

Prospective Study of C - reactive protein Level and Diameter of Appendix in Diagnosis of Acute Appendicitis

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Abstract

Background- Acute abdominal pain is a common complaint among emergency department patients. Diagnosis of one of the most common pathologies behind acute abdominal pain, acute appendicitis, has radically changed over the last decades.

Methods- The source of data was from pretested proforma which takes into account clinical history, general physical examination, relevant investigations, imaging modalities & study periods spread over the study period from Dec. 2016 to Dec. 2018.

Results- Mean CRP level in 0-6 mm appendix diameter patients was 1.63 ± 2.32 mg/dl, in 6-8 mm diameter cases was 2.89 ± 3.67 mg/dl, 8-10 mm cases CRP level was 3.60 ± 3.24 mg/dl and in 10-12 mm diameter cases CRP level was 3.61 ± 2.28 mg/dl.

Conclusion- raised serum C-reactive protein and appendix diameter reducing the rate of negative explorations.

Keywords- C-reactive protein, Appendix diameter, Appendectomy

Introduction

Acute abdominal pain is a common complaint among emergency department patients. Diagnosis of one of the

most common pathologies behind acute abdominal pain, acute appendicitis, has radically changed over the last decades. Traditionally, the diagnosis of appendicitis was made solely based on clinical symptoms and signs, and later diagnosis included results of inflammatory laboratory variables such as leukocytes, neutrophils, and CRP. This practice in diagnosis led to a false positive diagnosis (negative appendectomy) rates in the range of 15-30%¹⁻³. The vermiform appendix is present only in humans, certain anthropoid apes and the wombat. It is a blind muscular tube with mucosal, submucosal and serosal layers. The appendix varies considerably in length and circumference. The average length is between 7.5 and 10cm and diameter generally does not exceed 6mm maximal outer diameter. The appendicular artery, a branch of ileocolic artery, passes behind the terminal ileum to enter the mesoappendix and supply the appendix. Four to six or more lymphatic channels traverse the mesoappendix to empty into the ileocaecal lymph nodes. In this study we correlate the quantitative serum levels of CRP with the diameter of appendix in acute appendicitis. This study emphasizes the impact of normal rather than raised serum C-reactive protein in reducing the rate of negative explorations.

Materials and Methods

Source data

The source of data was from pretested proforma which takes into account clinical history, general physical examination, relevant investigations, imaging modalities & study periods spread over the study period from Dec. 2016 to Dec 2018. The study was performed on 100 patients admitted in Department of general surgery , J.L.N. Medical College and Associated Group of Hospitals, Ajmer. They were diagnosed clinically as to have acute appendicitis after satisfying inclusion and exclusion criteria in this study.

They were included after explaining them about the study and taking their written consent.

Inclusion Criterion

The inclusion criteria are following:

1. All the patients who were admitted J.L.N. Medical College and Associated Group of Hospitals, Ajmer, during the study period with diagnosis of acute appendicitis and posted for surgery were included in the study.

2. Patients in the age group 12 to 50 Yrs.

Exclusion Criterion

The exclusion criteria are following:

1. Children below 12 years and elderly above 50 years was excluded as the CRP response is not optimal.

2. Patients who were managed conservatively or Individuals who had undergone appendicectomy for pain abdomen was excluded from this study.

3. Patients with past history of jaundice, signs and symptoms of liver disease, chronic alcoholic and with other coexisting acute inflammatory conditions were excluded, as CRP is exclusively produced in liver and raised in acute inflammatory condition.

4. Females taking oral contraceptive pills or pregnant were excluded as CRP is elevated in these individuals.

5. Patients with appendicular lumb / appendicular abscess were exclude.

6. Patients, not willing to participate in the study (who refused to give consent).

Measurement of serum CRP level

Quantitative assessment of serum CRP was done using human CRP kit based on the principle of solid -phase enzyme-linked immunosorbent assay .

Ultrasonography

Diameter of appendix in acute appendicitis was measured by Ultrasonography and was correlated with CRP levels .

Statistical analysis :

Datas were analysed in terms of demographic , clinical features, blood tests -white blood cells, serum CRP levels and diameter of appendix in acute appendicitis as per ultrasonography reports preoperatively.

OBSERVATIONS & RESULTS

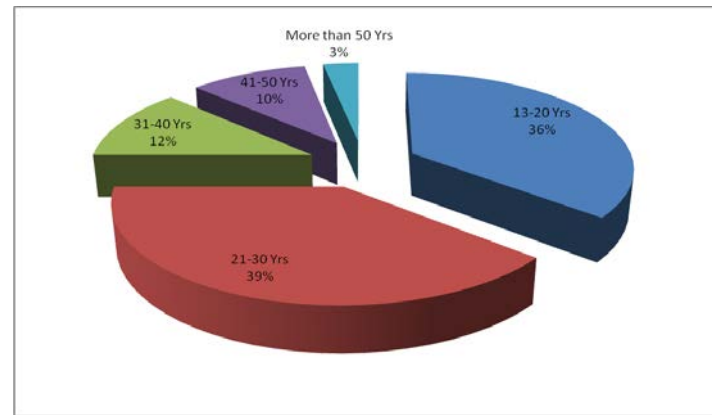


Table 1: Association between CRP level and appendix diameter

Appendix diameter	No. of patients	CRP level (mg/dl)
0-6 mm	17	1.63±2.32
6-8 mm	38	2.89±3.67
8-10 mm	39	3.60±3.24
10-12mm	6	3.61±2.28
p-value=0.001		

Mean CRP level in 0-6 mm appendix diameter patients was 1.63±2.32mg/dl, in 6-8 mm diameter cases was 2.89±3.67mg/dl, 8-10 mm cases CRP level was 3.60±3.24 mg/dl and in 10-12 mm diameter cases CRP level was 3.61±2.28 mg/dl.

Table 2 :Diagnostic accuracy of appendix diameter and CRP Level both

Sensitivity	93.02%
Specificity	85.71%
Positive predictive value	97.56%
Negative predictive value	66.67%
Diagnostic accuracy	92.00%

In our study appendix diameter and CRP both test sensitivity was 93.02%, specificity was 85.71 %, positive predictive value was 97.56%, negative predictive value was 66.67% and diagnostic accuracy was 92.00%.

Table 3 :Negative appendectomy

Appendectomy	No. of patients	Percentage
Negative appendectomy	14	14.00

In our study out of 100 cases, 14.00% negative appendectomy was occurred.

Discussion

The present study was undertaken to Prospective Study Of C-Reactive Protien Level and Diameter of Appendix In Diagnosis Of Acute Appendicitis at tertiary care Hospital in Ajmer Rajasthan in Dept. of general Surgery, J.L.N. Medical College, Ajmer. One hundred patients were recruited into the study over a period of 24 months from Dec. 2016 to Dec.2018.

Non-traumatic acute abdominal or flank pain is the common reason for emergency department (ED) visits and

accounts for approximately 5% - 10% of all ED visits ⁴. Nowadays, WBC and CRP are the most frequently used supportive diagnostic markers. These markers are easily accessible, cost-effective, and routinely analysed parameters in most of the centers. Still, they have limited specificity and sensitivity. Diagnostic sensitivity and specificity of WBC are 85% and 25%, respectively ⁵. Lower specificity of WBC values remains a serious problem. In AA, many markers of inflammation including phospholipase A2, serum amyloid A, interleukins, and cytokines have been investigated ^{6,7} Procalcitonin and D-dimer have been investigated for diagnostic purposes, and the authors indicated their lower diagnostic sensitivity and specificity ^{8,9} Bilirubin has been also investigated, and in one study it has been asserted that bilirubin could not specify AA and its complications. While in another study, higher bilirubin levels were found in PA when compared with AA patients ¹⁰ Although, higher CRP levels were found to be significantly higher in AA(acute appendicitis) patients relative to PA patients, it has a limited diagnostic value for AA (p < 0.0001) ^{11,12}

Emergency appendectomy was done on patients with acute appendicitis based on clinical impression of the surgeon. After the study it is noted that negative appendectomy rate was 14%.This rate of negative appendectomy was compared with other studies.

Khan MN et al, 2004 ¹³	14.3%
Vinoth Kumar et al, 2011 ¹⁴	10.00%
Shozoyokoyama et al, 2007 ¹⁵	8.00%
Asfar et al, 2000 ¹⁶	19.2%
Our study	14.00%

Conclusion

Raised serum C-reactive protein and appendix diameter reducing the rate of negative explorations

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