



Shabir's "SMART-LAB" score for predicting complicated appendicitis-a prospective study

Shabir Ahmad Mir , Mumtaz Din Wani 

Department of Surgery, Government Medical College Srinagar, Kashmir, India

ABSTRACT

Objective: Complicated appendicitis needs an aggressive and urgent management, hence there is need of an efficient scoring system for predicting complicated appendicitis. With this in mind, the author developed the present scoring system for predicting complicated acute appendicitis. The study aimed to assess the suitability of this novel (Shabir's SMART-LAB) score for predicting diagnosis of complicated appendicitis.

Material and Methods: In this prospective study, a novel score designated as "SMART-LAB" SCORE, proposed by the author (Shabir) based on his previous observations was calculated in all patients. This score includes sonography (S), migratory right iliac fossa pain (M), anorexia (A), rebound tenderness (R), tenderness (T), leukocytosis (L), Acute phase protein-CRP (A), and serum bilirubin (B).

Results: Of a total of 150 patients included in this study, 52 cases turned out to be perforated and/or gangrenous appendicitis on intraoperative/histopathologic examination. The most commonly affected age group was 10-19 years. SMART-LAB score of >9 was present in significantly higher number of patients in complicated (perforated and gangrenous) appendicitis than uncomplicated appendicitis (p value < 0.001 i.e., highly significant). Hence, high likelihood of complicated appendicitis is reflected by a score >9 (with a sensitivity= 80.7%, specificity= 92.9%, PPV= 85.7%, NPV= 90.1%, and accuracy= 88.7%), while a score 7-9 needs further confirmation to reach a conclusion, and for a score of <7, there is low likelihood of complicated appendicitis.

Conclusion: It seems that this novel score (Shabir's SMART-LAB score) is a reasonably good tool to predict the diagnosis of complicated appendicitis. Early diagnosis of appendiceal perforation is important to limit the associated abdominal sepsis.

Keywords: Gangrenous/perforated appendicitis, SMART-LAB score, bilirubin, leukocyte count, ultrasonography

INTRODUCTION

Appendicitis is the most common general surgery emergency. Appendicitis complicated by gangrene or perforation is a well-known entity. Complicated appendicitis needs an aggressive and urgent management; hence there is need of an efficient scoring system for predicting complicated appendicitis. The author devised the present scoring system for predicting complicated acute appendicitis. Acute uncomplicated appendicitis can be difficult to be distinguished clinically from perforated appendicitis, especially in the elderly and children (1,2) Mortality associated with simple acute appendicitis has been reported to be 0.3%, but increases to 6% in cases with perforation (3). Early diagnosis of appendiceal perforation is important to limit associated abdominal sepsis. Moreover, radiological modalities such as computed tomography (CT) scan and ultrasonography (US) are effective in supplementing the diagnosis of acute appendicitis (4,5), but both modalities have lower sensitivity in detecting perforated appendicitis (6,7). The development of supplementary tools, besides clinical examination and radiology, could be beneficial in the early diagnosis (3). Several studies have found bilirubin to be a useful serological marker for predicting acute appendicitis (8,9) and appendiceal perforation (3,9). Many scoring systems have been proposed, starting from the first score which was presented by Alvarado in 1986 and further more modified Alvarado score was presented by Kalan and colleagues (10). Their score ranges from 0-9 points and includes symptoms, signs and laboratory markers. In Sweden, the Appendicitis Inflammatory Response (AIR)-score was presented in 2008 (11). Adult appendicitis score has been presented by Sammalkorpi and colleagues recently (12). Concerning the pediatric population, a couple of scoring systems are in use, including the Pediatric Appendicitis Score (PAS) (13) and the Lintula score (14).

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Corresponding Author

Shabir Ahmad Mir

E-mail: drshabirmir@gmail.com

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There are many scoring systems available for appendicitis, but a comprehensive and acceptable scoring system for predicting complicated appendicitis is lacking. The aim of the present study was to introduce and assess the suitability of a novel (Shabir's SMART-LAB) score for predicting diagnosis of complicated appendicitis. Early diagnosis of appendiceal perforation is important to limit the associated abdominal sepsis. Current scoring systems do not meet such a demand.

MATERIAL and METHODS

Design of the Study

This prospective study was carried out in the Postgraduate Department of Surgery at Government Medical College Srinagar over a period of two years from January 2014 to January 2016. This study consisted of patients admitted with a clinical suspicion of acute appendicitis.

Inclusion Criteria

The study finally included a group of 150 patients who had histologically proven appendicitis and others were excluded as per the pre-framed exclusion criteria.

Exclusion Criteria

Patients initially admitted with a clinical suspicion of acute appendicitis but subsequently unproven by histological examination (negative appendectomies) were excluded from the study. This group included a total of fifteen patients. Other exclusion criteria were patients undergoing interval appendectomies and patients with risk factors for hepatic disease such as alcoholism, a history of viral hepatitis, Gilbert's disease, Dubin-Johnson syndrome, benign recurrent intra-hepatic cholestasis, and other documented biliary, hemolytic or liver diseases associated with hyperbilirubinemia (a total of two patients).

Study Parameters

Subsequent to hospital admission, all patients underwent thorough physical examination and routine laboratory examination. Pre-ultrasound clinical diagnosis was made based on clinical history, physical examination, and laboratory findings. Duration of the symptoms was also recorded. The most common symptom was pain in the right iliac fossa. Real-time, high-resolution (5 MHz, 7.5 MHz) graded compression ultrasound examination was performed by senior radiologists after a clinical diagnosis had been made. The diagnosis of perforation on USG was made by visualization of loculated pericecal fluid, phlegmon or abscess, prominent pericecal or periappendiceal fat and circumferential loss of the submucosal layer of the appendix (15). Sonographic films were taken, and findings were recorded.

"SMART-LAB" Score

A novel score designated as "SMART-LAB" SCORE, proposed by the author (Shabir) based on his previous observations was calculated in all patients. The aim of the present study was to introduce a novel comprehensive and acceptable scoring system for predicting diagnosis of complicated appendicitis. This score includes sonography (S), migratory right iliac fossa pain (M), anorexia (A), rebound tenderness (R), tenderness (T), leukocytosis (L), Acute phase protein-CRP (A), and serum bilirubin (B). Contributing points for these parameters are listed in Table 1.

In our novel score, positive findings of sonography (S) and tenderness (T) are awarded a score of two while migratory right iliac fossa pain (M), anorexia (A), rebound tenderness (R) are given scores of one each. Leukocytosis (L) of the order of $10.0-14.9 \times 10^9$ Cells/L and $\geq 15.0 \times 10^9$ Cells/L is given a score of two and three, respectively. When either CRP (Acute phase protein) of ≥ 10 mg/L or polymorphonuclear leukocytes of $\geq 80\%$ or even both where present, a score of only one is given. Serum bilirubin (B)

Table 1. SMART-LAB Score (Shabir's Score)

Findings		Points
Sonography (S)		2
Migratory right iliac fossa pain (M)		1
Anorexia (A)		1
Rebound tenderness (R) or muscular defense		1
Tenderness (T)		2
Leukocytosis (L)	$10.0-14.9 \times 10^9$ Cells/L	2
	$\geq 15.0 \times 10^9$ Cells/L	3
*CRP (Acute phase protein) ≥ 10 mg/L or polymorphonuclear leukocytes $\geq 80\%$		1
Serum bilirubin (B) ≥ 1.5 mg/dL		3
Total possible score		14
CRP: C-reactive protein.		
* Use CRP or polymorphonuclear leukocytes, whichever is available or above cut-off, if both are available.		

of ≥ 1.5 mg/dL is given a score of three. Maximum total possible score is 14. Parameters more specific for complicated appendicitis are given a maximum individual score of three. ROC curve analysis was performed during the analysis of our novel score.

Management

Preoperatively, the patients were kept nil per oral and received intravenous fluids along with intravenous antibiotics including ceftriaxone or piperacillin tazobactam, with or without metronidazole or tinidazole. No analgesic was given preoperatively. We used the open approach for operative intervention in all study patients. Surgical findings of all patients were recorded separately. All patients were followed for two weeks after surgery, and their histopathological findings were recorded. The initial diagnosis made by the experienced surgical team was based on the usual practice (history/clinical examination/ultrasonography/WBC/differential neutrophil count) before final gold standard diagnosis (operative/histopathology) was reached in our study population of 150 patients as positive or negative for complicated appendicitis. Then the overall sensitivity and specificity of this usually practiced method in predicting complicated appendicitis compared to final gold standard diagnosis (operative/histopathology) was assessed. In addition, sensitivity and specificity of SMART-LAB score for predicting complicated appendicitis compared to final gold standard diagnosis (operative/histopathology) was calculated.

Definitive diagnosis was based on histopathological examination. Patients undergoing interval appendectomies and patients with negative appendectomies confirmed on histological report were excluded from the study. Other exclusion criteria included patients with risk factors for hepatic disease such as alcoholism, a history of viral hepatitis, Gilbert's disease, Dubin-Johnson syndrome, benign recurrent intra-hepatic cholestasis, and other documented biliary, and hemolytic or liver diseases associated with hyperbilirubinemia.

This research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethics Principles for Medical Research Involving Human Subjects"

Statistical Methods

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as mean \pm SD, and categorical variables were summarized as frequencies and percentages. Chi-square test or Fisher's exact test, whichever appropriate, was applied for comparing categorical variables. In order to determine the optimal cutoffs of SMART-LAB Score for prediction of various forms of appendicitis, receiver operating characteristic (ROC) analysis was performed. Further diagnostic accuracy (sensitivity, specificity, PPV and NPV) of SMART-LAB score was obtained by taking

operative/histopathological findings as gold standard. A P-value of less than 0.05 was considered statistically significant. All P-values were two tailed.

RESULTS

Design of the Study

This prospective study was carried out in the Postgraduate Department of Surgery at Government Medical College Srinagar over a period of two years from January 2014 to January 2016. The study consisted of patients admitted with the clinical suspicion of acute appendicitis. The study finally included a group of 150 patients who had histologically proven appendicitis, and fifteen patients unproven by histological examination to have appendicitis (negative appendectomies) were excluded from the study. Two more patients were excluded in accordance with other exclusion criteria. Mean age of our patients in years was 15.3 with a standard deviation of 4.39. Majority of the patients belonged to the age groups of 10-19 years and 20-29 years, respectively containing 59 (39.3%) and 51 (34%) patients. There were 97 males and 53 females included in our study.

Mean duration of symptoms (hours) at presentation in our study was 34.8 with a standard deviation of 12.34. Most (36.7%) of the patients presented within 24 hrs of the development of the symptoms. The most common symptom was pain in the right iliac fossa.

All patients with an initial diagnosis of appendicitis were operated up on. The study finally included a group of 150 (Table 2) patients who had histologically proven appendicitis and oth-

Table 2. Demographic distribution & duration of symptoms

Demographic Distribution	
Age group (years)	Number of patients (%)
Up to 9	21 (14%)
10-19	59 (39.3%)
20-29	51 (34%)
>30	19 (12.6%)
Total	150 (100%)
Sex distribution	
Males	97 (64.7%)
Females	53 (35.3%)
Duration of symptoms (hours)	
Hours	Number of patients (%)
<24	55 (36.7%)
24-48	52 (34.7%)
48-72	24 (16%)
>72	19 (12.6%)
Total	150 (100%)

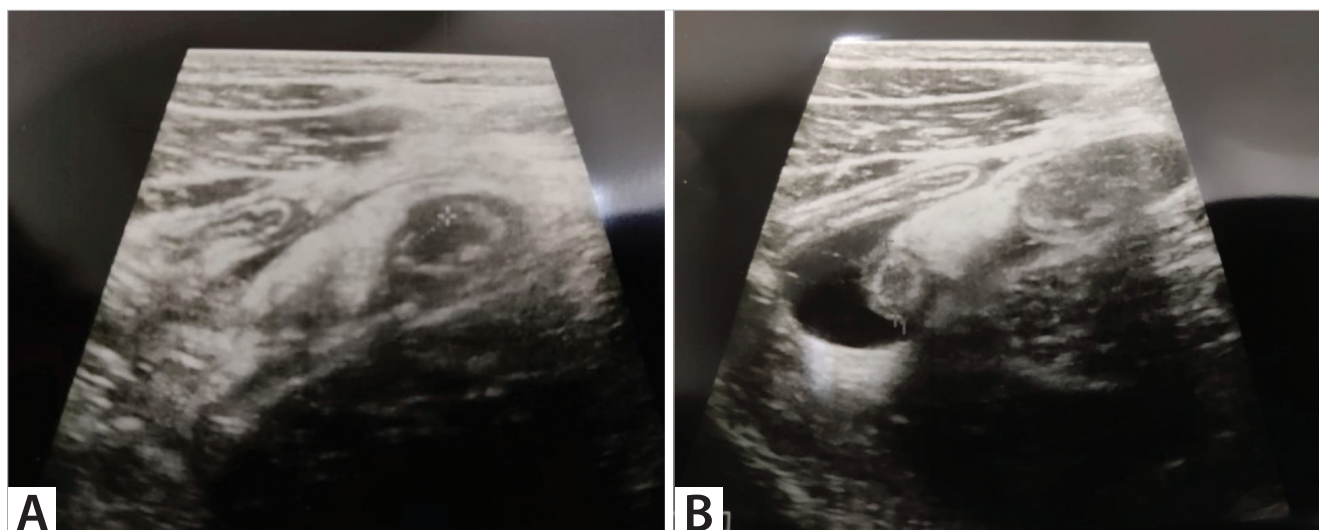


Figure 1. A. USG image. USG image of a patient showing tubular blind ending inflamed gut loop in RIF with marked peri-appendiceal fat stranding with focal breach likely perforated appendix. **B.** USG image of the same patient showing inflamed appendix with small peri-appendiceal collection suggestive of acute appendicitis with perforation.

ers were excluded. Of the 150 patients included in this study, 52 cases turned out to be of complicated (perforated and/or gangrenous) appendicitis (Figures 1,2) on intraoperative/histopathologic examination. Duration of symptoms is recorded in Table 2. Among the perforated and /or gangrenous and non-perforated cases, the preoperatively calculated SMART-LAB score and the analysis of SMART-LAB score and its diagnostic accuracy are shown in Tables 3 and 4.

We came up with a score of more than nine to be positive in cases of complicated appendicitis and similarly a score of five or more, i.e. more than four, in cases of appendicitis by performing ROC curve analysis (Figures 3,4; Table 5).

Since the majority (82.6) of patients in uncomplicated appendicitis group had SMART-LAB score of ≥ 5 (i.e. > 4), only 17.4% had a score of 3-4, hence it represents high likelihood of appendicitis for a score ≥ 5 (i.e. > 4), while a score of 3-4 needs further confirmation to reach a conclusion, and for a score of < 3 , there is low likelihood of appendicitis.

SMART-LAB score of > 9 was present in a significantly higher number of patients in complicated (perforated and gangrenous) appendicitis than uncomplicated appendicitis (p value < 0.001). Cut off was chosen as "nine" because the greatest sum of sensitivity and specificity was achieved at this value. Hence, it sounds high likelihood of complicated appendicitis for a score > 9 (with a sensitivity= 80.7%, specificity= 92.9%, PPV= 85.7%, NPV= 90.1%, and accuracy= 88.7%) while a score of 7-9 needs further confirmation to reach a conclusion, and for a score of < 7 there is low likelihood of complicated appendicitis.

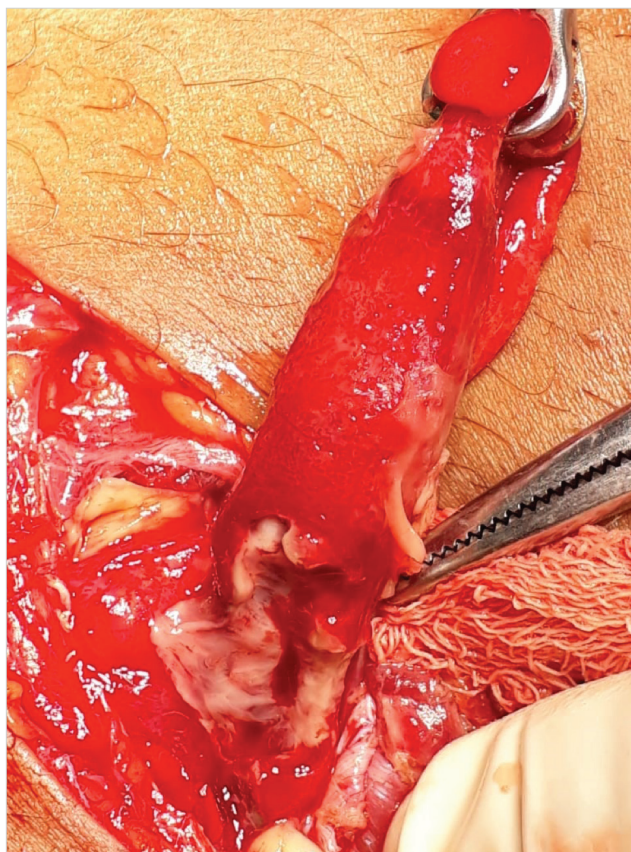


Figure 2. Intraoperative picture of the same patient showing complicated appendicitis.

Table 3. Cut-off values (SMART-LAB Score)				
Cut-off value (SMART-LAB Score) for Complicated appendicitis= 9				
SMART-LAB score in complicated appendicitis		Number of patients (%)		
Score of patients		42 (80.8%)		
>9		8 (15.4%)		
7-9		2 (3.8%)		
<7		52 (100%)		
Total				
Majority of patients with complicated appendicitis had a score of >9.				
SMART-LAB score in non-perforated appendicitis				
Score		Number of patients(%)		
>9		7 (7.1%)		
5-9		74 (75.5%)		
3-4		17 (17.3%)		
Total				
98 (100%)				
Analysis of SMART- LAB score with respect to score 9 as cut-off				
Status of appendix	Score positive (>9)	Score negative (≤ 9)	Total	Positive rate
Perforated &/or gangrenous (complicated)	42	10	52	80.7%
Non perforated (uncomplicated)	7	91	98	7.1%
Total	49	101	150	
$\chi^2= 83.72$; df= 1; P< 0.001				
Cut-off value (SMART-LAB Score) for appendicitis= 4				
Analysis of SMART- LAB score in non-perforated cases of appendicitis				
Status of appendix	Score positive (≥ 5 i.e.> 4)	Score negative (<5 i.e. ≤ 4)	Total	Positive rate
Non perforated/non gangrenous appendicitis	81	17	98	82.6%
No appendicitis	2	13	15	13.3%
Total	83	30	113	
$\chi^2= 32.06$; df= 1; P< 0.001.				
Analysis of SMART- LAB score in appendicitis				
Status of appendix	Score positive (≥ 5 i.e.> 4)	Score negative (<5 i.e. ≤ 4)	Total	Positive rate
Appendicitis	133	17	150	88.66%
No appendicitis	2	13	15	13.3%
Total	135	30	165	
$\chi^2= 52.02$; df= 1; P< 0.001.				

Further information regarding the utility of this score in the diagnosis of uncomplicated appendicitis, and all appendicitis patients, is given in Table 3 and 4.

SMART-LAB score of ≥ 5 (i.e.> 4) was present in a significantly higher number of patients in uncomplicated (non-perforated

and non-gangrenous) appendicitis than in patients who were proven to be negative for appendicitis (p value of < 0.001) on histological examination.

Table 4. Diagnostic accuracy of SMART-LAB score

Diagnostic accuracy of SMART-LAB score for complicated appendicitis(cut-off value= 9)		
Variable	Value (%)	95% Confidence Interval
Sensitivity	80.7	67.48-90.37
Specificity	92.9	85.82-97.08
PPV	85.7	72.77-94.05
NPV	90.1	82.57-95.14
Accuracy	88.7	
Diagnostic accuracy of SMART-LAB score for simple appendicitis (cut-off value= 4)		
Variable	Value (%)	95% Confidence Interval
Sensitivity	82.6	73.70-89.55
Specificity	86.7	59.57-98.34
PPV	97.6	91.56-99.71
NPV	43.3	25.47-62.54
Accuracy	83.2	
Diagnostic accuracy of SMART-LAB score for appendicitis (both simple & complicated)= cut-off value 4		
Variable	Value (%)	95% Confidence Interval
Sensitivity	88.67	82.48-93.26
Specificity	86.67	59.54-98.34
PPV	98.52	94.81-99.59
NPV	43.3	31.91-55.51
Accuracy	88.48	

PPV: Positive predictive value; NPV: Negative predictive value.

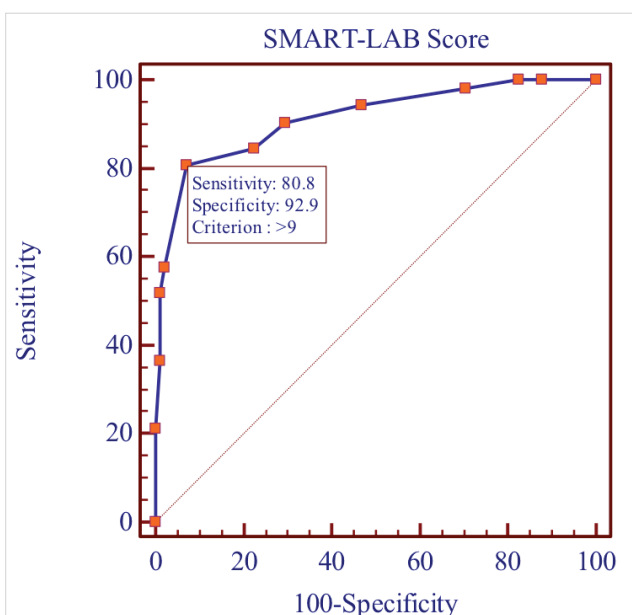


Figure 3. ROC analysis of SMART-LAB score for complicated appendicitis.

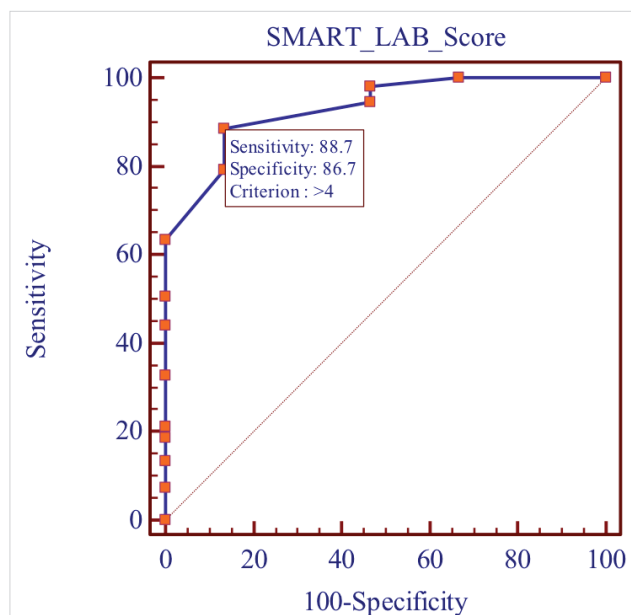


Figure 4. ROC analysis of SMART-LAB score for appendicitis.

Table 5. ROC analysis

ROC analysis of SMART-LAB score for complicated appendicitis			ROC analysis of SMART-LAB score for appendicitis		
Variable	Value (%)	95% Confidence Interval	Variable	Value (%)	95% Confidence Interval
Optimal cutoff	>9	-	Optimal cutoff	>4	-
Area under ROC curve	0.913	0.856-0.953	Area under ROC Curve	0.932	0.882-0.965

DISCUSSION

Despite being one of the most frequent diagnoses among surgical emergencies, acute appendicitis continues to pose significant diagnostic problems. The difficulty of diagnosing acute appendicitis in old age is reflected by high incidence of perforation, 60-90%, in many reports rather than by a high rate of negative appendectomy (16,17). Morbidity and mortality rates associated with appendicitis are greatly increased when perforation ensues, wound infection rates may treble, intra-abdominal abscess formation increases 15-fold and mortality may be 50 times greater. Three of our patients in the complicated appendicitis group developed surgical site infection postoperatively and were managed successfully. Appendiceal perforation can also cause tubal infertility (18). In our present study, long term follow up was not available to look for such complications of complicated appendicitis. Early diagnosis of appendiceal perforation is important to limit the associated abdominal sepsis.

In the present study, the author tested a novel score to predict the diagnosis of complicated (perforated/gangrenous) appendicitis. The score included eight components. The components included serum bilirubin, USG (ultrasonography), Acute phase protein-CRP or polymorphonuclear leukocyte percentage, and modified score for leucocyte count, in addition to the few components used in usual Alvarado score. Author recommends use of C-reactive protein (CRP) or percent polymorphonuclear leukocyte count, whichever is available or above cut off if both are available (either one if both are above the cut off).

The author has already found in one of his studies that serum bilirubin, CRP, and ultrasound are effective for differentiating perforated from nonperforated appendicitis. Bilirubin, CRP, and USG are important preoperative biochemical and sonographic markers of perforation, respectively in appendicitis (19). The diagnosis of perforation on USG was made by visualization of loculated pericecal fluid, phlegmon or abscess, prominent pericecal or periappendiceal fat and circumferential loss of the submucosal layer of the appendix (20). Serum bilirubin is an important adjunct in diagnosing the presence of gangrenous/perforated appendicitis (21). Preoperative assessment of Bilirubin, CRP, WBC and Alvarado scoring system together, as a routine procedure for patients admitted in the emergency ward, may help the surgeon determinate the risk of complications in acute appendicitis (22).

We came up with a score of more than nine to be positive in cases of complicated appendicitis and similarly, a score of five

or more i.e. more than four, in cases of appendicitis by performing ROC curve analysis (Figures 3,4; Table 5). In the present study, SMART-LAB score of >9 was present in significantly higher number of patients in the group of complicated (perforated and gangrenous) appendicitis than the uncomplicated appendicitis (p value of <0.001). Hence, it sounds high likelihood of complicated appendicitis for a score >9, while a score of 7-9 needs further confirmation to reach a conclusion of complicated appendicitis, and for a score of <7, there is low likelihood of complicated appendicitis. The high predictive power of SMART-LAB score for complicated appendicitis seems to come from the incorporation of specific markers for gangrenous or perforated appendicitis in the novel score like serum bilirubin, USG (ultrasonography), acute phase protein-CRP or polymorphonuclear leukocyte percentage, and modified score for leukocyte count. SMART-LAB score of ≥ 5 (i.e. > 4) was present in significantly higher number of patients in uncomplicated (non-perforated and non-gangrenous) appendicitis than in patients who were proven to be negative for appendicitis (p value of <0.001) on histological examination. Also, the majority (82.6%) of patients in uncomplicated appendicitis group had SMART-LAB score of ≥ 5 (i.e. > 4), while only 17.4% had a score of 3-4, hence it sounds high likelihood of appendicitis for a score ≥ 5 (i.e. > 4), while a score 3-4 needs further confirmation to reach a conclusion, and for a score of <3, there is low likelihood of appendicitis.

It has been shown that during appendicitis, an ulceration of the mucosa in the appendix occurs due to inflammation which facilitates bacterial translocation from the appendix to the portal blood system (23). The most common bacteria to infect the appendix is *E. coli* when *E. coli* reaches the hepatic tissue through the portal venous system, animal models have shown that the bacteria interferes with the hepatocyte microcirculation, which induces damage to the liver cells and compromises excretion of bile acids into the bile canaliculi (24). Furthermore, *E. coli* has been shown to induce intravascular hemolysis, and both mechanisms may result in an increased amount of bilirubin circulating in the blood (25). Bilirubin can be elevated in cases of sepsis, intra-abdominal abscesses from urological, gynecological or gastroenterological origins, antiviral therapy or in patients with genetic disease such as Dubin-Johnson syndrome, Rotor's syndrome, and Gilbert's syndrome (26). It has been proposed that hyperbilirubinemia is a weak marker of appendiceal perforation among persons with Gilbert's syndrome (27). There exists no single diagnostic test or symptom other than surgery with

pathologic examination that can definitely result in a diagnosis. In a study by McGowan et al., the authors have found that biochemical markers (bilirubin, CRP and white cell count) were significantly higher in perforation ($p < 0.001$). The greatest sum of sensitivity and specificity of CRP was at 34.6 mg/L (sensitivity 78.57%, specificity 63.01%), and bilirubin was at 21.5 $\mu\text{mol/L}$ (sensitivity 62.96%, specificity 88.31%). They have concluded that Bilirubin and CRP are markers of perforation in appendicitis, but are not accurate enough to be diagnostic (28).

Cumulative sensitivity and specificity of all components together was significantly more than any individual parameter of "SMART-LAB" score in predicting complicated appendicitis. Sensitivity (80.7%), specificity (92.9%), and diagnostic accuracy (88.7%) of "SMART-LAB" score for complicated appendicitis were better than the initial diagnosis (61.54%, 83.67%, and 76% respectively) made by the experienced surgical team as per routine practice (history/clinical examination/WBC/differential neutrophil count/USG). However, in case of simple appendicitis, "SMART-LAB" SCORE had sensitivity and specificity similar to initial diagnosis made by usual practice method. Hence, our novel score seems to be valuable for predicting complicated appendicitis.

CONCLUSION

It seems that this novel score (Shabir's SMART-LAB score) is a reasonably good tool to predict the diagnosis of complicated appendicitis. Early diagnosis of appendiceal perforation is important to limit associated abdominal sepsis. It also has the potential to predict diagnosis of simple uncomplicated appendicitis. Serum bilirubin seems to be a valuable component of this novel score for predicting complicated appendicitis.

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Ethics Committee Approval: This study was approved Government Medical College Ethical Committee (Decision no: 125/ETH/GMC/ICM, Date: 10.01.2014).

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Author Contributions: Author Contributions: Concept - S.A.M; Design - S.A.M; Supervision - S.A.M; Materials - S.A.M; Data Collection and/or Processing - S.A.M; Analysis and/or Interpretation - S.A.M; Literature Search - S.A.M., M.D.W.; Writing Manuscript - S.A.M; Critical Reviews - S.A.M, M.D.W.

Conflict of Interest: The authors have no conflicts of interest to declare.

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ORİJİNAL ÇALIŞMA-ÖZET

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Komplike apandisit öngörmede Shabir'in "SMART-LAB" skoru: Prospektif bir çalışma

Shabir Ahmad Mir, Mumtaz Din Wani

Devlet Tıp Koleji, Cerrahi Bölümü, Srinagar, Kaşmir, Hindistan

ÖZET

Giriş ve Amaç: Komplike apandisitte agresif ve acil müdahale gerekir, bu sebeple komplike apandisit öngörmek adına etkili bir skora sisteme ihtiyaç vardır. Bu amaçla, yazar tarafından komplike akut apandisit öngören bir skora sistemi geliştirildi. Bu çalışmanın amacı, komplike apandisit tanısının öngörülmesinde bu yeni skora sisteminin (Shabir'in SMART-LAB skoru) uygunluğunu değerlendirmektir.

Gereç ve Yöntem: Bu prospektif çalışmada, kendi gözlemleri doğrultusunda yazar (Shabir) tarafından geliştirilen "SMART-LAB SCORE" adındaki bu yeni skor tüm hastalarda hesaplandı. Bu skora sisteme sonografi (S), migratör sağ iliyak fosa ağrısı (M), anoreksiya (A), tepkisel duyarlılık (R), duyarlılık (T), Lökositoz (L), akut faz protein-CRP (A) ve serum bilirubin (B) dahildir.

Bulgular: Çalışmaya dahil edilen 150 hastanın 52'sinde perfore/gangrenöz apandisit olduğuna intraoperatif/histopatolojik inceleme sonucunda ulaşıldı. En yaygın olarak etkilenen yaş grubu 10-19 yıl idi. SMART-LAB >9 skoru, komplike (perfore veya gangrenöz) apandisit hastalarında komplike olmayan apandisit hastalarına göre daha fazla bulundu (P değeri < 0,001, yani yüksek oranda anlamlı). Bu doğrultuda, >9 skorda komplike apandisit yüksek olasılıkla (sensitive= %80,7, spesifite= %92,9, PPV= %85,7, NPV= %90,1, ve doğruluk= %88,7), 7-9 arası skorda sonuca ulaşmak için daha detaylı incelemeler gerektiği ve <7 skorda komplike apandisit düşük olasılıkla olduğu bulundu.

Sonuç: Bu yeni skor sisteminin (Shabir'in SMART-LAB skoru), komplike apandisit tanısını öngörmede makul bir derecede iyi olduğu ortaya çıktı. İlişkili abdominal sepsisi sınırlamak için apandisit perforasyonunun erken tanısı önemlidir.

Anahtar Kelimeler: Gangrenöz/perfore apandisit, SMART-LAB skoru, bilirubin, lökosit sayısı, ultrasonografi

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