

# Diagnostic Accuracy of CRP in Acute Appendicitis and Correlation with Histological Findings

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**Abstract:** *Background:* Appendicitis being notorious in being diagnosed so there is need of valuable laboratory investigation for early diagnosis. *Aims:* To assess the use of serum CRP in detection of acute appendicitis & correlate with histological findings & reduce need of radiological investigations. *Material & Method:* 100 patients with history of pain in right iliac fossa admitted to Mahatma Gandhi hospital were included in study. *Result:* C-reactive protein & Histopathological diagnosis which was found to be statistically significant. *Conclusion:* We found that serum CRP alone & in conjugation with clinical signs & symptoms a valuable laboratory investigation in diagnosing acute appendicitis.

**Keywords:** C-Reactive protein, appendicitis, histopathological findings

## 1. Introduction

Abdomen is temple of surprises, which accommodates innumerable viscera. The appendix a cul-de-sac is crudely referred as “worm of bowel” in ancient books. Some modern books refer it as “abdominal tonsil”. As had been said by Bailey “A correct diagnosis is the hand maiden of successful operation”. Despite the advancements in the field of diagnosis the surprises never cease.<sup>1</sup>

In 1886, Reginald Fitz<sup>2</sup> of Boston identified appendix as the primary cause of pain in right lower quadrant pain. He coined the term appendicitis, & recommended early removal of appendix. Appendix is mischievous in being mimicked by other conditions. Incidence is 11 per 10,000 persons/year.

Clinical & laboratory findings allow for early diagnosis & treatment. Many patients have atypical presentation leading to misinterpretations. Wrong diagnosis can lead to morbidity & complications like appendicular lump, abscess, and perforation.

With availability of modern radiographic imaging which pose high economic burden on patient in just making diagnosis is not justified. Despite advances in diagnostic laboratory investigations & modern radiological imaging pre-operative diagnosis of acute appendicitis remains a challenge.

The purpose of this study is to evaluate diagnostic accuracy of CRP in acute appendicitis & correlate with histological finding & to reduce economic burden of modern radiological imaging.

## 2. Aims & Objectives

- 1) To assess the use of serum CRP in detection of acute appendicitis.
- 2) To assess correlation of serum CRP with histological findings.
- 3) To reduce need of modern radiological imaging which pose economic burden in diagnosis.

## 3. Materials & Methods

### Source of data (sample)

100 patients with history of pain in right iliac fossa admitted to Mahatma Gandhi hospital were included in study.

### Method of collection of data

All patients with sign & symptoms of pain in right iliac fossa fulfilling inclusion criteria were included in this study. A detailed clinical history was elicited and a careful general physical & systemic examination with necessary investigation & treatment.

### Inclusion criteria

- 1) Patient of all ages with pain in right iliac fossa were selected.
- 2) Well informed patients, willing to comply with the study protocol.

### Exclusion criteria

- 1) Pregnant women
- 2) Appendicular lump in right iliac fossa
- 3) Immuno-compromised patients.

## 4. Observation & Results

**Table 1:** Histopathology findings:

Diagnosis	No. of patients	Percentage%
Acute appendicitis	75	90%
Gangrenous Appendix	6	
Sub acute Appendicitis	4	
Acute Catarrhal Appendix	2	
Haemorrhagic appendix	1	
Necrotic appendicitis	1	
Appendicitis with carcinoid tumour	1	10%
Normal Appendix	10	

Table 1 shows diagnosis after surgery conducted on 100 patients of suspected acute appendicitis. Appendicitis was confirmed in 90% patients by histopathological examination of which 75% patients had diagnosis of acute appendicitis rest 10% had negative appendicectomy.

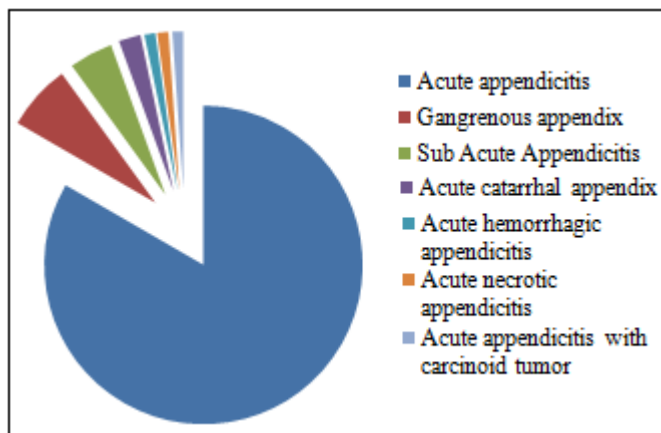


Figure 1: HPE findings pie chart

Table 2: Association between C-Reactive protein & Histopathological diagnosis

Diagnostic test result	Histopathological diagnosis			P value
	Appendicitis	Normal	Total	
Positive	80	4	84	0.0004
Negative	10	6	16	
Total	90	10	100	

Table 2 shows association between C-reactive protein & Histopathological diagnosis which was found to be statistically significant. Of 100 cases included in study, 84 patients had positive serum CRP. 80 of these were HPE proven acute appendicitis, whereas 4 were found to be normal histologically. Of the 16 patients with negative serum CRP, 10 patients had inflamed appendix & 6 had normal appendix.

## 5. Discussion

Appendectomy is most frequently performed surgery (10% of all emergency operations)<sup>3,4</sup>

Tillet & Francis<sup>5</sup> first described C-reactive protein in 1930. They concluded that serum of patient suffering from acute infection precipitated with pneumococcal extract called C polysaccharide in presence of calcium ions. The protein that caused this reaction therefore called C-reactive protein.

Previous studies have revealed that an increased CRP reveals acute appendicitis & claim to be highly sensitive investigation. The present study depicted sensitivity of 87% with specificity of 58%. These results compared well with Sadaf Ali's<sup>6</sup> study on 197 patients showing sensitivity of 89.7% & specificity of 57%.

Erkasap et al<sup>7</sup> reported higher values with sensitivity of 96% & specificity of 87%. Dueholm et al<sup>8</sup> and Thomson et al<sup>9</sup> reported lower sensitivity than our study.

Shakhatresh HS (2000)<sup>10</sup> in a prospective study involving 98 patients highlighted that CRP is very helpful in the diagnosis of acute appendicitis, with sensitivity of 95.5% & specificity of 88.9%, but it does not replace clinical skill of surgeons.

Shoshtari et al (2006)<sup>11</sup> in their study on 98 patients of suspected acute appendicitis found that specificity of CRP

was 89.7%, sensitivity 80%. Raised value of CRP was directly related with severity of inflammation (p-value < 0.05).

Inflammatory processes & Malignant conditions result in rise in serum CRP as a non-specific phenomenon, CRP can never be used alone as a sole diagnostic test. If CRP results are interpreted together with clinical condition they are quite helpful.

## 6. Conclusion

In spite of advances in diagnostic laboratory & Modern radiographic techniques accurate diagnosis cannot be made in complicated cases. No single test either laboratory or imaging can diagnose appendicitis & reduce economic burden on patients going through negative appendectomies. C-reactive protein being an acute phase reactant is sensitive but not specific in diagnosis of acute appendicitis. If CRP results are interpreted in conjunction with clinical manifestation they are quite helpful.

To conclude, we found that serum CRP alone & in conjunction with clinical signs & symptoms a valuable laboratory investigation in diagnosing acute appendicitis in spite of modern radiologic investigation like CT scan thus reducing cost of treatment & negative appendectomies.

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