

Original article

Correlation between Surgical Alvarado score and histological examination in the assessment of acute appendicitis

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Abstract

Objective: The aim of this study was to assess the diagnostic accuracy performance of Alvarado score in patients with suspected appendicitis with respect to histological examination .

Methods: In this retrospective study we examined the files of 84 patients who underwent appendectomies at Prince Hashem Bin Abdullah II Hospital in Aqaba and king Hussien Hospital in Amman from August 2013 to December 2015 . Alvarado score was calculated from preoperative notes . All cases had subsequent histological examination which was also obtained from the patients' files .

Results: out of 84 patients who underwent appendectomy , diagnosis was confirmed by histopathological findings in 68 patients . 63 of them with alvarado score of 7 or more (92,6 %) , the normal appendectomy rate was 19 % . the number of patients with score less 5 , 5 - 7 , 7 - 9 were 7 , 24 , 53 respectively , while the number of appendicitis in each group were (4,7 %) , 8 (33,3 %) , 49 (92,4 %) .

Conclusion: Alvarado scoring system is a simple and reliable test in the pre-operative diagnosis of acute appendicitis and should be encouraged in day to day practice to ensure best patient care and management .

Keywords: *appendicitis , alvarado score , histopathology ..*

Introduction

Acute appendicitis is one of the most common causes of an acute abdomen which need surgery (1) (2) . Every person has a 7 % risk to get acute appendicitis during his life (3) (4) . Symptoms of appendicitis can mimic other surgical conditions like non specific abdominal pain , acute cystitis , perforated peptic ulcer , acute pancreatitis , diverticulitis , inflammatory bowel disease , peritonitis , bowel obstruction , trauma , hepatitis , dissecting abdominal aortic aneurysm , rupture ovarian cyst , and ectopic pregnancy , UTI , etc. (1) (2) , thus making definitive preoperative diagnosis difficult , mainly at an early stage of presentation (5) (6) .

Plan of treatment for these Patients can be divided into different management strategies : like reassurance , or pursuit of an alternative diagnosis

or observation/admission to hospital . If admitted to hospital , appropriate imaging study may be needed before proceeding to an appendectomy (7) (8) .

Imaging studies like computer tomography or ultra sound usually used in assessment patients with suspected acute appendicitis , they can help in decrease number of negative appendectomies , but these models of investigations are operator dependent which decrease their sensivity and specificity , so for previous reasons the surgeon usually depend on his clinical sense and findings to make a final decision to perform appendectomy or not (9) (10) (11) (12) .

Alvarado scoring system which uses a 10 - point clinical scoring system based on symptoms , signs and diagnostic tests was introduced in the

preoperative assessment of acute appendicitis . (figure 1) (1) (7) (13) .

The aim of the study was to predict accuracy of Alvarado scoring system for diagnosis of acute appendicitis and correlate it with the absolute diagnostic modality , histopathology .

Alvarado Score :	
Feature :	Score :
Migration of pain	1
Anorexia	1
Nausea	1
Tenderness in right iliac fossa	2
Rebound pain	1
Elevated temperature	1
Leucocytosis	2
Shift of WBC to the left	1
Total :	10

1 - 4 ---- Discharge

5 - 6 ---- Admission and Observation

7 - 10 ---- Surgery

Methods

This retrospective study was conducted in the Department of Surgery of Prince Hashem Bin Abdullah II Hospital in Aqaba and King Hussein hospital in Amman from August 2013 to December 2015 . A 84 patient underwent appendectomy in that period of all age groups and both genders were included in the study .

Data were retrieved from the 84 patients' files , and from the Histopathology Department in King Hussein Medical Centre of the Royal Medical Services computerized data base . Patients with gynecological or surgical problems other than appendicitis or patients with incomplete documentations were excluded from the study .

Given that the hospital hematology laboratory WBC differential count doesn't include band (Immature neutrophils) so a left shift could not be assessed in our 84 patients . Making our Alvarado Score out of 9 instead of 10 .

From the Admission notes and Investigations Alvarado Scoring where computed and patients were categorized into 3 groups : < 5 Are Unlikely to have Appendicitis , 5 – 7 probably having appendicitis , and 7 - 9 labeled as diagnostic Appendicitis .

Alvarado scores , operative findings and histopathological report were all correlated and analyzed together so we can find out the negative appendectomy rate , the positive predictive value

in order to assess the reliability of Alvarado scoring system .

Result

A total of 84 patients were included in this study . Mean Age was 17.4 years in a range of 07 - 40 years and there was 48 (57,1 %) male and 36 (42,8 %) female .

7 (8.3 %) patients were categorized within the < 5 score range , 24 (28.5 %) were placed within 5–7 and 53 (63 %) in to the last score range of 7 – 9 .

The sex distribution was 7 (100%) males and no females within 1 – 4 range , 14 (58,3 %) males and 10 (41,6 %) females in the group score range of 5 – 7 , 25 (47,1 %) males and 28 (52,8 %) females in the last group .

out of 84 patients who underwent appendectomy , diagnosis was confirmed by histopathological findings in 68 patient (80,9 %) . 63 of them with alvarado score of 7 or more (92,6 %) , the normal appendectomy rate was 19 % . the number of patients with score less 5 , 5 - 7 , 7 - 9 were 7 , 24 , 53 respectively , while the number of appendicitis in each group were (4,7 %) , 8 (33,3 %) , 49 (92,4 %) .

Score	Number of patients	Number of positive appendectomy
< 5	7	4.7 %
5-7	24	8 (33,3 %)
7-9	53	49 (92,4 %)

Discussion

Approving diagnosis of acute appendicitis still considered a challenge to most of surgeons , even with all developing in radiological investigations the history and physical examination still the main and most important part to confirm the diagnosis and make a decision to operate or not . (15) (16) During last decades a many suggestions were discussed to find a way to decrease a rate of negative appendectomy , until 1986 when A.Alvarado suggest a scoring system contain 8 predictive factors depend on history , physical examination and lab results . This scoring system has maximum points of 10 . Since this time many studies were done to study the efficacy of this scoring system . (15) (16) (7)

Comparing results in our study to different studies in literatures . Our study shows a positive appendectomy of 80 % and 92,6 % for scoring above 7 , comparable with literature reports of 86,9 % (15) , 71,3 % (17) .

In Iran-Tahran study was done on 300 patients , their results were 85.66 % of patients had scores of 7 or less and 14.33 % had scores more than 7 . For patients that had approved appendicitis , 25.7 % had Alvarado scores of 7 or less , whereas 93 %

had Alvarado scores more than 7. In this study sensitivity of the Alvarado scoring system had 37 % , and the specificity was high at 95 % . (1)

In India study included 130 patients who suspected to have acute appendicitis , The positive predictive value was 88.37 % where 95 patients approved that had inflamed appendix and negative appendectomy rate was 11.63 % (with respect to Alvarado score > 7) . (18)

In another study done specially on group of geriatric patients and compared between Alvarado score and another scoring system called Lintula score , on 1728 patients almost none of the patients who suffered Acute Appendicitis had Alvarado score less than 3 and almost all patients who had score 7 and above they approved to have acute appendicitis . This give very high specificity to Alvarado score above 7 . (4) (19) .

Looking to the development in radiological investigations specially in (US \ CT) we have to mentioned that they are helping so much in confirm the diagnosis of acute appendicitis . (20)

Some studies which discussed the efficacy of radiology(US \ CT) to confirm the diagnosis mentioned that the ultrasonography has 55 % to 98 % sensitivity and 78 % to 100 % specificity (21) .

But in other hand some studies showed up that Ultrasound don't give any change to decrease the rate of negative appendectomy and don't have any advantage over using the Alvarado Score to establish the diagnosis . (17) , (21) .

Difference in results on these studies can be referred to that the Ultrasound and CT is an operator – dependent technique .

Conclusion

1 - Alvarado scoring system is very useful method can be done by all surgeons and can help them to make a decision about next step in management patients with suspected acute appendicitis and can prevent an unnecessary appendectomies .

2 - High negative rate in our patient comparing with literature improve us to use an Alvarado Score on all our patients who suspected to have acute appendicitis .

3 - Clinical judgment still the first and important part to made decision on way of management patients with suspected acute appendicitis .

Limitation of study

The hospital hematology laboratory don't give count of immature neutrophils , so a left shift of WBC couldn't be assessed , making our alvarado score 9 instead 10 .

The archive systems in our hospital is not organised which made us find just 84 files from 170 patients we had in beginning of our study .

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