Experience of Tzanakis Scoring System for Accurate Diagnosis of Acute Appendicitis in Jinnah Postgraduate Medical Centre, Karachi

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ABSTRACT

OBJECTIVE: To assess the diagnostic accuracy of Tzanaki's scoring in diagnosing acute appendicitis.

STUDY DESIGN: A prospective observational study.

PLACE AND DURATION: Surgical ward 3 of Jinnah Postgraduate Medical Centre, Karachi, Pakistan from 1st March 2015 to 31st August 2016.

METHODOLOGY: Patients presented in emergency department with clinical diagnosis of acute appendicitis were included in the study. There are four variables in Tzanakis's Scoring System and these are presence of right lower abdominal tenderness(4 Points), Rebound tenderness(3 points), presence of white blood cells greater than 12000/mm^3 in complete blood count(2 points) and positive Ultrasound scan finding for appendicitis(6 points) . The diagnosis was confirmed on the basis of histopathological features of appendicitis by the pathologist. Patient's age, sex, Tzanakis's Score, Ultrasound findings and histopathology reports were recorded on a Performa.

RESULTS: Among 214 appendectomies, histopathologically proven Acute Appendicitis was found in 89.7% and 10.3% were found to have normal appendix. Sensitivity, specificity and overall diagnostic score of Tzanaski score was found to be 99%, 91% and 95% respectively.

CONCLUSION: The Tzanakis score is simple and easy to be applicable and effective for diagnosing acute appendicitis.

KEY WORDS: Acute Appendicitis, Diagnostic Accuracy, Tazanski Score, Sensitivity, Specificity

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INTRODUCTION

Amongst several causes of acute abdominal surgeries, acute appendicitis (AA) is the most common. Overall appendicitis (including both acute appendicitis and other pathology) accounts for a lifetime risk of 7%[1]; whereas in males the lifetime risk of appendicitis is reported to be 12% and 25% in females.[2] The diagnosis of acute appendicitis is mainly based on physical examination and detailed history of patient.[3] The symptoms of acute appendicitis often overlap with the symptoms of many other acute abdominal conditions making its diagnosis very difficult. It has been reported that in diagnosis of acute appendicitis, clinical examination is accurate only in 70% to 87% of cases.[4,5] About 20% to 33% of patients with suspected acute appendicitis have atypical findings making clinical diagnosis difficult which requires plasma markers and imaging techniques.[6,7] Due to this overlap of symptoms; the rate of negative appendectomy has been reported to range from 20% to 40%.[8] In Pakistan, rate of negative appendectomy has been reported to be as low as 7% and as high as 18% with 29.2% in females and 12.7% in males. Furthermore, perforation rate in Pakistan has been reported to be 7% to 13%[9-11] Many surgeons preferred early surgery for the treatment of acute appendicitis to avoid perforation at the cost of negative appendectomy rate which is about 15-20%.[8] On one hand operating on patients with normal appendix is a financial burden for the patients and health system, on the other hand wrong diagnosis and keeping the patients on conservative management may leads to complications like perforation and peritonitis.[12] To avoid misdiagnosis, several scoring systems have been developed for sustenance of diagnosis of acute appendicitis. These scoring systems are based on history, clinical examination and some laboratory tests. Tzanaki's scoring system is one of these scoring systems; combining clinical assessment , raised leucocytes count and ultrasonography.[8] There are only four variables with a total of 15 points and a score of either 8 or more is considered acute appendicitis requiring surgical treatment. This scoring system has been reported to be 95.4% sensitive, 97.4% specific and 96.5% accurate in diagnosing acute appendicitis.[13] The objective of this study was to assess

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the diagnostic accuracy of Tzanaki's scoring in diagnosing acute appendicitis.

METHODOLOGY

This prospective observational study was carried out in patients with clinical diagnosis of acute appendicitis who underwent emergency appendectomy in department of surgery of Jinnah Postgraduate Medical Centre, Karachi, Pakistan. The duration of study was one and half years (from 1st March 2015 to 31st August 2016). This study was approved by the Ethical Committee of Jinnah Hospital. Patients having acute appendicitis based on history and clinical examinationz were included in the study. Patients who's diagnosis has been changed based on preoperative findings including appendicular abscess, appendicular mass, generalized peritonitis and who did not give consent were excluded from the study. Eligible patients had complete blood count (CBC) and abdominal ultrasonography (USG). There are four variables in Tzanakis's Scoring System and these are presence of right lower abdominal tenderness(4 Points), Rebound tenderness(3 points), presence of white blood cells greater than 12000/mm^3 in complete blood count(2 points) and positive Ultrasound scan finding for appendicitis(6 points). Patients were scored according to Tzanaki's Scoring System.[13] Patients with scores below the cut off value (i.e. <8) were also subjected to surgery based on clinical examination. USG was performed by using 5 MHz linear transducer. We included those patients in our study who underwent abdominal USG by the senior consultant radiologist to exclude observer bias. The radiologist was kept blind to the results of clinical and laboratory findings. An established ultrasonographic criteria was followed to differentiate between acutely inflamed appendix from normal.[14] The confirmation of diagnosis was made by the pathologist. **Data analysis**: Data analysis was conducted with the help of SPSS version 21.0. Mean ± SD was computed for all the quantitative variables. Qualitative variables were presented as frequency ad percentage. Fisher exact test was applied to assess significant association between histopathology and Tazanki's scoring. Sensitivity, specificity, negative predictive value, positive predictive value and area under the curve was also calculated. P-value<0.05 was considered significant.

RESULTS

A total of 214 patients were enrolled in this study. Out of which, majority (n=143, 66.8%) were males and only 71 (33.2%) were females. Mean ± SD age and Tzanaski score of the patients was 24.6 ± 10.2 years and 11.9 ± 2.9; respectively. According to ultrasound findings, acute appendicitis was diagnosed in 140 (65.4%) patients. However, histopathologically 192 (89.7%) patients were found to have acute appendicitis. The rate of negative appendectomy was found to be 10.3% (Table I). Tzanaski score cut-off of 8 for diagnosing acute appendix yielded sensitivity and specificity 99% and 91% respectively, positive and negative predictive value 99% and 91% respectively. Overall diagnostic accuracy of Tzanaski score was found to be 95% (Table II).

Table I: Frequency of different studied parameters (N=214)

Gender	**n (%)**
Male	143 (66.8)
Female	71 (33.2)
Age in years	
Mean ± SD	24.6 ± 10.2
Min-Max	12-70
Tzanaski score	
Mean ± SD	11.9 ± 2.9
Min-Max	6-15
Ultrasound finding	**n (%)**
Proven acute appendicitis	140 (65.4)
Not acute appendicitis	74 (34.6)
Histopathology	**n (%)**
Proven acute appendicitis	192 (89.7)
Not acute appendicitis	22 (10.3)

Table II: Diagnostic accuracy of Tzanaski score (N=214)

Tzanaski score	**Histopathology**					
	Acute appendicitis	**Not acute appendicitis**	**Total**	**Sensitivity Specificity**	**PPV NPV**	**P-value AUC**
≥8	190(88.8)	2(0.9)	192(89.7)	0.99 0.91	0.99 0.91	0.000**‡ 0.95
<8	2(0.9)	20(9.3)	22(10.3)			
Total	192(89.7)	22(10.3)	214(100)			
**P-value<0.0001, ‡Fisher-exact test						

DISCUSSION

Diagnosing acute appendicitis is always the most challenging and difficult task for surgeons.[15,16] Despite the recent advancements in the diagnosis of different diseases, the diagnosis of acute appendicitis remains a problem for the surgeons.[17] Radiological investigations including USG, CT and MRI helps in diagnosis of acute appendicitis but alone are not confirmatory.[16] To solve this issue many surgeons and physicians try different scoring systems to make diagnosis more accurate. Different scoring systems e.g., RIPASA, Alvarado, Ohman, Tzanakis are

established to help decision making in uncertain cases.[10,18,20] Male predominance was found with male to female ratio in our study was 2:1 which is compareable to other studies but the ratio ranges from 1.2:1 to 2.6:1 like Sigdel GS et al reported a ratio of 2.6:1.[18-20] Mean age in our study was 24.6 with a standard deviation of 10.2 means acute appendicitis affects from teenage to early adulthood but it can occurs at any age and these values are comparable to other international studies.[3,19-20] Tzanakis et al reported that sensitivity and specificity of 95.4% and 97.4% respectively.[12] Similarly, Malik AA et al reported sensitivity and specificity of Tzanaki's scoring as 98.32% and 96.29%.[18] These results are comparable to our study's outcomes. Shashikala V et al reported sensitivity, specificity, positive predictive value and negative predictive value of Tzanakis score as 79.62%,83.3%,97.72% and 31.25% respectively.[19] Sigdel GS et al reported sensitivity, specificity, positive and negative predictive values and overall diagnostic accuracy of Tzanakis score as 91.48%, 97.27% and 33.33%, 66.66% and 90% respectively. Furthermore, the negative appendectomy rate was found to be 6%. They reported low sensitivity rate of USG (63.82%) the reason for low specificity.[20] The negative appendectomy rate in our study is slightly high that is 10.3% but in comparison it is a good rate as 15-20% rate of negative appendectomy was considered acceptable by many studies.[9-10,18] Also, in our study the negative predictive value is very high due to less observer bias in USG.

CONCLUSION

The Tzanakis score is simple and easy to be applicable and effective for diagnosing acute appendicitis.

CONTRIBUTION OF AUTHORS

Iqbal MM: Conceived Idea. Study design. Data collection,

Manuscript writing,

Ahmed T: Manuscript writing. Data collection.

Khan I: Data analysis, Interpretation of data.

Iftikhar A: Histopathology of appendix. Interpretation of data.

Shah SH: Data collection, Data analysis.

Magsi AM: Data collection.

Abbasi UA: Manuscript writing

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