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PROTOCOL BASED MANAGEMENT OF ACUTE RIGHT ILIAC FOSSA PAIN TO IMPROVE DIAGNOSTIC ACCURACY

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ABSTRACT

OBJECTIVE: *To determine that Clinical use of a diagnostic score improves decision making in acute appendicitis.*
STUDY DESIGN: *Descriptive case series.*
SETTING *Surgical units 4 and 5 of Civil Hospital Karachi*
METHODOLOGY: *All patients presented consecutively through emergency department with complaints of right iliac fossa pain were included. All the relevant information was recorded in a Performa. These patients were divided in to 3 groups according to Alvarado Score. Group I comprised of patents with score 7 or more, all were admitted to the surgical ward and operated for Appendicectomy. Group II included patients with Alvarado score 5-6; they were admitted to ward for observation for 24 hours. Those improved were sent home while those in whom symptoms aggravated and score rose were operated for Appendicectomy. Group III included patients with score 1-4. They were evaluated in emergency department, given symptomatic treatment and sent home with directions to report if symptoms aggravate or persist.*
RESULTS: *Out of 201 patients, 164 (81.6%) were operated with the diagnosis of acute appendicitis, (94 male and 70 female) among them 140(85.4%) had acute appendix; (83male and 57female). Negative appendicectomy was done in 24 patients (14.6%) 15 male and 9 female. The positive predictive value of Alvarado score was 85.4 %.(male 88.3% and female 81.4%)*
CONCLUSION: *Alvarado score is a helpful tool for the admission criteria and further management in order to reduce unnecessary admissions and to reduce the morbidity and mortality of acute appendicitis. It is easy, simple and cheap and has special place in developing countries where costly diagnostic facilities like Ultrasound, CT scan. MRI and C reactive protein estimation is not available in majority of hospitals*

KEY WORDS: Alvarado Score, Acute appendicitis, Pain right iliac fossa, scoring system

INTRODUCTION

The early and accurate diagnosis of acute appendicitis is still a difficult problem1. Despite introduction of ultrasound, CTscan or MRI and special laboratory investigations (e.g. C-reactive protein) high diagnostic error rates are observed. Thus significant number of perforations of appendix and high rates of negative appendectomies still occur which are highly undesirable simply because perforations adds to mortality and morbidly in an easily controllable condition. Similarly negative appendectomies have low but definite mortality and morbidity rates in addition such patients under go un- necessary operations.2 In the last few years, several scoring systems have been developed for supporting the diagnosis of acute appendicitis. Initial evaluation studies have reported excellent results, indicating that scoring systems would be ideal as diagnostic aids because they have good performance and require no special equipment, being user-friendly and comprehensible to the clinician.1.3.4 The Alvarado score was first described in 1988 by Alfredo Alvarado as a practical score for the early diagnosis of acute appendicitis, that can be instituted easily in the outpatient setting. It is a 10 point scoring system based on clinical symptoms, signs and total and differential leukocyte count5 .6.7 (Table 1).He suggested operation for patients having a score of 7 or above. Kalan et al brought out a modified Alvarado score by excluding DLC and reducing total score to 97. This modification is not accepted by every one.
This study was developed and evaluated in surgical department of Civil Hospital Karachi

to ascertain the validity of Alvarado Score; so as to identify the parameters in history, clinical examination and laboratory findings which may help to decide which patients may have a serious underlying disease process, and therefore warrant more expedited evaluation and treatment.

METHODOLOGY

Patients above the age of 12 years and both genders presented consecutively at the emergency department of Civil Hospital Karachi during a period of 1year from May 2007 to April 2008 with acute right lower quadrant abdominal pain were included in the prospective study. Patients were examined by the admitting surgical team after taking a thorough history. Specific points noted include; gender, duration of pain, site of pain, character of pain, fever, loss of appetite, change in bowel habit, vomiting, abdominal distension and urinary or genital symptoms.

Points in the clinical examination that were considered of significance included temperature, tachycardia, and abdominal tenderness and localized guarding.

Investigations included full blood picture, urine routine examination, x-ray KUB.

Data was collected on the patients' case files and master register of the surgical ward. All relevant information was stored in Specific Performa, which included the relevant 8 variable of Alvarado score. See Table 1.Then the sum of all the scores were calculated for each patient and based on the results patients were divided into three groups.

1. Aggregate score 7-10.All patients in this group diagnosed to have acute appendicitis and underwent emergency appendicectomy.
2. Aggregate score 5-6. These patients were admitted and kept under observation for 24 hours with frequent re-evaluation of the clinical data and re-application of the score. Condition of some patients improved shown by a decrease in score and therefore they were discharged with the instructions that they should come back if symptoms persist or increase in intensity. Where as those patient whose condition aggravated with increase of Alvarado Score were operated for appendicectomy
3. Aggregate score 1-4: these patients, after giving initial symptomatic treatment, were discharged and sent home with the instructions, to come back if symptoms persist or condition become worse.

The diagnosis of acute appendicitis was confirmed by operative findings and histo-pathological assessment of the appendicectomy specimen.

Finally the reliability of Alvarado scoring system was assessed by calculating negative appendicectomy rate in which case appendix was normal looking at operation and on histopathology no inflammatory changes were reported; and positive value which included the proportion of patients proved of having acute appendicitis at operation and confirmed later by histopathology.

Exclusion criteria was urological, gynecological conditions or mass in right iliac fossa

Table 1

Alvarado Scoring System

Symptoms	
Pain migrated to right iliac fossa	1
Nausea/Vomiting	1
Anorexia	1
Signs	
Tenderness in right iliac fossa	2
Rebound tenderness in right iliac fossa	1
Fever	1
Laboratory findings	
Leucocytosis, more then 10000/ml	2
DLC shift to left, polymorphs >75%1	1

Interpretation of Alvarado Scoring System

Score 1-4: Acute appendicitis *very unlikely:* keep under observation.
Score 5-6: Acute appendicitis *may be*: for regular observation.
Score 7-10: Acute appendicitis highly *probable or definite:* operate.

Table 2

Post-operative Diagnosis

Acute Appendicitis	**139**
Normal appendices	**62**
Total	**201**
Other diagnoses at surgery, which were not included in the study	
a) Complicated ovarian cyst	**3**
b) Rupture Graafian follicle	**1**
c) Ectopic Pregnancy	**2**
d) Pelvic inflammatory disease	**2**

Table 3

Comparison of accuracy with other studies

Authors	Year	No of Patients	Accuracy
T.D.Owen et al18	1992	215	78%
M.Y.P. Chan20	2001	148	77%
I Khan et al 7	2005	100	72%
N A Lone et al8	2006	240	88%
N.Baidya et al18	2007	231	82%
Current Study	2008	201	85.4

RESULTS

This study was conducted on 201 patients,

122 were male (60.7%) and79 female (39.3%) with ages ranging from 13 to 65 years (mean 22yrs). According to Alvarado score these patients were divided into 3 categories.

1. Alvarado score 7-10 .In this group there were 152 patients (75.6%)that were admitted to the hospital and all were operated. 130 patients had positive finding of acute appendicitis, the remaining 22 patients had normal appendix. The sensitivity of Alvarado score in this group was 86/%.
2. Alvarado score 5-6. Here 32 patients (16%) on admission were kept under observation. Out of these 20 were discharged after 48 hours due to clinical improvement. The remaining 12 patients were found with increased severity of clinical features and Alvarado score rose to 7 and above, all of them were operated and acute appendicitis was found in 9 and normal appendix in 3 patients. Sensitivity being 90.6%. Acute appendicitis found at surgery was confirmed by histopathology.
3. Alvarado score 1-4. Seventeen patients (8.4%) were not admitted but all of them after initial assessment and symptomatic treatment were sent home with instructions to report immediately if condition aggravate. None of them reported with complaints of acute abdomen in follow up.

In this series in all 164 patients 81.6% were operated with the diagnosis of acute appendicitis,(94 male and 70 female) among them 139(85.1%) had acute appendix; (83male and 56female) and 25 (14.6%) patients were with normal appendix (15 male and 9 female). Thus the positive predictive value of Alvarado score was 85.4 %.(male 88.3% and female 81.4%)

No patients with gangrenous or perforated appendicitis scored less than 7. No patient with score of 4 or less was found to have appendicitis. Shifting pain to right lower quadrant was the most common feature present in74 % of patients. Among all surgeries performed 19 patients (11.5%) had perforated appendices and 11patients (6.7%) had gangrenous appendices, all were scored 8 or above and none of them was missed by Alvarado score thus all were operated. Our operative findings are shown in Table 2

DISCUSSION

The diagnosis of acute appendicitis still remains a daunting task for surgeons and the general practitioners. A negative rate of appendectomy of 20 - 40% is not an unusual finding in surgical literature8 much difficulty is faced in a suspect with equivocal signs. A surgeon's goal is to avoid a negative laparotomy so as to save the patient from economic loss as well as operative morbidity and mortality associated with the procedure. On the other hand missing an acute appendicitis could result in perforation and peritonitis that definitely increases the morbidity and mortality. To control this problem many investigative tools are in use like ultrasound, CT scan, diagnostic laparoscopy etc but none has proved very satisfactory and at the same time they increase the cost of treatment7.8.9. Another approach towards this problem is the search of scoring systems. Different scoring systems have been tried like Ramirez, Teicher and Ohmann.10 Recently the Alvarado Score has been devised which is now routinely in use as it is simple and can be instituted easily as the scoring is clinical, non-invasive and can be used to support diagnosis of acute appendicitis. 11. 12It is a structured form for recording patient's data and provides a more consistent and complete pre-operative patient assessment and it can be a cheap and quick tool to apply in emergency room. 13

It is clearly proved in our study that routine application of Alvarado scoring system in diagnosis of acute appendicitis results in achieving high degree of positive predictive value and thus diagnostic accuracy. A Positive predictive value of 85.4%.in our study is comparable with the literature where it has been reported between 82 to 89% 10. See Table 3 for results of some important studies. Gender wise break up of sensitivity was male 88.3% and female 81.4%. This is in conformity with world literature14.15. The comparatively low figures of sensitivity in females or in other words higher negative appendicectomy rate of18.6% against 11.7% in males are due to presence of female sex related disorders which mimic acute appendicitis, like pelvic inflammatory disease, tubal pregnancy, salpingitis, twisted ovarian cysts, and ruptured ovarian cysts etc.16. To minimize these problem female patients need to under go additional investigations.9.17

In our study patients who have no evidence of guarding, normal temperature, and normal white cells count fell into the Alvarado score of 1-4 all of them were observed and no one had acute appendicitis. This practice proved to reduce the rate of negative appendicectomy and is in total agreement with world literature17.18.19.Many studies18.19.20 have shown that, there was no perforated appendicitis in patient with a score of less than 6, and suggested the use of the score by general practitioners; the same fact was proved in our study. The present study revealed Alvarado score = 7 to have accuracy of 85.4%. In patients with score = 6 observations lead to correct diagnosis in 39 out of 42 and none of them had perforated appendicitis. This means patients with score = 6 should be observed and the decision to operate should be changed accordingly. Thus Alvarado score is a practical, reliable and easy to use. It can be helpful for safe and accurate decision making in patients with acute appendicitis. It can also categorize the patients for observation.

CONCLUSION

In patients with RIF pain, Alvarado score is found to be helpful in the diagnosis and management of acute appendicitis. Alvarado score can be recommended as a helpful tool for the admission criteria and further management in order to reduce unnecessary admissions and to reduce the morbidity and mortality of acute appendicitis. This scoring system is easy, simple and cheap and has special place in developing countries where costly diagnostic facilities like Ultrasound, CT Scan. MRI and C reactive protein estimation is not available in majority of hospitals.

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