Evaluation of Alvarado Score in the Diagnosis of Acute Appendicitis

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Abstract
Acute appendicitis is a common and serious surgical illness with protean manifestations, generous overlap with other clinical syndromes, and significant morbidity, which increases with diagnostic delay. It can be diagnosed by computerized tomography scan of abdomen accurately but this is not always feasible due to its higher cost. Hence the need of a good scoring system is required. Alvarado scoring system is one scoring system used to diagnose acute appendicitis. 100 cases of pain in right iliac fossa were evaluated in terms of Alvarado score. Postoperative histopathology reports of appendix were compared with the Alvarado scores. It was seen in our study that 75% of cases showed a higher Alvarado score out of 99 histopathologically positive cases. Alvarado score is hence an efficient scoring system in the diagnosis of acute appendicitis.

Keywords: acute appendicitis, Alvarado score.

Introduction
Appendicitis is defined as an inflammation of the inner lining of the vermiform appendix that spreads to its other parts. This condition is a common and serious surgical illness with protean manifestations, generous overlap with other clinical syndromes, and significant morbidity, which increases with diagnostic delay. In fact, despite diagnostic and therapeutic advancement in medicine, appendicitis remains a clinical emergency and is one of the more common causes of acute abdominal pain.1
Appendicectomy remains the only curative treatment of appendicitis. The surgeon’s goals are to evaluate a relatively small population of patients referred for suspected appendicitis and to minimize the negative appendicectomy rate without increasing the incidence of perforation. The surgeon must evaluate the larger group of patients who present with abdominal pain of all etiologies with the goal of approaching 100% sensitivity for the diagnosis in a time, cost and consultation efficient manner.2
Appendicitis is a transmural inflammatory process and a common cause of an acute abdomen. Inflammation that leads to perforation of the appendix, which is associated with increased morbidity and mortality, warrants prompt diagnosis.2 The aim of this study is to evaluate the efficacy of Alvarado score in the diagnosis of acute
appendicitis as this can prevent negative appendicectomies and can also prevent delay of surgery in positive cases.

Materials and Methods

In this prospective study, 100 cases of pain in the right iliac fossa are admitted. History and physical examination are carried out. All routine haematological investigations are done. Alvarado score is calculated for all the patients. Ultrasound (USG) of the abdomen is done. On the basis of positive Alvarado score or positive USG for acute appendicitis, patients are taken up for surgery (open or laparoscopic appendicectomy).

Post operative histopathological reports are compared with the Alvarado scores. A score of 7 is taken as high probability of acute appendicitis for Alvarado scoring system.

Patients with a right iliac fossa mass or a diagnosed appendicular lump are excluded from the study.

Results

Table 1: Distribution of Cases according to Alvarado Score criteria

| Criteria Score Symptoms       | Score Value | Cases | Percentage |
|-------------------------------|-------------|-------|------------|
| Migratory RIF(Right iliac fossa) pain | 1           | 89    | 89.00      |
| Anorexia                      | 1           | 84    | 84.00      |
| Nausea and vomiting           | 1           | 89    | 89.00      |
| Signs                         |             |       |            |
| Tenderness in RIF             | 2           | 100   | 100.00     |
| Rebound tenderness            | 1           | 87    | 87.00      |
| Elevated temperature >37.5°C  | 1           | 49    | 49.00      |
| Laboratory                    |             |       |            |
| Leucocyte count (>10x0x⁹/l)   | 2           | 76    | 76.00      |
| Shift to left                 | 1           | 14    | 14.00      |
| Total                         | 10          | 100   | 100.00     |
Table 4: Comparison of Alvarado score with histopathological findings of appendix

| Score       | Histopathological diagnosis | Total |
|-------------|----------------------------|-------|
|             | Appendicitis (n=99) | No appendicitis (n=1) |       |
| Alvarado score ≥7 | 75 (75.8%) | 0 (0%) | 75     |
| score <7     | 24 (24.2%) | 1 (100%) | 25     |

Table 4 shows comparison of Alvarado score with histopathological findings. Histopathological findings were grouped into two categories – Appendicitis and no appendicitis. Case having normal appendix was 1, grouped into ‘No Appendicitis’ group while remaining 99 cases with various types of appendicitis were grouped under ‘Appendicitis’.

Among the 99 appendicitis cases, Alvarado score was suggestive of operative procedure in 75.8% cases.

Among the 1 non appendicitis case, Alvarado score was not suggestive of operative procedure and in the same group.

Discussion

Acute appendicitis is one of the most common surgical emergencies encountered in the world particularly among the young adults and children. In the United States, the rate of negative appendicectomy is approximately 15% out of the total appendicectomies done each year. Surgeon’s good clinical assessment is considered to be the most important requisite in the diagnosis of appendicitis. Several other conditions can mimic this clinical condition.

In our study, Alvarado score was less than 7 in 25% cases and it was 7 or more in 75% cases. In a study by Regar MK et al., Alvarado score when applied in all the clinically suspected patients, has 65% cases with score >7 and 35% cases with score less than 7. In a study by Nasiri S et al., 65.3% patients had Alvarado score ≥ 7 and 34.67% patients had Alvarado scores <7. This study shows that almost two thirds of symptomatic cases had Alvarado score ≥ 7 and our study is comparable with the studies above.

Contrary to these results, a study by Chong CF et al. found that out of 192 cases 80 (41.66%) had Alvarado score ≥ 7 and in remaining 112 cases it was <7.

Among the 99 appendicitis cases, Alvarado score was suggestive of operative procedure in 75.8% cases.

The mean Alvarado score was 8.31 in acute appendicitis, 6.69 in suppurative appendicitis, 6.11 in perforated appendicitis and 7.34 in gangrenous appendicitis. It was 4.9 in normal appendix.

Conclusion:

Alvarado score is efficient in the diagnosis of acute appendicitis and should be considered while deciding the further management of the case.

Sources of support- None

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