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Study on the diagnostic accuracy of the Alvarado score in the diagnosis of acute appendicitis

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Abstract

Diagnostic accuracy of Alvarado score in diagnosing acute appendicitis has been in the talk for a long time. The accuracy of Alvarado score in the diagnosis of acute appendicitis is disappointingly low in Asian population according to some studies. If so how much is it capable of diagnosing is the talk. This study puts in an effort to find the answers.

Keywords: Scoring system, Alvarado score, acute appendicitis

Introduction

The diagnosis of appendicitis is clinical and essentially is based on history, clinical examination and routine laboratory tests. The classic form of appendicitis may be promptly diagnosed and treated, however, when it presents with atypical features, it poses a diagnostic challenge. In such cases, laboratory and imaging investigation may be useful in establishing a correct diagnosis. Early and accurate diagnosis is essential to prevent morbidity and mortality related to appendicitis. According to available statistics, 1 out of 5 cases of appendicitis is misdiagnosed whereas a normal appendix is found in 15-40% of patients who undergo an emergency appendectomy [1-3]. In attempts to increase the diagnostic accuracy and reduce the high negative appendectomy rate, various scoring systems, imaging modalities and novel techniques have been devised, however, most of these are complex, expensive and difficult to implement in emergency situation. Several scoring systems have been developed to increase the diagnostic accuracy of the appendicitis, of these, the Alvarado scoring system has been the most popular. This popular system has been developed for the western population and several studies had pointed out its inadequacy in the South East Asian scenario [5]. A new scoring system, Raja Isteri Pengiran Anak Saleha Appendicitis (RIPASA) score has been developed to aid in the diagnosis of acute appendicitis in the Asian countries. This study intends to find the sensitivity, specificity and predictive value of Alvarado scoring system. Elements from the person's history, the physical examination and from laboratory tests:

- Abdominal pain that migrates to the right iliac fossa
- Anorexia (loss of appetite) or ketones in the urine
- Nausea or vomiting
- Tenderness in the right iliac fossa
- Rebound tenderness
- Fever of 37.3 °C or more
- Leukocytosis, or more than 10,000 white blood cells per microliter in the serum
- Neutrophilia, or an increase in the percentage of neutrophils in the serum white blood cell count.

The two most important factors, tenderness in the right lower quadrant and leukocytosis, are assigned two points, and the six other factors are assigned one point each, for a possible total score of ten points.

A score of 5 or 6 is compatible with the diagnosis of acute appendicitis. A score of 7 or 8 indicates a probable appendicitis, and a score of 9 or 10 indicates a very probable acute appendicitis.

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Aims and Objectives

The study intends to find the sensitivity, specificity and predictive value of Alvarado scoring system.

Materials and Methods

A cross-sectional study design was employed.

The study population included all the patients attending the OPD with right iliac fossa pain, vomiting and fever was clinically examined those with a suspected clinical diagnosis of appendicitis and posted for appendectomy.

A total of 30 cases were studied. This study was done in MES Medical College.

This study was done from March 2019 to February 2020.

Exclusion Criteria

Patients of age below 12 years and with complications of appendicitis [perforated appendix, appendicular mass and malignancy, elective appendectomy. Decision to operate was usually made by general surgical teams who are not members of the research team and their decision is based on clinical judgment. Once appendectomy is decided, history taken, physical examination performed and the laboratory results reviewed, Alvarado scoring performed. Preoperative and histopathological findings were followed from the records. Preoperative findings considered positive for appendicitis were limited to the terms: normal, early appendicitis, inflamed appendix, suppurative appendicitis, perforated appendix, gangrenous appendix and appendicular mass. Histopathological finding consistent with diagnosis of appendicitis is inflamed appendix.

Results

Table 1: Alvarado score findings

Sensitivity	65
Specificity	90
PPV	96.6
NPV	37
Diagnostic accuracy	69
Negative appendectomy rate	3.3
Diagnostic odds ratio	16.5

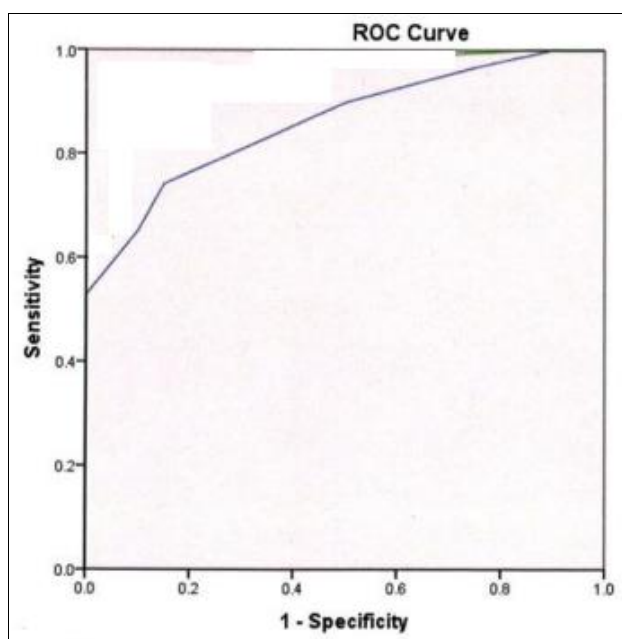


Table 2: ROC Curve

Discussion

There are new scoring systems like, Raja Isteri Pengiran Anak Saleha Appendicitis (RIPASA) score has been developed to aid in the diagnosis of acute appendicitis in the Asian countries. Some studies has been found to be having more sensitivity, specificity and predictive value compared to that of Alvarado scoring system. This study aims to validate and to compare the diagnostic accuracy of this particular scoring system to an accepted scoring system in our setup.

Routine practice of CT imaging may lead to early diagnosis of low-grade appendicitis and unnecessary appendectomies, which would otherwise be resolved spontaneously by antibiotic therapy [6]. For this purpose, many scoring system has been brought up. These include Alvarado, Samuel, Ohmann, Eskelinen, Fanyo, Lindberg, Logistic score of Kharbanda *et al.* Of these, Alvarado score is the most commonly used and accepted because of high sensitivity and specificity in the western population [7]. In 2010, RIP AS developed the RIPASA scoring system by adding few other demographic variables, symptoms, signs and laboratory results [8]. There was a preponderance of patients in the age group less than 40 years (76.1%). Most of the patients [65.1%] in this study were females. In this study, Alvarado scoring system had a sensitivity and specificity of 65.17% and 90.0% for the diagnosis of acute appendicitis [p=0.059]. The Alvarado score has a better specificity in this study when compared to that of Chong *et al.* [9] and Ismail *et al.* [10]. The sensitivity is low compared to that of Ismail *et al.* [10] but similar to that of Chong *et al* and Nanjundaiah *et al.* [11]

Conclusion

The area under the curve is low when compared to the other scoring systems. Further analysis and studies are need to put this into effect in our local population.

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