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Original Research Article

The role of rebound tenderness in acute appendicitis and appendicular perforation

Yashwant R. Lamture*, Varsha P. Gajbhiye, Vinay V. Shahapurkar

Department of Surgery, Jawaharlal Nehru Medical College, Sawangi Meghe, Wardha, Maharashtra, India

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***Correspondence:**
Dr. Yashwant R. Lamture,
E-mail: dryrlamture@yahoo.co.in

ABSTRACT

Background: Acute appendicitis is the most common surgical emergency. Inspite of sophisticated new investigations mainstay of diagnosis depends on clinical sign and symptoms, rebound tenderness is very important sign with controversial views regarding it in available literature. Hence this study was undertaken to prove its efficacy of it related to rule out appendicular perforations.
Methods: This study was conducted in 418 patients with 186 female and 251 male. Patients were of acute appendicitis operated for appendicectomy were included in the study. Data analysis was done by data statistic software.
Results: The sensitivity and specificity of rebound tenderness to diagnose acute appendicitis is 65% and 73.6% respectively whereas the sensitivity and specificity of rebound tenderness to diagnose appendicular perforation was 94% and23.3% respectively with positive predictive value is 5 and negative predictive value is 99.
Conclusions: Hence it indicates that rebound tenderness is very important to rule out complications like perforation or peritonitis and to support diagnosis of acute appendicitis. It has minimal significance to diagnose perforation of appendix as positive predictive value is less.

Keywords: Appendicitis, Perforation, Peritonitis

INTRODUCTION

Acute appendicitis is the most common surgical emergency and the decision for appendicectomy is usually based on clinical signs and symptoms of acute appendicitis. The most important of these signs is rebound tenderness which actually shows presence of peritonitis. Although certain investigations such as C-reactive protein, ultrasonography and spiral CT scan abdomen lead to improved diagnosis. The gold-standard for diagnosis of acute appendicitis is histopathology.[1] Appendectomy is the treatment of choice for acute appendicitis (AA) which has a morbidity of 3.1%. With perforation, the morbidity is varied but can reach up to 47.2%, while the mortality rate is less than 1%. The high morbidity rate is due to a delay in presentation and initiation of active treatment, as well as patient factors. AA is a potential risk for patients due to the life-threatening complications. Therefore, careful assessment at emergency departments is mandatory to avoid preventable complications associated with AA. Observation has improved the ability to distinguish patients with appendicitis from those without, while negative explorations are related to improper assessments based mainly on the findings of the clinical examination rather than on other related signs and symptoms, as well as the inflammatory marker status.[2] Out of all signs rebound tenderness is a very important sign suggesting presence of complication like peritonitis. The aim of this study was to explore the specificity and sensitivity of

rebound tenderness in diagnosing acute appendicitis and its significance in predicting complications of appendicitis like peritonitis and perforation.

METHODS

This study included 418 consecutive patients (186 female and 251 male) who were admitted under the care of single consultant surgeon from January 2012 to September 2016. The clinical diagnosis and the timing of the appendectomy had been made by the surgeon who was not blinded to the preoperative imaging studies required in some patients. The inclusion criteria included all patients who were admitted with a diagnosis of AA (including complicated appendicitis) and also who underwent laparoscopic appendectomy, regardless of age, gender, all AA patient which refers to the inflammation of the appendix was evaluated by the surgeon macroscopically and confirmed on histopathological examination of the specimen. The diagnosis of AA and the decision to operate depends mainly on the clinical picture and investigations, such as white cell count, C-reactive protein level, abdominal and pelvic ultrasonography, and sometimes computed tomography (CT), especially in females of childbearing age and in borderline cases. Standard histological examination was conducted for all specimens. Sensitivity and specificity of rebound tenderness was calculated by statistic software. Ethical approval from Institutional Ethics Committee was sought before starting of this study.

RESULTS

418 patients were admitted with the diagnosis of AA and underwent appendectomy. A total of 186 women and 251 men were included in this study. The mean age was 18.8 (range 8 - 83) years. Normal appendix found in 50 cases, hence negative appendicectomy rate was 11.96%. Different pathology was found in 1 in the form of carcinoid of appendix (0.24%) but treated by appendicectomy. Sensitivity was 65% and specificity was 73.6%, positive predictive value and negative predictive values were 94.9% and 23% (Table 1) respectively to diagnose acute appendicitis.

Table 1: Related to diagnose acute appendicitis.

Sensitivity	65.1%
Specificity	73.6%
Positive predictive value	94.9%
Negative predictive value	23.3%

There are 13 cases of perforation observed in the study out of 418 (3.11%), 8 (1.19%)were females and 5 (1.19%) were males, out of 13 only 1 patient was having no rebound tenderness rest in all 12 patient rebound tenderness was elicited. Sensitivity and specificity were 92%and 43%.The positive and negative predictive values (NPV) were 5% and 99 % respectively to diagnose perforation (Table 2).

Table 2: Related to diagnose perforation.

Sensitivity	92%
Specificity	43%
Positive predictive value	5%
Negative predictive value	99%

DISCUSSION

Rebound tenderness represents pain from layer of peritoneum by stretching or moving. Positive “blumberg sign” or rebound tenderness is indicative of peritonitis which can occur in diseases like appendicitis and may occur in ulcerative colitis with rebound tenderness in the right lower quadrant.[3] This method is especially useful in diagnosing appendicitis requiring urgent management. However, in recent years the value of rebound tenderness has been questioned, since it may not add any diagnostic value beyond the observation that the patient has severe tenderness. The usefulness of the rebound tenderness test in indicating peritonitis was prospectively assessed by Liddington MI in his 142 unselected patients admitted as emergencies with abdominal pain and tenderness. It was found to be of no predictive value.[4] But use of this sign has been supported by others.

Bundy, DG et al in his study further noted in select groups of children, in whom the diagnosis of appendicitis is suspected and evaluation undertaken, rebound tenderness triples the odds of appendicitis like perforation peritonitis, while its absence reduces the likelihood of it.[5] Such type of confusing scenario is present in the literature regarding one of the most used and taught sign to the graduate and post graduate students to know presence of peritonitis hence the study was undertaken.

418 patients were admitted with the diagnosis of AA and underwent appendectomy. A total of 186 women and 251 men were included in this study. The mean age was 18.8 (range 8 - 83) years. Different pathology was found in 1 in the form of carcinoid of appendix (0.24%) but treated by appendicectomy. Sensitivity of rebound tenderness was 65%and specificity was 73.6% to diagnose acute appendicitis. Positive predictive value and negative predictive values were 94.9% and 23.3% respectively. This suggested significance of it to diagnose acute appendicitis. Present study is comparable to the study done by Alshehri MY and et al. In his prospective study on 123 randomly selected patients admitted with the diagnosis of acute appendicitis, the value of rebound tenderness as a clinical diagnostic tool was statistically compared to those of some other physical signs; namely guarding, rigidity and Rovsing's sign. Rebound tenderness was found to carry the highest sensitivity (94.7%), negative predictive value (81.3%), reliability (49.1%), and association with histological diagnosis ($P < 0.05$). However, its specificity and positive predictive

value was not significantly different from those of other physical signs.[6]

CONCLUSION

In contradiction to some previously published reports, his study emphasizes the role of rebound tenderness in the clinical diagnosis of acute appendicitis. There are 13 cases of appendicular perforation observed in this study out of 418 (3.11%), 8 (1.19%) were females and 5 (1.19%) were males, out of 13 only 1 patient was having no rebound tenderness rest in all 12 patients it was elicited.

The female patient with no rebound tenderness was of age 60 with lax abdominal wall and morbid obesity. Laxicity of the wall and obesity may be the reason for negative abdominal sign like rebound tenderness in a presence of perforation of appendicitis.

Sensitivity and specificity of this sign towards appendicular perforation were 92% and 43% respectively, the positive and negative predictive (NPV) value were 5% and 99 % respectively.

Here 99% NPV means that if rebound tenderness test is negative, you have a 99% chance of not having perforation. 5% PPV means that if rebound tenderness positive, you have a 5% chance of actually having the perforation. This clearly indicates that rebound tenderness is very important to rule out complications like perforation or peritonitis but to diagnose perforation it is of no use.

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