The Assessment of Modified Alvarado Score in the Diagnosis of Acute Appendicitis

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Abstract

Background: Acute appendicitis is the most common surgical emergency. The case fatality rate has fallen to less than 0.1% for uncomplicated appendicitis as a result of early diagnosis and intervention.

Objective: To evaluate the accuracy of the modified Alvarado score in the preoperative diagnosis of acute appendicitis and to compare the result of our study with others.

Methods: A prospective study was carried on including seventy eight patients with presumptive diagnosis of acute appendicitis in Baquba general hospital for one year period (first of jan. 2001 through 30 first of Dec. 2001) and the data were analyzed using a modified Alvarado score.

Result: The presence of high score was found to be an easy stationary aid to early diagnosis of appendicitis.

Conclusion: The modified Alvarado score is simple to use easy to apply. Effective particularly in men while diagnosis laparoscopy is advised in woman to minimize the false negative appendectomies. Still its validity has to be assessed in pediatric age group.

Keywords: Modified Alvarado score acute appendicitis.

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Introduction

The recognition of appendicitis as a clinical and pathological entity for which surgical therapy is essential dates from 1886 when Reginald Fitz gave a paper at the first meeting of the association of American physician entitled preformatting inflammation of the vermiform appendix.

While the diagnosis of acute appendicitis can usually be made on the basic of careful history and physical examination. A certain percent of patients will present with either a history which is not consistent with the diagnosis or an equivocal clinical findings. In a retrospective study of patients operated upon for suspected appendicitis operated upon for suspected appendicitis.

The negative (laborotomy rates was 23% in females and 7% in male patients) [1,2].

In recent years considerable attention has been devoted to the development of diagnosis techniques such as peritoneal aspiration cytology. Computer analysis, ultrasound, laparoscopy. However these techniques involve additional cost. And are yet to achieve a (wide spread use) [3].

A scoring system described by Alvarado was designed to reduce the negative appendectomy rate without increasing the morbidity and mortality [4].

The aim of this study is to evaluate the usefulness of a lightly modified version of the Alvarado score in patient with provisional of acute appendicitis.

Patients and methods

A prospective study of 78 patients with provisional diagnosis of acute appendicitis for one year period (first of jan. 2001 through 30 first of Dec. 2001) was done. All patients were admitted from causality department to surgical wards. Baquba general hospital. They were 40 males and 30 females with ages from 6-60 years. However they are 8 children (age less than 14 years).

Patients were interviewed, examined and investigated (white cell count) by one surgeon and operated upon by different surgeons. Age, sex , presenting symptoms , physical and operative findings were introduced into a data sheet.

All the data were analyzed using a modified Alvarado score. Which have been advocated (by kalan et al (33) after omitting the left shift of the neutrophils maturation (score 1).

Patients with score of (1 - 4) were considered unlikely to have acute appendicitis. Those with score (5-6) had possible diagnosis of acute appendicitis. While those with a score (7 – 9) were graded as acute appendicitis and underwent appendectomy. All patients with score (less than 7) were submitted to a period of active observation and the score was reassessed should any change in the patient condition occurs.

All appendices were examined macroscopically and longitudinally bisected. Divided into inflamed and normal looking appendices. The later were submitted to histological examination. The appendix was regarded as inflamed if its lumen contains obstruction faecolith, distended by purulent material. Ulcerated or necrotic mucosa, congested swelling of the muscular wall , and the presence of inflammatory peritoneal exudate .

Results

Our assessment categorized 78 patients into three groups, adult men, adult woman , and children. With age ranger (6 – 60).

The result were summarized in the following tables and figures.

Considering those patients with high modified Alvarado score. Table (II). The 24 men. 15 woman and 3 children. In the adult male group . appendicitis was confirmed in all patients (true positive) with a sensitivity rate of 93.8%. In the adult female group, 14 out of 15 had appendicitis (true positive) producing a sensitivity rate of 90.5% , while the woman with histologically normal appendix. Had an ovarian pathology producing a false positive rate of 5%. In addition 2 out of 3 children had appendicitis (true positive) with a sensitivity rate of 83.3% , while the child with histologically normal appendix , had meckels diverticulitis (false positive rate 16.7%). Over all they indicates false positive rate of 3.6%.

Those patient with modified Alvarado score less than 7, only 3 out of 11 patient underwent surgery. Table III, had one appendicitis producing a false negative rate of 9.6%. they were one man , one woman , and more child, No patient with score less than 5 underwent surgery.

The operative finding in relation to both groups is that, tow from those patients with score more than 7 , had histologically normal appendices (false positive) , while 5 from those patients with score less than 7 had

inflamed appendices (false negative). The operative findings in patient with histologically normal appendices : tow patients with score more than 7 had other surgically correctable pathologies (one had overian cyst, the other had mechels diverticulum). Patients with score less than 7 who had normal appendices.

Had other diseases which can be treated conservatively (pelvic inflammatory disease. Mesenteric lymphadenitis and nonspecific abdominal pain . few had other pathologies which need surgery (overian cyst).

The validity of the modified Alvarado score was shown in fig.(3), the sensitivity (91.5%) and specificity was (95.9%) in 78 patients with provisional diagnosis of acute appendicitis.

Table 1: The Alvarado & Modified Alvarado Score.

		Alvarado	Modified Alvarado
Symptoms	Migratory RIF pain	1	1
	Anorexia	1	1
	Nausea / vomiting	1	1
Signs	Tender RIF	2	2
	Rebound tenderness RIF	1	1
	Elevated temperature > 37.5	1	1
Lab. investigation	Leucocytosis	2	2
	Shift to left neutrofils	1	-
Total score		10	9

Table 2: The Sensitivity of Modified Alvarado Score.

	No of Patients	Score more than 7	Appendicitis	Sensitivity
Men	40	24	24	93.8%
Woman	30	15	14	90.5%
Children	8	3	2	83.3%
total	78	42	40	91.5%

Table 3: The specificity of Modified Alvarado Score.

	No of Patients specificity	Score less than	operated	Appendicitis	specificity
Men	40	16	1	1	100%
Woman	30	15	8	1	95.2%
Children	8	5	2	1	90.9%
total	78	36	11	3	95.%

	Score more than 7	Score less than 7	Total
Positive	41	4	45
Negative	1	32	33
total	42	36	78

Sensitivity=41\45*100=91.5%

Specificity=32\33*100=95.5%

Discussion

Acute appendicitis represent a common cause of abdominal pain, individual carry a 7% life time risk of developing appendicitis [1]. Acute appendicitis is by no means an easy diagnosis to make and can battle the best physician. Failure of early diagnosis can lead to progression of the disease with its attendant morbidity & mortality. Routine history & physical examination remains the most effective & practical diagnosis method [6] the result demonstrate that modified Alvarado score carries a false positive rate which varies according to the age groups. Our study demonstrates that simple scoring system in patient suspect of having acute appendicitis works extremely well in men with sensitivity of 93.8%. while in women particularly the child bearing age, even with score of 7 or more about 5% did not have an inflamed appendix. These findings are supported by a large study by Owen et al [7] involving 215 patents over a year with similar conclusion.

In children . migratory RIF pain may be overlooked by a distressed child & rebound tenderness can be difficult to elicit accurately . in addition , children often display a florid abdominal signs & symptoms during inter current infections. These findings are supported by a study carried by stringer et al [8] involving 118 patients with ages range (4-14) with acute abdominal pain studied for 6 months period. The false positive rate was 11.6%. The incidence of perforation in acute appendicitis range from (17-40) with median of 20%(1) being more common in children & adult ages (5) both these groups percentage is low in our study. Resulting in low incidence of perforation. As well as the more accurate diagnosis depending on the application of the Alvarado score.

Conclusions

Routine history & physical examination remain the most practical diagnostic method. The modified Alvarado score is simply to use & easy to apply since it depend on history. Physical examination & basic lab investigation (W.B.C. count).

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