

**C-Reactive Protein Level in Diagnosis of Acute Appendicitis**Prabhash Bhavsar<sup>1</sup>, Dileep Singh Nirwan<sup>2</sup><sup>1</sup>Associate Professor, Department of Biochemistry, Govt. Medical College, Dungarpur<sup>2</sup>Assistant Professor, Department of Biochemistry, PDU Medical College, Churu

Received: 25-01-2024 / Revised: 23-02-2024 / Accepted: 20-03-2024

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Conflict of interest: Nil

**Abstract:**

**Background:** Acute appendicitis is one of the most common surgical emergencies. Accurate diagnosis of acute appendicitis is based on careful history, physical examination, laboratory and imaging findings. The aim of this study was to analyze the role of C-reactive protein (CRP) in improving the accuracy of diagnosis of acute appendicitis and to compare it with the histopathology findings.

**Methods:** This was a retrospective study on 100 patients surgically treated for acute appendicitis. The measurement of CRP was randomly collected pre-operatively from 100 patients. Pre-operatively CRP level were correlate with appendix diameter.

**Results:** Mean CRP level in 0-6 mm appendix diameter patients was 1.61 ±2.42 mg/dl, in 6-8 mm diameter cases was 2.84 ±3.52 mg/dl, 8-10 mm cases CRP level was 3.06±3.12 mg/dl and in 10-12 mm diameter cases CRP level was 3.68±2.61 mg/dl.

**Conclusion:** Raised serum C-reactive protein reducing the rate of negative explorations.

**Keywords:** CRP, Appendix, Pain abdomen.

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**Introduction**

Acute appendicitis remains a common surgical emergency in patients presenting with acute abdominal pain. Usual signs and symptoms described in textbooks are often in the elderly atypical, diminished or absent. Similarly in young children, signs and symptoms are non-specific, due to the wide range of causes and the inability to retell an accurate history. Therefore, appendicitis is a challenging diagnosis to make. Although clinical acumen remains the most important diagnostic tool in acute appendicitis, clinicians often rely on blood tests to support and improve the accuracy of diagnosis. The value of C-reactive protein (CRP) is very helpful in planning the management. It is vital in reducing the negative appendectomy rates, currently in one recent audit study 20.6%. [1-2]

C-reactive protein (CRP) together with other acute phase proteins increases in response to tissue injury. Many studies have shown the value of raised serum CRP quantitative measurement in improving the diagnosis of acute appendicitis. [3-4]

**Materials and Methods**

This was a retrospective study on 100 patients surgically treated for acute appendicitis.

**Inclusion Criterion:** The inclusion criteria were following:

All the patients who admitted with acute appendicitis and posted for surgery were included in the study.

**Exclusion Criterion**

The exclusion criteria were following:

1. Children below 12 years and elderly above 60 years were excluded as the CRP response is not optimal.
2. Patients who managed conservatively or individuals who had undergone appendectomy 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 pill or pregnant were excluded as CRP is elevated in these individuals.
5. 5. Patients, not willing to participate in the study (who refused to give consent).

**Statistical analysis:** Data was 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.

## Results

**Table 1. Association between CRP level and appendix diameter**

Appendix diameter	No. of patients	CRP level (mg/dl)
0-6 mm	16	1.61±2.42
6-8 mm	35	2.84±3.52
8-10 mm	32	3.06±3.12
10-12mm	17	3.68±2.61
<b>p-value=0.001</b>		

	Sensitivity	Specificity
Khan MN et al, 2004 <sup>5</sup>	75.6%	83.7%
Vinoth Kumar et al, 2011 <sup>6</sup>	94.4%	95.5%
Shozoyokoyama et al, 2007 <sup>8</sup>	84.3%	75.8%
Asfar et al, 2000 <sup>9</sup>	93.6%	86.6%
Our study	97.67%	85.71%

Mean CRP level in 0-6 mm appendix diameter patients was 1.61 ±2.42 mg/dl, in 6-8 mm diameter cases was 2.84 ±3.52 mg/dl, 8-10 mm cases CRP level was 3.06±3.12 mg/dl and in 10-12 mm diameter cases CRP level was 3.68±2.61 mg/dl.

## Discussion

In our study serum CRP level was elevated in 90.00% of the patients and this rate corresponds to study done at Wishaw General Hospital, Lanarkshire UK by Khan MN et al [5] 2004 where CRP levels were elevated in 85.7% of patients with acute appendicitis, also with study done by Vinoth Kumar et al [6] where 90% of patients had elevated CRP levels. But in contrast to our study according to Mikaelson et al [7] the elevation of serum CRP levels were found in only 47% and 72% of patients respectively.

Serum CRP levels increases after the onset of inflammatory pathology, so the levels might be normal until about 12hrs after the onset of symptoms of acute appendicitis so the time interval between the appearance of symptoms and the actual testing of serum CRP levels had some bearing on the result shown by Mikaelson et al in their studies. [8]

According to our study the sensitivity and specificity of serum levels in diagnosis of acute appendicitis is comparable to the results given by other researchers. So it is derived from different studies that serum CRP test is highly sensitive and specific in making diagnosis of patients who truly had acute appendicitis. [9]

## Conclusion

No doubt surgeon's clinical diagnosis using time tested clinical signs is effective in diagnosing acute

appendicitis. However elevated serum CRP levels and appendix diameter support the surgeon's diagnosis and hence avoids chances of error in diagnosis, due to atypical presentations and may avoid negative appendicectomy.

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