ORIGINAL ARTICLE

Is it beneficial to use clinical scoring systems for acute appendicitis in adults?

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ABSTRACT

BACKGROUND: Clinical scoring systems have been used to reduce negative appendectomy rate for several decades. However, the use of these systems has been questioned due to differences in their diagnostic accuracies. The aim of this prospective study was to develop a new clinical scoring system using a combination of all previously described variables for the diagnosis of acute appendicitis (AA).

METHODS: Consecutive patients who underwent emergency appendectomy for AA between December 2016 and April 2017 were prospectively included in the study. During admission, a prepared questionnaire including variables obtained from the previously used clinical scoring systems was administered. Histopathological analysis was regarded as the main outcome. Patients with no histopathological evidence of AA were defined as negative appendectomy. All variables were analyzed separately to assess their association with AA. A receiver operating characteristic curve with area under curve analysis was performed to obtain the cut-off values for numerical variables.

RESULTS: There were 200 patients with a mean age of 30.8±12.8 years with a negative appendectomy rate of 5.5%. There was no significant association between the variables and the detection of histologically proven AA except increased white blood cell count >11.05/mm^3 and proportion of the polymorphonuclear leukocytes >71.2% (p=0.003 and p=0.015, respectively).

CONCLUSION: The present study shows that the development and/or use of scoring systems does not significantly improve the diagnostic accuracy of AA.

Keywords: Appendicitis; decision support techniques; diagnosis.

INTRODUCTION

For the past two centuries, acute appendicitis (AA) has been the most common indication for emergent abdominal surgery. The rate of diagnostic errors of AA cases still remains approximately 20%–45% despite the widespread use of imaging techniques.[1–3] This rate increases up to the higher levels especially in women who are in the reproductive age group, children, and elderly patients.[1,3]

In most of the cases, surgical removal of the macroscopically and microscopically normal appearing appendix vermiformis is performed, resulting in unnecessary surgeries with a negative appendectomy rate of 20%–45%.[1,4] The use of ultrasound or computed tomography (CT) is recommended to increase the diagnostic accuracy of AA.[5] However, variable accuracy, cost, ionizing radiation for tomography, and further delay in diagnosis and surgery should be considered before implementing imaging techniques in the current practice.[6,7]

Clinical scoring systems have been used to reduce the negative appendectomy rate without increasing morbidity and mortality due to AA for several decades.[1,4] There have been >10 such scoring systems including Alvarado, Ohmann, Eskelinen, RIPASA, Fenyo, Lintula, Tzakis, and others.[1,4,8] Assignment of point values obtained from the patient's history, physical examination, and simple laboratory tests have been used to determine the probability of AA in the patient.[1] Although

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there has been excellent predictive accuracy reported by the authors who developed these clinical scoring systems, the differences in the sensitivities and specificities in subsequent studies lead to the uncertainty of the scoring systems' reliability.[3,9–11] It has been thought that if these scoring systems were applied to the populations in which they were originally created, the diagnostic accuracy increases.[8] Additionally, the presence of variances for the differential diagnosis of AA according to several geographic areas with ethnic and linguistic differences and the different spectra of AA may impair the widespread application of these scoring systems.[5,8]

Based on prospectively collected data, the aim of the present study was to develop a new clinical scoring system for the diagnosis of AA using a combination of all variables that were previously described in the clinical scoring systems.

MATERIALS AND METHODS

Consecutive patients who underwent appendectomy for suspected AA between December 2016 and April 2017 were prospectively included in the study. The local ethics committee approved the study in accordance with the Declaration of Helsinki. Written informed consent was obtained from all patients. All patients were ≥17 years old, presented with right iliac fossa pain, and underwent emergency appendectomies as the only surgical treatment modality for suspected AA. Patients who had an appendectomy as part of other emergent surgeries, who had an elective appendectomy, and with incomplete data were excluded from the study. The diagnosis of AA was established by using clinical history, physical examination, laboratory examination, and imaging techniques including ultrasound and CT in selected cases.

Patients' demographic data (age and gender) were recorded. During admission to the emergency department, a prepared questionnaire was administered by the 2nd to 4th year general surgery residents after collecting patients' history, thorough physical examination, and laboratory tests. Laboratory tests included white blood cell (WBC) count (upper normal limit: 10,500/mm^3), proportion of the polymorphonuclear (PMN) leukocytes (upper normal limit: 78%), and serum C-reactive protein (CRP) level (upper normal limit: 5 mg/dL) during the initial presentation of the patients. Before completing the questionnaire, a brief explanation in relation to the variables was given by the chief surgeon to the general surgery residents. All completed forms were later collected by the chief surgeon, as the study coordinator, in a separate folder.

Questionnaire

The variables were obtained from the previously used clinical scoring systems for AA including Alvarado, Eskelinen, Ohmann, Tzakis, Lintula, Fenyo, RIPASA, and the Appendicitis Inflammatory Response Score (AIRS).[1,4,8] The variables in these systems were evaluated by two authors (EK and MH) and combined into a simple questionnaire comprised of 20 variables (Table 1). All nominal and categorical variables were dichotomized based on the previous scoring systems as stated above. The severity of pain was graded as mild, moderate, or severe. "Age" was classified as <40 years and ≥40 years for numerical variables. Duration of complaints and elevated body temperature were each classified into two groups: <48 h and ≥48 h and <37.5 °C and ≥37.5 °C. Body temperature was measured from the axillary region, and measurements >37.5 °C were regarded as increased body temperature. Bowel sounds were regarded as abnormal if absent, tinkling, or high-pitched. Dysuric complaints, such as burning during urination, frequent or intense urge for urination, and any change in color or smell of urine, were questioned, and in suspicious cases, this condition was confirmed by a urinalysis. The absence of blood, neutrophils, or bacteria was regarded as negative urinalysis. Being a foreigner as the variable found in the RIPASA scoring system was excluded from the questionnaire due to its invalidity to the present study.

Demographic data (age and gender), symptoms (right iliac fossa pain, migratory pattern to the right iliac fossa, intensity of pain as severe and moderate or mild, progression of

Table 1. Summary of the variables found in the scoring systems for acute appendicitis

No	Scoring systems	Variable
1	A, E, F, I, O, L, T	Right iliac fossa rebound tenderness
2	A, E, F, I, O, R, T	Leukocytosis
3	A, F, L, O, R	Migration of pain
4	A, E, F, I, L, O, R	Muscular guarding or rigidity
5	A, E, I, L, O, R, T	Right iliac fossa pain
6	A, F, I, L, R	Nausea/vomiting
7	E, F, R,	Duration of complaints
8	F, L, R	Gender
9	A, I, L, R	Fever
10	A, R	Anorexia
11	O,R	Age
12	O, R	Negative urinalysis/no dysuric symptoms
13	A, R	Right iliac fossa tenderness
14	F	Progression of pain
15	A, I	Left shift in WBC differential
16	F	Aggravation with cough
17	L	Bowel sounds
18	O	Continuous pain
19	L	Intensity of pain
20	I	C-reactive protein

A: Alvarado; E: Eskelinen; F: Fenyo; I: Appendicitis inflammatory response; O: Ohmann; L: Lintula; T: Tzakis; R: RIPASA.

pain as increased and decreased or the same, continuous pattern of pain, aggravation with cough, duration of complaints, anorexia, nausea and/or vomiting, and dysuric symptoms), clinical findings (elevated body temperature, right iliac fossa tenderness, right iliac fossa rebound tenderness, muscular guarding or rigidity, and bowel sounds), and laboratory test results (CRP, WBC count, and proportion of PMN leukocytes) were collected.

The decision to perform surgical treatment was made by the attending surgeon who was blind to the results of the questionnaires. Open or laparoscopic appendectomy was performed according to the decision of the attending surgeon. All specimens were analyzed histopathologically. A diagnosis of AA was confirmed in the presence of infiltration of the muscularis propria by PMN leukocytes. Patients with no histopathological evidence of AA were defined as negative appendectomy. The results of the histopathological reports were regarded as the main outcome.

Statistical Analysis

The variables found in the questionnaire were analyzed according to the results of the histopathological reports. Statistical analysis was performed using SPSS version 20 (SPSS, Chicago, IL, USA). Data were expressed as mean±standard deviation as well as frequencies and percentages for normally distributed continuous and categorical variables, respectively. First, all variables were analyzed separately to assess their association with AA as confirmed histopathologically. All nominal and categorical variables were dichotomized into two. The severity of pain was graded as mild or moderate and severe. For numerical variables, "age" was classified as <40 years and ≥40 years. Duration of complaints and elevated body temperature were classified into two groups as <48 h and ≥48 h and <37.5 °C and ≥37.5 °C. For WBC, proportion of PMN leukocytes and CRP dichotomization as increased or normal was used according to the upper normal limits set by the laboratory. The Mann–Whitney U test was used to assess significant differences in continuous variables, as appropriate. The Pearson chi-square and Fisher's exact tests were used for categorical variables. A p value <0.05 was considered statistically significant.

At the secondary level, a receiver operating characteristic (ROC) curve with area under curve analysis was performed for these numerical values to obtain the cut-off values based on the optimal combination of sensitivity and specificity. Based on the cut-off values of each, other dichotomization was used as increased or normal. This led to the following cut-off values for WBC count and proportion of PMN leukocytes as 11.05/mm^3 and 71.2%, respectively.

RESULTS

A total of 200 patients were included in the study. The mean age of the patients was 30.8±12.8 years. There were 131 (65.5%) male and 69 (34.5%) female patients. Final histopathological analysis revealed that there were 11 normal appendix vermiformis indicating a negative appendectomy rate of 5.5%. Patients with and without AA were similar except in WBC count and proportion of PMN leukocytes (Table 2). Patients with AA had significantly higher WBC count and proportion of PMN leukocytes.

The results of the variables found in the questionnaire and clinical and laboratory findings are detailed in Table 3.

There was no significant association between the variables and the detection of histologically proven AA except increased WBC (p=0.026) (Table 3). There were more patients with increased WBC in patients with AA than those in patients without AA. Sensitivity analysis revealed that the highest sensitivity was detected with right iliac fossa pain, right iliac fossa tenderness, and muscular guarding or rigidity. The highest specificity was calculated for increased duration of complaints and no dysuric symptoms and/or negative urinalysis (Table 3).

Table 2. Comparison of patients with and without AA

Feature	Overall	Patients with AA	Patients without AA	p
	200 (100)	189 (94.5)	11 (5.5)	
Age (year)*	30.8±12.6	30.7±12.8	32.6±10.6	0.381
Gender				
Female**	69 (34.5)	64 (33.9)	5 (45.5)	0.517
Male**	131 (65.5)	125 (66.1)	6 (54.5)	
Duration of the complaints (h)*	31.2±29.1	31.4±29.6	28.0±20	0.957
White blood cell count (mm^3)*	14.3±4.4	14.5±4.3	10.3±3.9	0.003
Proportion of polymorphonuclear leukocytes (%)*	75.9±10.4	76.4±10.1	68.1±11.7	0.015
C-reactive protein (mg/dL)*	47.1±73.1	48.3±74.7	26.3±34.5	0.220

*: Mean±standard deviation; **: N (%). AA: Acute appendicitis.

Table 3. Sensitivity and specificity analyses of the variables

Feature	Subgroup	Overall	Patients with AA	Patients without AA	p	Sensitivity	Specificity
		n (%)	n (%)	n (%)			
		200 (100)	189 (94.5)	11 (5.5)			
Age (years)	≥40	40 (20)	37 (19.6)	3 (27.3)	0.463	19.6	72.7
	<40	160 (80)	152 (80.4)	8 (72.7)			
Gender	Male	131 (65.5)	125 (66.1)	6 (54.5)	0.517	66.1	45.5
	Female	69 (34.5)	64 (33.9)	5 (45.5)			
Right iliac fossa pain	Yes	198 (99)	187 (98.9)	11 (100.0)	1.000	98.9	0.0
	No	2 (1)	2 (1.1)	0 (0)			
Migratory pattern to	Yes	128 (64)	121 (64.0)	7 (63.6)	1.000	64.0	36.4
the right iliac fossa	No	72 (36)	68 (36.0)	4 (36.4)			
Severity of pain	Severe	80 (40)	75 (39.7)	5 (45.5)	0.757	39.7	54.5
	Mild-moderate	120 (60)	114 (60.3)	6 (54.5)			
Progression of pain	Yes	77 (38.5)	73 (38.6)	4 (36.4)	1.000	38.6	63.6
	No	123 (61.5)	116 (61.4)	7 (63.6)			
Continuous pattern of pain	Yes	110 (55)	105 (55.6)	5 (45.5)	0.548	55.6	54.5
	No	90 (45)	84 (44.4)	6 (54.5)			
Aggravation with cough	Yes	142 (71)	135 (71.4)	7 (63.6)	0.733	71.4	36.4
	No	58 (29)	54 (28.6)	4 (36.4)			
Increased duration of	Yes	25 (12.5)	24 (12.7)	1 (9.1)	1.000	12.7	90.9
complaints (>48 h)	No	175 (87.5)	165 (87.3	10 (90.9)			
Anorexia	Yes	133 (66.5)	127 (67.2	6 (54.5)	0.512	67.2	45.5
	No	67 (33.5)	62 (32.8)	5 (45.5)			
Nausea/vomiting	Yes	89 (44.5)	83 (43.9)	6 (54.5)	0.544	43.9	45.5
	No	111 (55.5)	106 (56.1)	5 (45.5)			
No dysuric symptoms and/	Yes	26 (13)	25 (13.2	1 (9.1)	1.000	13.2	90.9
or negative urinalysis	No	174 (87)	164 (86.8)	10 (90.9)			
Elevated body temperature	Yes	55 (27.5)	53 (28.0)	2 (18.2)	0.731	28.0	81.8
	No	145 (72.5)	136 (72.0)	9 (81.8)			
Right iliac fossa tenderness	Yes	193 (96.5)	183 (96.8)	10 (90.9)	0.331	96.8	9.1
	No	7 (3.5)	6 (3.2)	1 (9.1)			
Right iliac fossa rebound	Yes	174 (87)	165 (87.3)	9 (81.8)	0.639	87.3	18.2
tenderness	No	26 (13)	24 (12.7)	2 (18.2)			
Muscular guarding or rigidity	Yes	193 (96.5)	182 (96.3)	11 (100.0)	1.000	96.3	0.0
	No	7 (3.5)	7 (3.7)	0 (0)			
Abnormal bowel sounds	Yes	41 (20.5)	38 (20.1)	3 (27.3)	0.699	20.1	72.7
	No	159 (79.5)	151 (79.9)	8 (72.7)			
Increased WBC	Yes	165 (82.5)	159 (84.1)	6 (54.5)	0.026	84.1	45.5
	No	35 (17.5)	30 (15.9)	5 (45.5)			
Increased % PMN leukocytes	Yes	99 (49.5)	96 (50.8)	3 (27.3)	0.214	50.8	72.7
	No	101 (50.5)	93 (49.2)	8 (72.7)			
CRP	Yes	143 (71.5)	137 (72.5)	6 (54.5)	0.300	72.5	45.5
	No	57 (28.5)	52 (27.5)	5 (45.5)			

AA: Acute appendicitis; WBC: White blood cell count; PMN: Polymorphonuclear; CRP: C-reactive protein.

Table 4. ROC curve analysis of WBC count and proportion of PMN leukocytes

Parameter	Value	p	AUC	Sensitivity	Specificity	95% CI	
						Lower bound	Upper bound
WBC count	>11.05	0.003	0.770	81	63.6	0.625	0.915
% PMN leukocytes	>71.2	0.015	0.717	74.6	63.6	0.571	0.864

WBC: White blood cell; PMN: Polymorphonuclear; AUC: Area under curve; CI: Confidence interval.

ROC curve analysis of WBC count and proportion of PMN leukocytes revealed that WBC count higher than 11.05/mm^3 and proportion of PMN leukocytes higher than 71.2% were also significantly associated with AA (p=0.003 and p=0.015, respectively) (Table 4) (Fig. 1).

DISCUSSION

An accurate diagnosis of AA is still a controversial issue for most of the cases.[12] Although many probabilistic approaches, such as scoring systems, computer models, and algorithms, have been used to facilitate the accurate diagnosis and management of AA for the last several decades, the level of diagnostic errors has remained the same.[1] In addition to the use of modern diagnostic tools, operator dependency for ultrasound, unavailability and risks for CT, and diagnostic laparoscopy, there is no consensus for an algorithm in association with the diagnosis of AA.[8] Therefore, clinical scoring systems are usually based on clinical evaluations that are inexpensive and non-invasive and utilize easy diagnostic tools. It can be possible to improve the diagnostic accuracy of AA and to help to select patients for immediate surgery, follow-up, or additive tests.[3,8,10,12,13]

Two of the most widely used scoring systems since 1986 include Alvarado and modified Alvarado, both of which were developed in the West.[5] However, there were significant differences in sensitivity and specificity levels depending on the cut-off threshold levels and the geographic variation of the countries in which they were applied. In addition, there have been some studies in which the diagnostic accuracy of AA did not improve after the use of such scoring systems.[9,10,14,15] There have even been worse outcomes when such scoring systems were performed in countries or hospitals where the scores were not originally developed, possibly due to a constant feedback to the clinician.[3,7,9,11,16] This difference has been thought to be higher in cases in which a scoring system that is developed in the West is used in a country located in the East. In the retrospective study by Ohmann,[11] it has been shown that there were significant differences between 10 different scoring systems, even if the cut-off points were varied systematically. Owing to the presence of optimistic biases, it has been believed that the evaluation of such scores on different clinical environments rather than the original and local database resulted in poor performances. Therefore, it should be kept in mind that there are some major limitations including definite ethnic differences and optimistic biases for world-

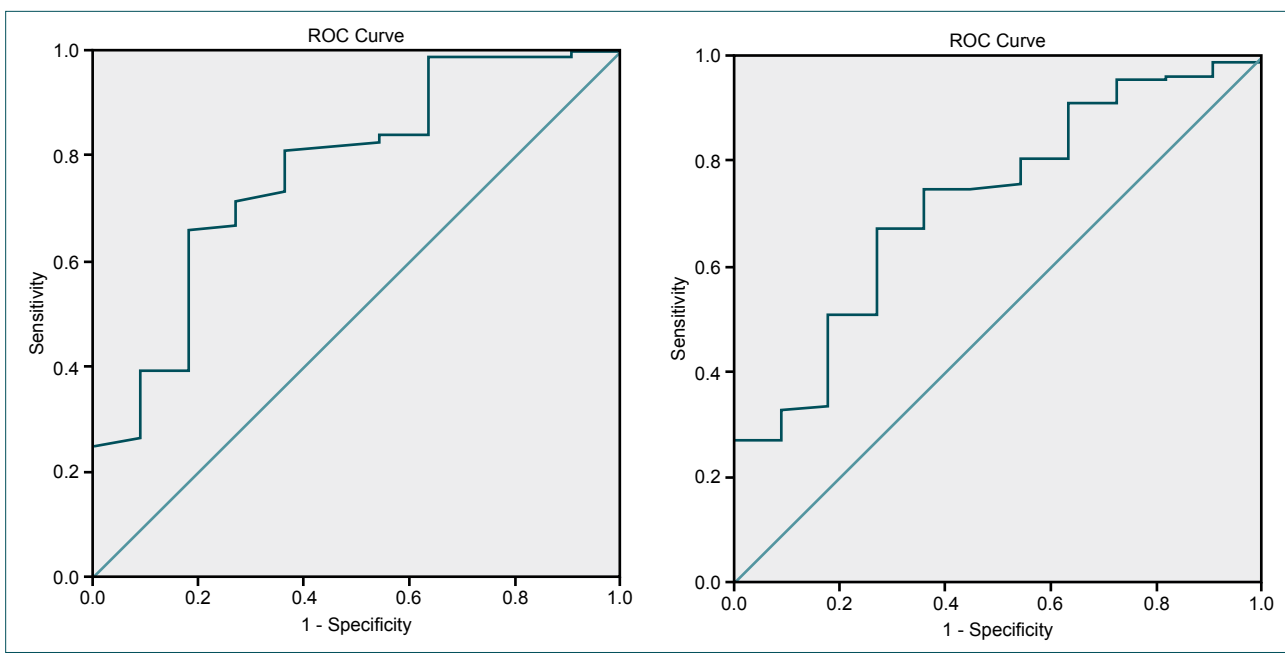

Figure 1. ROC curve analysis of WBC count and proportion of PMN leukocytes showing AUC values as 0.770 and 0.717, respectively.

wide acceptance and use of these scoring systems. Although the use of standardized questionnaires for such scoring systems helps physicians to improve their data and provide a more systematic approach, the clinical benefit of diagnostic scoring systems in AA remains controversial and needs to be clarified by prospective studies.[3] Considering definite ethnic differences and optimistic biases, the development and use of local scoring systems are more helpful for physicians to reach more significant outcomes. By that way, selection of the study groups with narrow geographic or demographic limitations would have less variability in presentation and consequently more diagnostic accuracy.[17] In the present study, we aimed to develop a new scoring system for AA that is to be developed and used in a local manner. For that purpose, the scoring systems for AA were evaluated and summarized in a variable list to develop a new system.

The majority of the systems that have been used for the diagnosis of AA showed high sensitivity and positive predictive values.[1] However, it has also been reported that there are low specificity and negative predictive values causing delayed diagnosis and consequent events. Comparison of two or more scoring systems has been performed previously in different studies from several regions. Yılmaz et al.[18] showed that the Alvarado score is more useful to predict AA than the Ohmann score that provides more guidance to eliminate AA. In the study by Walczak,[1] comparison of six different scoring systems (Alvarado, Fenyo, Eskelinen, Ohman, Tzakis, and RIPASA) revealed that the Tzakis scoring system's highest positive predictive value is 81% with sensitivity and specificity rates of 65% and 62%, respectively. The Alvarado, Eskelinen, Ohmann, and RIPASA scoring systems have been studied by Erdem et al.[8] They found that the Ohmann and RIPASA scoring systems have the highest sensitivity for AA. Based on these controversial findings, it cannot be possible to reach a significant conclusion. Therefore, any scoring system should not be used alone to or not to diagnose AA. Instead, it may be regarded as a diagnostic aid to manage the treatment or follow-up protocol as immediate surgery, close observation at home, or further diagnostic tests.[6] However, our results did not support this hypothesis.

In previous studies, it has been shown that the sensitivity and specificity of the Alvarado scoring system vary with age, gender, and duration of symptoms.[13,18–20] Therefore, there may be some modifications by adding or excluding some local parameters. The RIPASA scoring system has been one example that was developed for this purpose.[5] However, this system still has no widespread acceptance. In the studies by Jawaid and Teicher,[3,21] the authors used some predictive factors using a pretested questionnaire that collected information on demographics, clinical signs and symptoms, and laboratory and radiological investigations. After exclusion of the non-significant variables, Jawaid tried to describe a new scoring system using 19 variables with sensitivity and specificity rates of 78% and 89%, respectively.[3] In the study by Teicher et al.,[21] they described seven predictive factors including sex, age, duration of symptoms, genitourinary symptoms, involuntary right lower quadrant muscle spasm, right-sided rectal mass, and WBC count and thought of the elimination of over one-third of the unnecessary laparotomies by using a scoring system. In the study by Lintula et al.,[22] they described a diagnostic model using six medical history and three clinical finding variables in pediatric patients with AA. In this study, by using the diagnostic model, the negative appendectomy rate would have been reduced from 27% to 13%. In another study, several variables including pain in the right lower quadrant, pain relocation, tenderness at the right lower quadrant, muscular guarding, WBC count, proportion of PMN leukocytes, and CRP levels have been shown to be associated with AA.[23] For this purpose, this study was designed as a prospective study using all variables described previously in the scoring systems. Although such methodology was selected to obtain an optimum variable list, only one significant association was detected between an increased WBC level and the presence of AA. Therefore, a predictive and diagnostic model for AA using logistic regression analysis could not be constructed due to the absence of significant prognostic variables. The negative appendectomy rate as 5.5% in the present study may have a negative impact on detecting significant associations for developing a new scoring system. Therefore, the development and use of such scoring systems based on the variables with statistically significant associations should be questioned.

There have been different variables including symptoms, signs, and routine laboratory findings in these previously described clinical scoring systems for the diagnosis of AA. Assessment of the patients by such questionnaires may show variances due to different physicians with varying clinical experiences and communication abilities.[3] In addition, evaluation of some variables may be open to inter- or intra-observer variation.[6,14] It can be difficult to evaluate the severity of pain as mild, moderate, or severe for the Lintula score. In addition, similar difficulty is still present in the grading of rebound tenderness and muscular defense as light, medium, and strong for the AIRS. Lack of objective definitions of anorexia, nausea, or relocation of pain is another controversial issue during the use of these scoring systems.[6] Determination of different numerical values for the variables in some scoring systems may also cause different outcomes due to the variances in the study populations originated from different regions of the world. Some authors have tried to use alternative cut-off values of each scoring system to increase their accuracy in the selected populations.[1,17] Owing to the fact that the determination of the cut-off values has shown great variances depending on the overstatement of sensitivity or specificity by the authors, this issue should be regarded as the main limitation of the scoring systems for their widespread use.[3] In the present study, we tried to grade and categorize all variables into dichotomous data to prevent the loss of diagnostic information.[6] In addition to this effort, there was

only one significant association for AA. Therefore, logistic regression analysis and backward regression analysis were not performed to develop a new diagnostic model.

Our study has some limitations. A relatively small number of patients in the present study were the main limitation. Inability to perform statistical analysis for developing a new diagnostic model may be regarded as another drawback. However, absence of conservative treatment for AA, inclusion of only patients with AA, and prospective data collection using structured forms were important factors for the accuracy of the conclusions of the study. Although the imaging techniques are widely used for the diagnosis of AA, we did not evaluate the possible impact of these techniques on diagnostic accuracy.

In conclusion, the present study shows that the development and/or use of scoring systems do not significantly improve the diagnostic accuracy of AA. Among the laboratory measurements, increased WBC count and proportion of PMN leukocytes are shown to be significantly associated with AA. Therefore, recommendation for the use of such scoring systems does not seem to be logical for the diagnostic accuracy of AA in adult patients.

Conflict of interest: None declared.

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ORİJİNAL ÇALIŞMA - *ÖZET*

Yetişkinlerde akut apandisit için klinik skorlama sistemlerinin kullanılması yararlı mı?

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AMAÇ: Klinik skorlama sistemleri, son yıllarda negatif apandektomiyi azaltmak için kullanılmaktadır. Bununla birlikte, bu sistemlerin kullanımı, teşhis doğruluğundaki farklılıklardan dolayı sorgulanmaktadır. Bu ileriye yönelik çalışmada akut apandisit tanısında daha önce tanımlanan tüm değişkenlerin bir kombinasyonu kullanılarak yeni bir klinik skorlama sistemi geliştirilmesi amaçlanmıştır.

GEREÇ VE YÖNTEM: Aralık 2016 ile Nisan 2017 arasında akut apandisit için acil apandisit ameliyatı yapılan ardışık hastalar ileriye dönük olarak çalışmaya dahil edildi. Hastaların ilk başvurusu esnasında, daha önce kullanılan klinik skorlama sistemlerinden alınan değişkenleri içeren hazır bir anket uygulandı. Histopatolojik analiz ana sonuç değişkeni olarak kabul edildi. Histopatolojik olarak akut apandisit bulgusu olmayan hastalar negatif appendektomi olarak tanımlandı. Tüm değişkenlerin akut apandisit ile olan ilişkilerini belirlemek için istatistiksel değerlendirme yapıldı. Nümerik değişkenlerin kestirim (cut-off) değerlerini belirlemek için ROC ve AUC analizleri yapıldı.

BULGULAR: Ortalama yaşları 30.8±12.8 yıl ve negatif apendektomi oranı %5.5 olan 200 hasta çalışmaya dahil edildi. 11.05/mm^3'den daha yüksek lökosit sayısı ve %71.2'den daha yüksek nötrofil oranı dışında diğer değişkenler ile histopatolojik olarak kanıtlanmış akut apandisit arasında anlamlı bir ilişki gösterilemedi (sırasıyla, p=0.003 ve p=0.015).

TARTIŞMA: Bu çalışmada elde edilen bulgular, skorlama sistemlerinin geliştirilmesinin ve/veya kullanılmasının akut apandisitin tanısal doğruluğunu anlamlı bir şekilde iyileştirmediğini göstermektedir.

Anahtar sözcükler: Apandisit; karar destek teknikleri; tanı.

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