

Original article:

Diagnostic value of C-Reactive Protein (CRP) in Pain Abdomen

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Abstract

Background : CRP is a non-specific inflammatory marker that is used routinely in clinical practice to evaluate the severity of the disease. An analysis of CRP levels was done in patients with pain abdomen to assess the usefulness of this inflammatory marker in the management of these patients.

Patients and methods: Patients presenting with pain abdomen were included. Routine blood investigations including CRP and leucocyte count was done. Clinical, surgical and histopathologic data were collected. Patients were classified into those with non-specific abdominal pain (NSAP), those who were treated conservatively and those who underwent surgery and the CRP values for each of the above groups were assessed. Cut-off values (<10, 10-50, 50-100, 100-150, >150mg/l) were used to obtain a definite diagnostic value for the above groups.

Results: 100 patients were selected by purposive sampling. 47 were women and 53 were men between the ages of 18-78 years. CRP was done in all patients at the time of admission. 34 patients were diagnosed to have NSAP, 32 were treated conservatively and the rest 34 required surgery. The mean values of CRP were 7mg/l for patients with NSAP, 87mg/l for those treated conservatively and 126mg/l for those who underwent surgery.

Conclusion : CRP levels were statistically significant for patients with NSAP, those treated conservatively and those who underwent surgery. It increases with the severity of inflammation. Hence it can be used as a helpful marker in the management of patients with pain abdomen in addition to leucocyte count.

Keywords : C-Reactive protein, CRP, pain abdomen

Introduction

Pain abdomen is a common surgical complaint. History and clinical evaluation is the first important step while evaluating patients with pain abdomen. However, the accuracy of clinical evaluation is between 45-75% and this accuracy is directly proportional to the experience of the surgeon.¹

CRP is a acute-phase, pentameric, ring-shaped protein whose levels rise in blood plasma in

response to inflammation.² It is produced by the liver in response to factors like Interleukin-6 released by macrophages and adipocytes. It binds to phosphocholine, which is expressed on the surface of dead and dying cells and microbes and helps in activation of the complement system and phagocytosis.^{3,4}

CRP along with leucocyte count is routine used in clinical practice as a diagnostic aid in patients presenting with pain abdomen.¹The knowledge

pertaining to the diagnostic value of CRP in patients presenting with pain abdomen is limited. Hence, the aim of this study is to analyze the CRP levels in patients presenting with pain abdomen and associate it with the severity of the disease. Based on the severity of the disease, the patients were grouped into those with non specific pain abdomen (NSAP), those who were treated conservatively and those who underwent surgery.

Patients and methods

A descriptive study was done on 100 patients aged between 18-78 years presenting with pain abdomen at Fr. Muller Medical College, Mangalore between July 2012 and July 2014. Patients were evaluated with a combination of history, clinical evaluation, laboratory investigations and radiological tests and a diagnosis was made. The CRP level was collected for all patients at the time of presentation. The cases were divided into three groups - those with NSAP, those treated conservatively and those requiring surgery. Mean value of CRP for each group was calculated. The CRP levels of all three groups were further categorized based on the following cut-off values: <10mg/l (normal value), 10-50 mg/l, 50-100 mg/l, 100-150 mg/l and >150 mg/l and the percentage of cases in each category was calculated.

Results

100 patients were included in the study. 47 patients were women and 53 patients were men. The patients were aged between 18-78 years. Based on a combination of history, clinical evaluation, laboratory investigations and radiological tests, a diagnosis was made for each

of the above cases. 34 cases had NSAP, 32 cases were treated conservatively and 34 cases underwent surgery.

CRP values for every case was assessed and the mean values for each patient group was calculated.

The CRP levels of each patient group were further stratified into various cut-offs.

32% of patients presenting with NSAP had a CRP value of <10 mg/l, whereas 2% patients with NSAP had a CRP value between 10-50 mg/l.

27% of patients treated conservatively had a CRP value between 50-100 mg/l, whereas 3% had a CRP value between 10-50 mg/l and the remaining 2% between 100-150 mg/l.

22% of patients who required surgery had a CRP value ranging between 100-150 mg/l, 8% had CRP levels > 150mg/l and the remaining 4% between 50-100 mg/l.

Discussion

Pain abdomen is a diagnostic challenge for the present day surgeons. A combination of history and clinical findings, laboratory investigations, radiological tests including ultrasonography and CT scanning of the abdomen and diagnostic laparoscopy have all improved the diagnostic accuracy in the current day scenario.

CRP, being an inflammatory marker, has now been routinely used to assess the severity of the disease in patients presenting with abdominal pain.

Chi *et al.* evaluated the role of CRP in 147 patients with an acute abdomen. Patients were divided into two groups – group I (early discharge group) and group II (hospitalized or serious condition). In the group II, they found

that CRP was only 64% specific using a cutoff value for a positive test of > 5 mg/l. Hence, they concluded that CRP was a helpful aid in decision making in patients with an acute abdomen.⁵

Salem TA *et al.* concluded that CRP alone was not enough to predict whether a patient with pain abdomen can be managed conservatively or with surgery and should be used in conjunction with other clinical and biochemical parameters. Also, CRP alone was not enough to differentiate between NSAP from other important surgical causes of pain abdomen.¹ NSAP is defined as pain abdomen lasting more than 6 hours and less than 8 days; without fever, leukocytosis and peritoneal signs; and uncertain diagnosis after physical evaluation and baseline investigations including abdominal sonography.⁶

Eriksson *et al.* assessed the value of repetitive CRP and leukocyte count in patients considered for appendectomy. They concluded that a normal value for both tests should be an indication to defer appendectomy.⁷

Kyriakidis *et al.* showed that in acute appendicitis CRP values could be normal or slightly elevated at the beginning of the disease and in cases of gangrenous or perforated appendicitis, CRP values are almost always significantly elevated. When leukocyte count and CRP values are normal, acute appendicitis is rarely the diagnosis for right lower quadrant pain.⁸

Our study showed that CRP levels were low for those with NSAP, higher for those who needed conservative treatment and highest for those who underwent surgery.

Conclusion

Our study concluded that even though CRP levels were statistically significant for different groups, we could not identify a cut-off value for each group. Rising CRP levels were associated with increasing severity of the disease. CRP should always be used in addition to clinical findings and other laboratory investigations for better diagnostic accuracy and management of patients with pain abdomen.

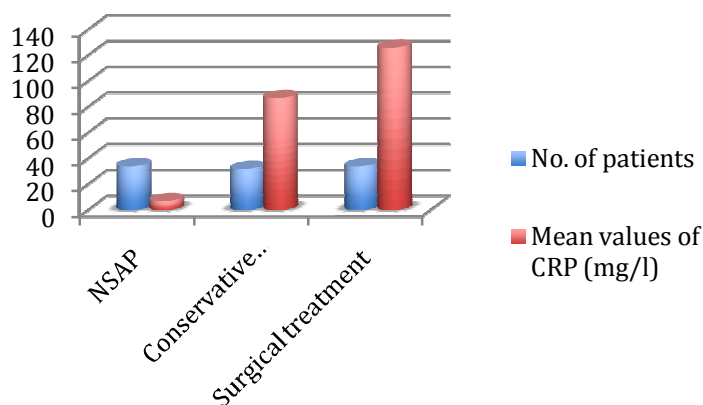


Fig. 1: Mean CRP values for each patient group

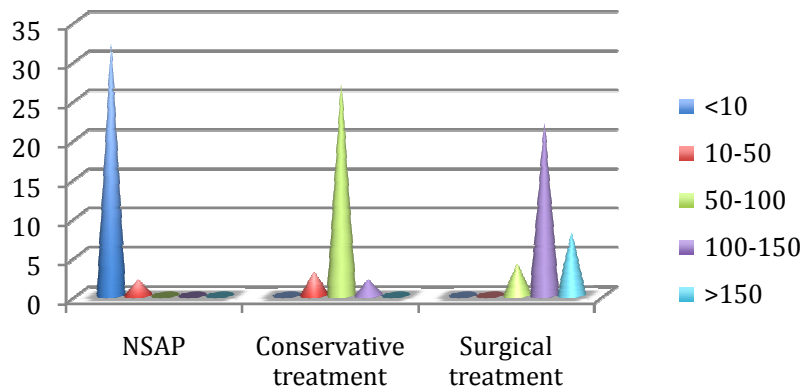


Fig. 2: Distribution of patients based on CRP values.

Sex	Men	Women	Total
No. of patients	53	47	100

Table 1: Sex distribution of patients in the study.

Diagnosis	No. of patients
Appendicitis	7
Pancreatitis	6
Cholecystitis	5
Urinary tract infection	5
Inflammatory bowel disease	2
Pelvic inflammatory disease	2
Colitis	3
Mesenteric lymphadenitis	2
Total	32

Table 2: Diagnosis of patients treated conservatively

Diagnosis	No. of patients
Appendicitis	10
Cholecystitis	8
Bowel obstruction	4

Gastrointestinal malignancy	3
Mesenteric ischemia	2
Bowel perforation	4
Obstructed hernia	3
Total	34

Table 3: Diagnosis of patients treated with surgery

Patient group	NSAP	Conservative treatment	Surgical treatment
No. of patients	34	32	34
Mean values of CRP (mg/dl)	7	87	126

Table 4: Mean CRP values for each patient group

CRP values (mg/l)	<10	10-50	50-100	100-150	>150
NSAP	32	2	0	0	0
Conservative treatment	0	3	27	2	0
Surgical treatment	0	0	4	22	8

Table 5: Distribution of patients based on CRP values.

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