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RESEARCH ARTICLE

Sonographic and histopathological correlation of Alvarado score in the diagnosis of acute appendicitis in Mid-western region of Nepal.

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Abstract

Aim: To evaluate the sonographic and histopathological correlation of Alvarado scoring system in the diagnosis of acute appendicitis.

Materials and Methods:

A retrospective search of the pathological database was performed for cases operated with a diagnosis of acute appendicitis. Inclusion criteria included a) patient age > 11 years of age b) no previous similar symptoms in the past c) no past surgical history within a period of 6 months d) cases with Alvarado scoring. Cases with incomplete clinico-radiological information and those treated prior to admission were excluded.

Results:

Of the total 362 cases, majority were males (54.69 %). The sensitivity of ultrasound in diagnosing acute appendicitis in patients with Alvarado score > 7 was 96.67 % which decreased to 79.14 % in those with a score of ≤ 7. The overall negative appendectomy rate was 11.87 %.

Conclusion:

Alvarado score in conjunction with ultrasound is significant in decreasing the negative appendectomy rate in acute appendicitis.

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INTRODUCTION

Acute appendicitis is the most common cause of acute abdomen in the general population with incidence increasing in Asian countries (1). Although, the diagnosis is straightforward in most cases, atypical presentation usually poses diagnostic dilemma. A number of scoring systems for acute appendicitis have been suggested to improve diagnostic accuracy and decrease the negative appendectomy rate (2). Ultrasound has been an indispensable tool in the diagnosis of acute appendicitis with certain sonographic criteria. In equivocal cases, a prompt and sound clinical judgment is paramount for prompt management (3). In this study, we evaluated the popularly employed Alvarado scoring for the diagnosis of acute appendicitis with a sonographic and histopathological correlation.

Materials and Methods:

A retrospective search of the hospital databases was performed for cases that had been operated with a clinical diagnosis of acute appendicitis at Nepalgunj Medical College, Teaching Hospital, Kohalpur and Nepalgunj from March 2015 to August 2015. A total of 412 cases were identified and the clinical, radiological, surgical and histopathological data were reviewed. The inclusion criteria were: a) patient age > 11 years b) no similar symptoms in the past c) patient with no surgical history within a period of 6 months d) cases with Alvarado scoring. Exclusion criteria included: a) cases with incomplete clinical, radiological and pathological information b) patient receiving treatment prior to admission in the institution. The inclusion criteria for sonographic diagnosis of acute appendicitis

were i) blind ended, non compressible aperistaltic tubular structure with gut signature arising from base of caecum with diameter greater than 6 mm. A total of 362 cases were included in the study that fulfilled the inclusion and exclusion criteria. Patients were divided into four groups: Group 1 (Alvarado score > 7 with positive sonographic findings), Group 2 (Alvarado score > 7 with negative sonographic findings), Group 3 (Alvarado score ≤ 7 with positive sonographic findings) and Group 4 (Alvarado score ≤ 7 with negative sonographic findings). The four groups were correlated with the histopathological diagnosis. Data were analyzed using SPSS version 14.0 software (SPSS Inc., Chicago, IL)

Results:

Of the 362 patients, 198 patients were male (54.7 %) with a male to female ratio of 1.2:1. The correlation of the Alvaroda score with histopathological findings in groups with score > 7 and ≤ 7 is depicted in Table 2. Table 3 depicts the correlation of Alvarado score and the ultrasound findings. The sensitivity of ultrasound in diagnosing acute appendicitis in patients with Alvarado score > 7 was 96.67 %. The sensitivity of ultrasound in diagnosing acute appendicitis in patients with Alvarado score ≤ 7 was decreased to 79.14 %.

Parameters	Clinical Manifestations	Score
Symptoms	Migratory pain to RIF	1
	Anorexia	1
	Nausea/ Vomiting	1
Signs	Right iliac fossa tenderness	2
	Rebound tenderness	1
	Extra signs Rovsing's sign Cough test Rectal tenderness	1
	Elevated temperature	1
Laboratory values	Leukocytosis	2
Total Score		10

Alvarado score	Histopathology positive	Histopathology negative
> 7	180 (Male 111, Female 69)	10 (Male 2, Female 8)
\leq	139 (Male 77, Female 62)	33 (Male 10, Female 23)

Alvarado score	Histopathology positive	Histopathology negative
>7		
Ultrasound positive	174	0
Ultrasound negative	6	10
≤ 7		
Ultrasound positive	110	0
Ultrasound negative	29	33

Discussion:

Acute appendicitis is the most common surgical cause for acute abdomen in the general population (1). The clinical presentation of acute appendicitis is non-specific and can mimic with other abdominal and non-abdominal pathologies. Various scoring system are in use with varying sensitivity and specificity in the diagnosis of acute appendicitis. Alvarado scoring system is the most widely used method in the diagnosis of acute appendicitis (2). Imaging modalities including ultrasound and computed tomography scan are widely used in the diagnosis and assessing the severity of acute appendicitis thus impacting in the overall management of cases. Ultrasound is particularly useful due to its wide availability as well as can be performed in children and pregnant women with no risk of radiation (4, 5).

In our series of cases, the negative appendectomy rate was overall 11.87 % which is comparable to other studies (6). The majority of the cases with negative appendectomy were noted in cases where the Alvarado score was less than 7. Besides, the negative appendectomy was higher among the females (33 of 43 cases). A significant finding in our cases was that ultrasound could identify acute appendicitis in 174 out of 180 histopathologically confirmed cases in patient with Alvarado score of > 7. In cases, with negative sonological finding for acute appendicitis, only 29 cases were histopathologically confirmed with diagnosis of acute appendicitis. Our study shows that Alvarado scoring system used in conjunction with ultrasonography could significantly decrease the negative appendectomy rate similar to few previous studies (2, 7, 8). In cases, with sonological findings not suggestive of acute appendicitis and with Alvarado score less than 7, a conservative approach would be more justifiable.

There are several limitations in our study. Firstly our study is a retrospective study and secondly all the sonological study was not performed by single operator. The level of competence of the operator will therefore be crucial in the diagnosis and exclusion of acute appendicitis. We believe use of Alvarado scoring system with sonography as aiding tool performed by skilled operator would further help in decreasing the negative appendectomy rate.

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