

Modified Clinical Score of Acute Appendicitis

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Abstract

Background Suspected acute appendicitis is the most common non traumatic admissions to the surgical emergency units .Over past 100 years mortality and morbidity rates related to appendicitis have markedly decreased. The diagnosis of acute appendicitis is predominantly a clinical preoperatively but final diagnosis of acute appendicitis needs surgical reports per-operatively and the standard pathological examinations postoperatively .There are many clinical scores have been established to help in the diagnosis of the condition in surgical emergency room by junior surgeons in a short time in order to perform surgery in solid bases The main purposes of accurate diagnosis of acute appendicitis :-

1-Management of acute appendicitis in a short time and high accuracy to:-

A-Avoid delayed diagnosis and prevent complications like perforation and finally peritonitis so mortality and morbidity of appendicitis markedly decrease

B-Avoid missing of any cases .

2 -Avoid unnecessary surgery. Alvarado scoring system especially for junior residents who work as the primary receptors of surgical cases at surgical emergency units. Alvarado score system was identified as a useful clinical tool because it is readily available , extremely affordable ,and relatively accurate

Aims This study: was conducted to modify Alvarado scoring system to more easy applicable, simple, cheap, quick and test(Reliability of suggested scoring system) by which we avoided laboratory readings and technical errors that may cause diagnostic difficulties Patients and Methods a prospective study of 120 patients with suspected acute appendicitis admitted to surgical department -Al-Hussein teaching hospital—Karbala during the period from 1st January—to 31st December 2010 were included in this study. The patients were given specific scores according to this (Suggested score system) categorized into three categories

Category 1 patients score 7 or more who underwent surgery

Category 2 patients score 5—6 admitted for a surgical ward under observation Category 3 patients score 4 or less where acute appendicitis can be excluded. All appendices that removed surgically were sent for histopathological examination.

Results By the (Suggested Score) Out of 120 patients 80 patients underwent surgery and acute appendicitis were confirmed in 60 patients thus negative appendectomy thus giving negative appendectomy frequency of 20%. Perforation rate was 6.25%.Positive Predictive Value was 80% (male 84% female 76%)

Conclusion The (suggested scoring system) aids in the diagnosis of acute appendicitis. It helps junior residents in early diagnosis of acute appendicitis. It is quicker—simpler cheaper and easily applicable than Alvarado score in Iraq. The (Reliability of suggested scoring system) tested in this study and the result was that the new score had a good reliability compared to Alvarado scoring system

Keywords: acute appendicitis-clinical diagnosis scores-new scoring system

Introduction

Diagnosis of acute appendicitis is basically a clinical matter . Many patients present with a typical history and physical examination findings .The cause of acute appendicitis is unknown but is probably multi-factorial : luminal obstruction and dietary and familial factors have all been suggested.(1).Acute appendicitis is the most common urgent abdominal surgery (2) . Appendicitis is the most common between the ages of 10 and 20 years . A male to female of 1.4/1 . The overall lifetime risk is 8.6% for males and 6.7% for females . Acute appendicitis is one of the most common surgical emergency with a life time prevalence of approximately 1 in 7 Surgery for acute appendicitis is the most frequent operation performed

(10%)of all operations. The diagnosis of acute appendicitis is purely based on .Surgery for acute appendicitis is the most frequent operation performed History--Clinical examination--and some laboratory investigations (like WBC count) Imaging tests have been shown to add very little . A certain diagnosis can only be obtained by at surgery and after pathological examination of surgical specimen. A negative appendectomy rate of 20-40% has been reported in literatures and many surgeons would accept 25% as inevitable. Surgical excision of normal appendix affects on patients and health services .Wrong management and delay in operation can lead to complications like perforation and lately peritonitis and literatures show that up to 10% of all adults on exploration have diseases other than appendicitis .Although there is much advancement in gastroenterology but no major improvement in diagnostic accuracy of acute appendicitis which ranges from 30--90% and optimum rate is 80% which is less in females than males. Scoring systems are valuable and valid tools to differentiate between appendicitis and other causes of abdominal pain .At present many scoring systems for the diagnosis of acute appendicitis are available like Alvarado scoring system is based on History-Clinical examination and few laboratory tests and applicable(3).The main difficulties in Alvarado score applications are 1-WBC COUNT is done usually by laboratory technician especially after official hours and

this showed significant variations leading to difficulties in diagnosis of patients. Sometimes it may add difficulties in diagnosis to a junior surgeon.

2-Shifting of WBC to the left is not a routine tests and so it may not aid in diagnosis of acute appendicitis.

3- Difficulty in diagnosis arise in

a—very young

b—elderly patients

c—female of reproductive age because they usually have atypical presentation

d—many other conditions also present like appendicitis .

The main advantages of suggestive score system are

1-Taking mouth signs in consideration which are important in diagnosis of acute appendicitis . The mouth signs studied are

A-FOETER ORIS = HALITOSIS it is a bad odor smelled from patients mouth from a distance. It is non-specific sign recorded in several GIT pathology when peristalsis of bowel became sluggish but if clinical features suggest acute inflammation of appends it is helpful in diagnosis and given score(1)

B-Dry White—Coated Tongue it is a sign of dehydration and seen in advanced appendicitis due to repeated vomiting anorexia pyrexia and peritonitis in case of perforation .This sign is suggestive of appendicitis and scored (1) .

2-The Rovessing s sign is a very important sign in diagnosis of acute appendicitis. It is a sign of irritation of somatic peritoneum elicited by pressing on the left iliac quadrant pain felt in the right iliac region . It is a suggestive sign of inflamed appendix in the presence of other features scored as(1)

The following table showed the two scores Table(1)

Objectives of study : A-To set a new clinical score of diagnosis of appendicitis
B-To test the reliability of (new score)

Patients and Methods

We performed this prospective study on 120 patients admitted to the surgical unit of Al-Hussein Teaching Hospital from emergency department and private clinics with diagnoses of suspected acute appendicitis during period from 1st January to 31st DECEMBER 2010 .

Patients of any age group and both sexes presenting to emergency unit with pain in right lower quadrant of abdomen were included in this study. Patient with presentation of

urological—gynecological—or surgical problems other than appendicitis were excluded from the study.

parameter	Alvarado score	Suggested score
M--- Migratory pain	1	1
A--- -Anorexia	1	1
N--- -Nausea & Vomiting	1	1
T---- Tenderness at RIF	2	2
R--- -Rebound Tenderness	1	1
E---- Elevated Temperature	1	1
L--- -Leucocytosis	2	
S---- Shifting to the left	1	
F--- Foeter Oris		1
DRY White Coated Tongue		1
R----Rovsing Sign		1
Total	10	10

The sum of all scores were calculated for each patient and based on the results patients divided to (three) groups :

1--Total score 7 & above (emergency surgery group) Emergency surgery were done

2--Total score 5--6 (observation group) These patients were admitted and kept under observation for 24 hours with frequent re-evaluation of the clinical data and reapplication of this score. The conditions of some patients improved shown by decrease in scores and therefore they can be discharged with instructions that they must come back if symptoms continue or increase in severity

3--Total score 1--4 (discharged group) These patients after giving initial treatment were discharged with instructions to come back if symptoms persist or condition become worse. The diagnosis of acute appendicitis was confirmed by operative findings and pathological assessment of appendectomy specimens. Finally the reliability of a new score was assessed by calculating negative appendectomy rate (the proportion of operated patients having normal appendix removed) and Positive predicted value (the proportion of patients with a positive test result who actually have the disease),

Results

We conducted this study in 120 patients with clinical features suggestive of acute appendicitis. Among 120 patients 72 were

female (60%) while 48 were male like 40% . Ratio male/female = 1:1.5 . Mean age was 20.2 years range (9—56) years

(4)

standard deviation 8.1 years with median age of 23 years . Most of patients were of younger age group . Frequency distribution of the patients according to A studied scoring system is given in table (2). Mean scores for the emergency surgery group --observation group --and discharged group were 8.4—5.5 and 3.6 respectively (range of score 1-10) table (3) Group wise results were as follows:-

1- We received (24) patients with a score of (1-4) All of them were discharged after initial assessment and symptomatic treatment. (4 patients) of them came back with increased severity of symptoms and score had become 7 or more within 48 hours. They were admitted and all of them underwent surgery. Operative finding and pathological reports showed that all the (4) patients had appendices while 20 patients discharged i . e had normal appendices. These patients either recovered or return to other hospital branches.

2- 36 patients had score of 5-6 females were (18)=50% while males were (18)=50% Patients. 20 patients ended up in a score of 4 or less after 24 hours and therefore were discharged. after asking them to return back if symptoms persist. Only 16 cases were increased in severity of symptoms with a score 7 or more on reevaluation with first 24 hours. These 16 patients underwent appendectomy

.Operative findings and histopathological reports showed that 12(75%) patients had inflamed appendix and the remaining 4(25%) patients had normal appendix.

3- In (60) patients the score was found to be (7) or more. All were admitted and underwent appendectomy. Operative findings and pathological reports showed 48(80%) patients had inflamed and 12(20%) patients had normal appendices. Negative appendectomy rate in this group was=20%. Total no. of surgeries done were (80) cases. Operative findings and

pathological reports showed that 64 patients=80% had inflamed appendices. The negative appendectomy rates was 16 cases=20% Positive Predictive Value of our score was 80% (male84%, females 76% Negative Predictive Value was73.5%. Among all surgeries performed (4)=6.25%% patients had perforated appendices and (4) patients had gangrenous appendices none of them was missed by a(Tested score) and all were operated .

Table 2. Number & percentage of patients according to a tested score

Suggested score	No. of Patients	Percentage
1	-----	-----
2	-----	-----
3	9	7.5%
4	15	12,5%
5	12	10%
6	24	20%
7	15	12.5%
8	24	20%
9	15	12.5%
10	6	5%
Total	120	100%

Table 3. Results of application of (tested) score

Management Group	Results	Percentage	Mean Score
Surgery	60	50%	8.82
Observation	36	30%	6.65
Discharge	24	20%	4.15

Table 4. Results of exploration operative finding and pathologic finding Findings No .of patients

Inflamed Appendix	64	80%
Acute Appendicitis	56	77.5%
Perforated Appendicitis	4	6.25%
Gangrenous Appendicitis	4	6.25%
Normal Appendix	16	20%
Ovarian Cyst Pathologies	4	5%
Pelvic Inflammatory Diseases= PID	4	5%
Mesenteric lymphadenitis	4	5%
Urological Pathologies	4	5%
Total Operated Patients	80	100%

Table 5. Tested Clinical Score Diagnosis Cross-Table

Category	Normal Appendix	Acute Appendicitis	Total
Equivocal (5- 6)	12	24	36
High Probability (7- 10)	48	12	60
Low Probability (1- 4)	4	20	24
Total	64	56	120

Table6. Tested Clinical Score Diagnosis Cross

COUNT	ACUTE APPENDICITIS	NORMAL APPENDECES	TOTAL
SCORE>7	48 TP	12 FP	60
SCORE<7	16 FN	44 TN	60
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Table(7) STATISTICULAR RESULTS OF THE STUDY

SENSITIVITY=TP/TOTAL	DISEASED	PATIENTS=48/64X100%	=75%
SPECIFICITY=TN/TOTAL	NORMAL	APPENDIX=44/56X100%	=78,57%
ACCURACY RATIO=TP+TN/TOTAL	No	PATIENTS=48+44/120	=76.66%
POSITIVE PREDICTIVE VALUE=TP/TOTAL CASES	7 < SCORE	=48/ 60=80%	

Discussion

The diagnosis of acute appendicitis depends on experience and clinical judgment. The diagnosis of acute appendicitis remains a challenging task for surgeons. The tested clinical score is a non-invasive safe diagnostic procedure that is simple fast cheap and reliable. The application of this score improves diagnostic accuracy and reduces complication rate . This score can be used as an objective criterion in screening patients with suspected appendicitis .It is applied purposefully and objectively in the patients of abdominal emergencies. The main aim of the clinical decision making process is to reach an accurate diagnosis in the FASTEST AND CHEPEST way .History and clinical examination provide useful data regarding diagnosis but even then different possibilities are there. The specialist surgeon is the person who decides the management of choice and cost-effective .Of course the more experienced the surgeon is more will be the diagnostic accuracy but the junior surgeons have to make the initial assessment and admit the patients and wait specialist decision to operate . Thus there is need of a complementary aids in difficult decisions .At present many clinical scores are available and useful in the of acute appendicitis . The choice that weather to operate or not is very important because surgical intervention for acute appendicitis carries definitive risk of mortality and morbidity. These days the diagnosis of acute appendicitis is mainly clinical .Different diagnosis aids have appeared recently and among these laparoscopy and ultrasound test have shown good results but they also have limitations and drawbacks .Thus there is need of a complementary aids in difficult decisions

.At present many clinical scoring system are available and have proved useful in the management of acute app Initial assessment can be improved by clinical scoring system like Alvarado which is based on: History----Physical examination—and few laboratory investigations and very easy to apply . A structured form for recording pats data provide a more consistent and complete pre—operative pat assessment and it can be a cheap and quick tool to apply in emergency units. Results of our study are comparable with the literature. Negative appendectomy rate in our study was 1(20%).It is comparable with the figures shown in literatures as(20%-40%) (6). Removal of some normal appendix is bound to lower the rate of perforation and consequently mortality Literature shows that if negative appendectomy rate is less than 10%-15% then the surgeon is operating on too few pats thus increasing the risk of complication .Some centers have even reduced negative appendectomy rates to less than 10% by having regular audit of appendicitis .Our study shows that application of suggestive score enhances accuracy of diagnosis POSITIVE PREDICTIVE VALUE OF suggested score (80%) is comparable with previous studies which reports 82.5%—80.3%—81.4%. Negative Predictive Value=73.3% which was compatible with some studies . Our study also revealed that female may need additional investigations to confirm diagnosis .In our study accuracy is the same in adults and children =76.6% This result was similar to previous studies where optimum accuracy rate = 70%-80%. Of our study Sensitivity rate=75%Specificity rate=78.57% .These results were congruent to (5) **We achieve the same results of Alvarado statistical criteria with easier low - cost quicker new score**

Conclusion

This study showed that clinical scoring systems like Alvarado and suggested scores can be cheap and quick tools to apply in emergency units to rule out differential diagnosis in acute appendicitis. This score is a dynamic one allowing observation and critical reevaluation of the evaluation of the clinical picture. Its application improves diagnosis accuracy and reduces negative exploration and complication rates like perforation.

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