, Batajoo H

Department of Surgery

Dhulikhel Hospital- Kathmandu University Hospital  
Kathmandu University School of Medical Science

Dhulikhel, Kavre, Nepal

## Corresponding Author

Bala Ram Malla

Department of Surgery

Dhulikhel Hospital- Kathmandu University Hospital  
Kathmandu University School of Medical Science

Dhulikhel, Kavre, Nepal

E-mail: mallabr504@yahoo.com

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## ABSTRACT

### Background

Acute appendicitis is the most frequent surgical emergency encountered worldwide. This study was conducted to compare the efficacy of Tzanakis score and Alvarado score in diagnosing acute appendicitis.

### Objectives

The aim of this study is to compare the efficacy of Tzanakis scoring system with Alvarado scoring system in diagnosing AA.

### Methods

This was a retrospective and nonrandomized observational study conducted in Dhulikhel hospital. It included 200 clinically diagnosed cases of acute appendicitis who underwent emergency open or laparoscopic appendectomy during the year 2012. Final diagnosis of acute appendicitis was based on histological findings given by pathologist.

### Results

The sensitivity, specificity, positive predictive value and negative predictive value of Tzanakis score was 86.9%, 75.0, 97.5% and 33.3% respectively. The sensitivity, specificity, positive predictive value and negative predictive value of Alvarado score was 76.0%, 75.0%, 97.2% and 21.4% respectively. Negative appendectomy was 8.0%.

### Conclusion

Tzanakis scoring system is an effective scoring system in diagnosing acute appendicitis.

## KEY WORDS

*Acute appendicitis, alvarado score, tzanakis score*

## INTRODUCTION

Appendicitis is the most common abdominal emergency worldwide.<sup>1-4</sup> Lifetime risk of acute appendicitis(AA) is 8.6% and 6.7% for man and women respectively.<sup>5-7</sup> Clinical examination is helpful in diagnosis of AA in only 70-87% of the cases.<sup>8,9</sup>

Alvarado scoring system is widely used to diagnose AA.<sup>10</sup> It consists of symptoms, signs and inflammatory markers. Out of 10 scores, a score of 7 or more is considered AA requiring emergency surgical treatment.<sup>10</sup> Its sensitivity and specificity ranges from 70-90% and 87-92% respectively.<sup>11,12</sup>

Tzanakis scoring system is a combination of clinical examination, ultrasonography and inflammatory markers.<sup>13</sup> Out of 15 scores, a score of 8 or more is considered AA requiring surgical treatment. Its sensitivity, specificity and accuracy are 95.4%, 97.4% and 96.5% respectively.

The aim of this study is to compare the efficacy of Tzanakis scoring system with Alvarado scoring system in diagnosing AA.

## METHOD

This retrospective and non randomized observational study was conducted in Dhulikhel Hospital from January 1<sup>st</sup>, 2012 to December 31<sup>st</sup>, 2012. A total of 200 cases were studied after the ethical approval from institutional review committee of Dhulikhel hospital.

All the patients, with the clinical diagnosis of AA, who underwent laparoscopic or open appendectomy, were included in the study. The study was conducted by reviewing all the inpatients records and emergency records of the patients who were clinically diagnosed as AA.

Those patients with the diagnosis of appendicular perforation, appendicular lump, and appendicular abscess were not included in the study. Any patient who received analgesics or sedatives before clinical diagnosis of AA were also excluded from the study. Alvarado score and tzanakis score observed at the time of admission were also recorded.

Final diagnosis of the AA was based on histological findings given by pathologist.

## RESULT

During the year 2012, there were 213 cases who were diagnosed clinically as AA. Out of those cases, seven patients refused to undergo surgical intervention and discharged on request. Further, six patients went to other hospital for the further management. A total of 200 cases underwent emergency appendectomy after clinical diagnosis of AA of which 128 cases underwent open appendectomy and 72 cases underwent laparoscopic appendectomy. However, sixteen patients (8%) had negative appendectomy which was confirmed by histological report. In the present study, the most common position of the appendix was found to be retrocaecal (79%).

In the attempt of comparing Tzanakis scoring system and the Alvarado scoring system, the cut off score of 813 and cut off score of 710 were considered for Tzanakis scoring system and the Alvarado scoring system respectively.

**Table 1. Tzanakis score and histological diagnosis.**

Tzanakis Score	Acute appendicitis	Normal appendix	Total patients
≥8	160	4	164
<8	24	12	36
<b>Total Patients</b>	184	16	200

On the basis of Tzanakis scoring system, out of 200 patients who underwent appendectomy, 160 patients were found to be true positive which was confirmed by histological examination (Table 1). Similarly, 4 patients having scored equal to or more than 8 were false positive. Further, among 36 patients with score less than 8, 24 were found to be false negative (Table 1). The sensitivity and specificity of the Tzanakis scoring system in diagnosing AA was 86.95% and

75% respectively. Its positive predictive value was found to be 97.5% and the negative predictive value was 33.33%.

On the basis of Alvarado scoring system, out of 200 patients who underwent appendectomy, the numbers of true positive cases were found to be in 140 patients who were confirmed by histological examination (Table 2). Similarly, four patients having scored equal to or more than seven were false positive. In addition, among 56 patients with less than seven score, the number of true negative were found to be in 12 cases (Table 2). The sensitivity and specificity of the Alvarado scoring system in diagnosing AA was 76 % and 75 % respectively. Its positive predictive value was 97.2 % and negative predictive value was 21.42 %.

**Table 2. Alvarado score and histological diagnosis.**

Tzanakis Score	Acute appendicitis	Normal appendix	Total patients
≥7	140	4	144
<7	44	12	56
<b>Total Patients</b>	184	16	200

## DISCUSSION

AA is the most common surgical emergency, it is always a difficult task for surgeon to diagnose AA.<sup>2,3</sup> Different scoring systems like RIPASA, Alvarado, Ohman, Tzanakis are developed to help the surgeon in decision making in doubtful cases

Tzanakis et al have reported that its scoring system had sensitivity and specificity of 95.4% and 97.4% respectively.<sup>13</sup> As per our study, sensitivity of Tzanakis scoring system was 86.5% which is comparable to Tzanakis et al. The specificity of Tzanakis scoring system was low in our study in comparison to the findings reported by Tzanakis et al. The low specificity of tzanakis score in our study could be due to low sensitivity rate of ultrasonography (USG) which had 68% sensitivity rate. It is quite low in compare to other studies which had shown the sensitivity rate of 85-96%.<sup>10-12</sup> The disparity might be due to various experience level of ultrasonologists who were involved in this procedure. So, disparity due to individual can not be avoided.

Alvarado score had sensitivity of 73-91% and specificity of 78 -92% in varies studies.<sup>10-12</sup> The sensitivity(76%) and specificity (75%) of Alvarado Score in the current study is comparable.

The aim of this study is to compare the efficacy of Tzanakis score and Alvarado score in the diagnosis of AA. Tzanakis score was found superior in terms of sensitivity and negative predictive value. The specificity of Tzanakis score and Alvarado score was found the same. However, the specificity of Tzanakis score can be improved by increasing the sensitivity rate of USG if the experienced ultrasonologist do the USG.

## CONCLUSIONS

Though AA is a clinical diagnosis, the scoring system can complement the clinical diagnosis. Tzanakis score is superior to Alvarado score in diagnosing AA in term of sensitivity and negative predictive values. Specificity can be increased if the sensitivity rate of the USG is increased by

involving experienced ultrasonologist.

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