

Evaluation of Utility of Alvarado Scoring System in Diagnosis of Acute Appendicitis at a Tertiary Care Centre of Dakshina Kannada

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How to cite this article:

Kiran T., Shafeek Ashraf. Evaluation of Utility of Alvarado Scoring System in Diagnosis of Acute Appendicitis at a Tertiary Care Centre of Dakshina Kannada. *New Indian J Surg.* 2018;9(3):390-92.

Abstract

Acute appendicitis is the commonest ailment presenting at the department of general surgery. A number of clinical scoring systems have been developed for assessing right lower Quadrant abdominal pain for suspected appendicitis. Many scoring systems like Alvarado score, Lintula score, Eskelinen score, Ohmann score, Christian score and Ripasa score are used for children, adults or mixed populations. Amongst them the Alvarado score is most accepted and commonly used scoring system. We intended to evaluate the utility of Alvarado scoring system in the diagnosis of acute appendicitis at our institution in dakshina karnataka. *Materials and Methods:* A prospective longitudinal and observational study was conducted between October 2015 to October 2017 at our institution. The inclusion criteria included patients between 15-60 years groups who presented with Right Iliac Fossa pain clinically suspected to be Acute Appendicitis. Exclusion Criteria included patients with delayed presentation leading to appendicular mass, cases with perforation and children below 15 years of age. The statistical analysis including sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and diagnostic accuracy were then calculated using histopathology (HPR) as a gold standard investigation. *Results:* Out of 100 patient who underwent appendectomy, 54 patient had showed positive Alvarado score >7 suggesting probability of acute appendicitis, 36 patients whose score was <7 showed positive histopathology report.

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Received on 19.04.2018, Accepted on 02.05.2018

Hence ALVARADO scoring SYSTEM was found to have sensitivity of 60%, specificity of 90%, positive predictive value of 98%, and negative predictive value of 20% and diagnostic accuracy rate of 63%. In our study the Alvarado score had low sensitivity but high positive predictive value. Conclusion: Alvarado score is simple scoring system which can be utilized to ascertain the diagnosis of acute appendicitis made by clinical and laboratory finding rather than utilizing it as a tool for making diagnosis of acute appendicitis.

Keywords: Alvarado Score; Acute Appendicitis; Sensitivity; Positive Predictive Value.

Introduction

Acute appendicitis is the commonest ailment presenting at the department of general surgery. A number of clinical scoring systems have been developed for assessing right lower Quadrant abdominal pain for suspected appendicitis. In 1986, ALVARADO published one of the most well-known appendicitis score called ALVARADO SCORE. According to which surgical intervention with appendectomy was best suited with a score of 8-10, while a score of 5-7 suggests further evaluated with imaging. The score has 6 clinical items and 2 laboratory measurements with a total 10 points. Although meant for pregnant females, it has been extensively validated in the non-pregnant population. Many other scoring systems are used for children, adults or mixed populations. The other scoring systems are Lintula score, Eskelinen score, Ohmann score, Christian score and Ripasa score.

The components of ALVARADO SCORING system are abdominal pain that migrate to the right iliac fossa, anorexia or presence of ketone bodies in urine, nausea or vomiting, tenderness in right iliac fossa, rebound

tenderness, fever of 37.3°C, leucocytosis with WBC counts of more than 10,000 cells/μl and neutrophilia. The two most important factors, tenderness in right iliac fossa and leucocytosis are assigned two points and 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. Various studies are done to assess the utility of ALVARADO score as a diagnostic modality of acute appendicitis in Indian population, where it has been identified as a simple and accurate modality in the diagnosis of acute appendicitis. We intended to evaluate the utility of Alvarado scoring system in the diagnosis of acute appendicitis at our institution in dakshinakarnataka.

Materials and Methods

The sources of data for the study were the patients coming to Department of General surgery at our institution. A prospective longitudinal and observational study was conducted between October 2015 to October 2017. The inclusion criteria included patients between 15-60 years groups who presented with Right Iliac Fossa pain clinically suspected to be Acute Appendicitis. Both emergency cases and elective cases were included in the study. Exclusion criteria included patients with delayed presentation leading to appendicular mass, cases with perforation and children below 15 years of age. An informed consent was taken from the patient before enrolling them in the study. They were observed for parameters of ALVARADO SCORE including clinical parameters, Blood examination, Complete Urine examination and diagnosis was then confirmed with histopathology Examination of the specimen following surgery. Patients were followed up during the post-operative Hospital Stay. The statistical analysis including sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and diagnostic accuracy were then calculated using histopathology (HPR) as a gold standard investigation.

Results

Out of 100 patients studied majority of the patients were between 15- 20 yrs of age. The percentage distribution of patient with respect to age is <20, 21-30, 31-40 and >40 years are 39%, 35%, 16% and 10% respectively. Out of 100 patient 52 were males attributing to 52% and females attributed to 48%. Out of 100 patient 90 cases (90%) had diagnosis of acute appendicitis on histopathology (positive HPR) and 10% cases were negative for HPR.

Out of 100 patient who underwent appendicectomy, 54 patient had showed positive Alvaradoscore >7 suggesting probability of acute appendicitis showed positive histopathology report, 36 patients whose score was <7 showed positive histopathology report as described in table 1.

Hence ALVARADO scoring SYSTEM was found to have sensitivity of 60%, specificity of 90%, positive predictive value of 98%, negative predictive value of 20% and diagnostic accuracy rate of 63%.

Table 1: Shows correlation between Alvarado score and Histopathology

| Alvarado Score | HPR | | Total |
|----------------|----------|----------|-------|
| | Positive | Negative | |
| Positive SCORE | 54 | 1 | 55 |
| Negative SCORE | 36 | 9 | 45 |

Discussion

Acute appendicitis is the commonest surgical ailment presenting as acute abdomen in any tertiary care centre⁽¹⁾. Timely diagnosis and management with appendectomy is important to prevent complications like perforation and appendicular mass formation. Also accurate diagnosis is essential as various genitourinary conditions can also present as acute abdominal pain in right iliac fossa and resulting in unnecessary appendectomy. In order to facilitate an accurate diagnosis various scoring systems have been formed and validated [2,3,4,5,6]. Amongst them is the Alvarado scoring system which is considered best by many western studies. In our study Alvarado score was found to have sensitivity of 60% which was consistent with other studies [7]. However the sensitivity of Alvarado scoring in our study was low in comparison to many other studies showing higher sensitivity [8,9]. The positive predictive value of Alvarado scoring in our study was higher with a low negative predictive value aiding in detecting true positive case of acute appendicitis and preventing false positivity which was in correlation to many other studies [10,11].

Conclusion

Alvarado score is simple scoring system which can be utilized to ascertain the diagnosis of acute appendicitis made by clinical and laboratory finding rather than utilizing it as a tool for making diagnosis of acute appendicitis.

Conflict of Interest: Nil

Financial Support: Nil

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