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SIGNIFICANCE OF C REACTIVE PROTEIN IN DIAGNOSIS OF ACUTE APPENDICITIS

General Surgery

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ABSTRACT

Background: For suspected acute appendicitis Appendicectomy is a common procedure. Despite several techniques and investigations used to improve the diagnostic accuracy, the rate of normal appendices unnecessarily removed remains still high. This study emphasizes the value of C - reactive protein in three groups of patients operated for clinical suspicion of acute appendicitis with different finding at appendicectomy namely an uninflammed appendix, uncomplicated acute appendicitis or complicated acute appendicitis.
Methods: This prospective study was performed on 50 consecutive patients who were operated on for acute appendicitis. Depending on results of the examination by a surgeon, patients underwent surgery for treatment of acute appendicitis. According to operative findings, true and false positive or negative serum CRP results were determined. Sensitivity, specificity, positive predictive value and negative predictive value were calculated.
Results: The percentage of negative laparotomies was 12 % and surgeon's clinical suspicion was true in 88%. Pre operative CRP values were false negative in 11 patients with appendicitis and false positive in 1 patient with normal appendix. The difference of true and false results between CRP test's and surgeon's diagnosis was statistically significant (P = 0.001). Present study revealed, sensitivity = 75%, specificity = 83.3%, positive predictive value =97% and negative predictive value = 31%
Conclusion: Serum C - reactive protein when elevated supports the surgeon's clinical diagnosis of acute appendicitis. It can be used frequently to diagnosis the acute appendicitis, so that the complication rate and negative laparotomies can be avoided. It is advisable to observe atypical patients with serial clinical examinations and CRP tests when there is doubt about the diagnosis with normal CRP values.

KEYWORDS

CRP, C- reactive protein, acute appendicitis

INTRODUCTION

In evaluating patients with an acute abdomen Clinical assessment remains the most important first step. However, clinical examination has been found to be accurate only in 47–76% of patients with acute abdominal pain. Even the most experienced surgeon will make correct diagnosis in 4 out of 5 cases. This drops to 50% with junior doctors and doctors working in the community. Delay in diagnosis may increase morbidity and mortality in these patients as many of them are elderly, and this may have significant effects on hospital resources due to increased length of stay [1] . Acute appendicitis is a common and urgent surgical illness with protean manifestations with frequent overlap with other clinical syndromes that results in significant morbidity.

Despite intense research and discussion, the diagnosis of acute appendicitis is still difficult and remains perhaps the most common problem in clinical surgery. On the one hand normal appendix on appendicectomy represents misdiagnosis; on the other hand a diagnostic delay of appendicitis may lead to perforation, peritonitis and septicemia. In spite of careful clinical, laboratory and ultrasound examinations, the rates of removing non-diseased appendix and of appendiceal perforation remains at around 20% of all cases subjected to appendicectomy. No single sign, symptom or diagnostic test accurately makes the diagnosis of appendiceal inflammation in all cases. It was shown that in children, there was no mortality but the postoperative morbidity varied between 10 and 20%. Thus, although appendectomy is currently a safe procedure in children, more specific non-invasive diagnostic aids are still needed to reduce the number of negative explorations and the rate of perforation [2] . The surgeon's goal is to evaluate a relatively small population of patients referred for suspected appendicitis and to minimize the negative appendicectomy rate without increasing the incidence of complications [3,4] .

Thus improving the diagnosis of acute appendicitis in order to prevent unnecessary surgery is a critical topic that has been debated often and vigorously. The use of laparoscopy, ultrasonography, barium enema examinations and CT scanning has improved diagnostic accuracy, but these diagnostic approaches are not available in primary health care setting. However, diagnostic efficiency can be improved, and unnecessary surgeries can be prevented, by performance of an appropriately selected combination of laboratory tests combined with evaluation of clinical symptoms. [5]

AIM

The aim of the present work is to study the C reactive protein values in three groups of patients operated for a clinical suspicious of acute appendicitis with different finding at appendicectomy - an uninflammed appendix, uncomplicated acute appendicitis or complicated acute appendicitis.

MATERIALS AND METHODS

This prospective study was performed on 50 consecutive patients who were operated on for treatment of acute appendicitis. Patients with acute abdominal pain were examined by surgeon. For establishing the diagnosis careful patient history was obtained at first. Physical examination of the patient by a surgeon was followed by some routine laboratory tests and radiographs.

In all cases, diagnosis was established by detecting right lower quadrant tenderness, guarding and rebound tenderness at physical examination, which was repeated as needed. Thereafter, the surgeon decided if emergency laparotomy was necessary.

Serum CRP concentrations were measured before the operation by CRP kit. Normal CRP levels range from 0 to 6 mg/l (negative). We did not take into account preoperative serum CRP concentrations for the decision of the laparotomy to compare diagnostic accuracy of CRP levels with the surgeon's clinical impression. Depending on results of the examination by a surgeon, patients underwent surgery for treatment of acute appendicitis. Operative findings and histo-pathological examination of appendicectomy specimens established the exact diagnosis.

According to operative findings, histopathology reports, true and false surgeon's clinical diagnosis, true and false positive or negative serum CRP results were determined. Sensitivity, specificity, positive predictive value and negative predictive value were calculated.

STATISTICAL ANALYSIS

- Negative laparotomies- 6 cases - 12%.
- Surgeon's clinical impression was true – 44 cases - 88%.
- In 44 patients of acute appendicitis serum CRP was elevated in 33 and normal in 11.
- Of the 6 patients with normal appendix serum CRP levels were normal in 5 and elevated in one patient.
- Pre-operative CRP values were false negative in 11 patients with appendicitis and false positive in one patient with normal appendix.

- The difference of true and false results between CRP test's and surgeon's diagnosis was statistically highly significant (p = 0.001).
- Present study reveals; Sensitivity = 75% Specificity=83.3% PPV =97% NPV=31%

RESULTS

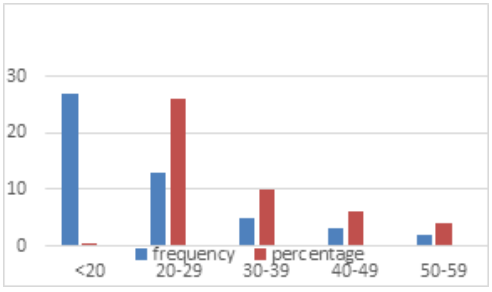

Chart no 1-age group distribution

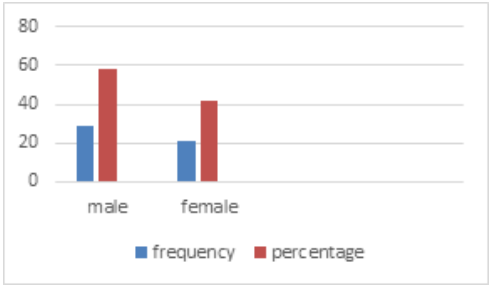

Chart no 2-sex distribution

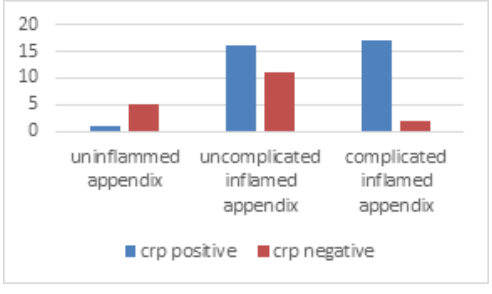

Chart no 3- intra operative finding and crp cross tabulation

Table no 1- sensitivity , specificity , positive predictive value and negative predictive value

	Appendicitis positive	Appendicitis negative	Total
CRP positive	33(a)	1(b)	34
CRP negative	11(c)	5(d)	16
	44	6	50

a= True positive

b= False positive

c= False negative

d= True negative

- Sensitivity (a/a+c) = 33/(33+11) = 33/44 = 75%
- Specificity (d/b+d) = 5/(1+5) = 5/6 = 83.3%
- Positive predictive value = (a/a+b) = 33/(33+1) = 33/34 = 97%
- Negative predictive value = (d/c+d) = 5/(11+5) = 5/16 = 31%

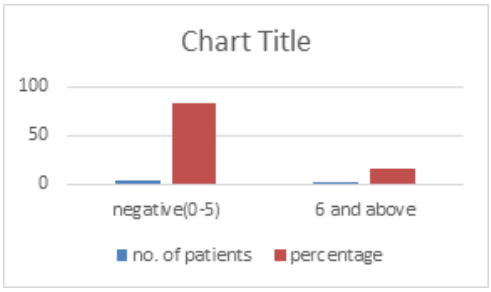

Chart no 4- uninflamed appendix

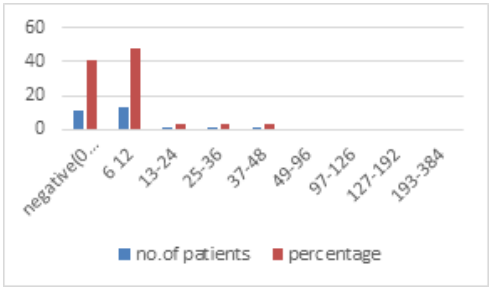

Chart no 5:CRP(mgm/lt)

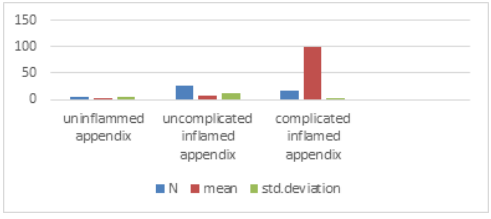

Chart no 6-mean and standard deviation of crp values

DISCUSSION

- In this study the diagnostic value of the serum CRP levels in patients with clinical suspicion of acute appendicitis was investigated.
- Following the onset of the infection, an increase occurs in the synthesis of some hepatic proteins as an acute phase response.
- Serum concentrations of acute phase proteins augment in 8 – 12 hours after the onset of infection.
- One of these, CRP, is a marker of acute phase response can be used as an indicator of disease. Elevation of serum concentrations of CRP indicates the presence of acute appendicitis.
- In patients with acute appendicitis the decision of emergency laparotomy is based generally on the clinical impression of the surgeons.
- Present study reveals the negative laparotomy rate is 12%, which is near (16%) to study which was conducted by Blair et al with review of 2216 appendectomy specimens, which was confirmed by pathological diagnosis.
- In present study serum CRP were elevated in 33 patients and normal in 11 patients of 44 patients with acute appendicitis whether it may be complicated or not.
- Mean CRP level in patients with complicated appendicitis was 99.529. Serum CRP levels were between 49 mg/lit to 192 mg/ lit in 71 % of complicated appendicitis group patients
- Serum CRP levels were between 6 mg/lit to 48 mg/lit in 59.25% with uncomplicated appendicitis.
- These results suggest that the CRP values between 6mg/lit and 48 mg/lit support the clinical diagnosis in patients having suspected clinical manifestation and signs of acute appendicitis, without increasing the risk of perforation or gangrene.
- Present study shows, CRP values are negative in 5 patients and positive in 1 patient with normal appendix.
- So, routine performance of CRP test can prevent the negative laparotomies.
- Six laparotomies might have been avoided if we would have relied on CRP values

CONCLUSIONS

1) Serum C-reactive protein when elevated supports the surgeon's clinical diagnosis of acute appendicitis.

2) It can be used frequently to diagnose the acute appendicitis, so that the complication rate and negative laparotomies can be avoided.
3) It is advisable to observe atypical patients with serial clinical examinations and CRP tests when there is doubt about the diagnosis with normal CRP levels.

REFERENCES:

1. Prospective study on the role of C-reactive protein (CRP) in patients with an acute abdomen TA SALEM1, RG MOLLOY2, PJ O'DWYER3. Department of Surgery, Royal Alexandra Hospital, Paisley, UK .Department of Surgical Gastroenterology, Gartnavel General Hospital, Glasgow, UKUniversity Department of Surgery, Western Infirmary, Glasgow, UK. Ann R Coll Surg Engl 2007; 89: 233–237.
2. Early childhood appendicitis is still a difficult diagnosis.Paajanen H, Somppi E.Department of Pediatric Surgery, Tampere University Hospital, Finland. Acta Paediatr. 1996 Apr; 85(4):459-62.
3. Anderson RE, Hugander A, Thulin AJ. Diagnostic accuracy and perforation rate in appendicitis: association with age sex of the patient and with appendicectomy rate. Eur j surg 1992: 158; 37-41.
4. Van Dieijen- Visser MP, Go PMNYH, Brombacher PJ. The value of lab tests in patients suspected of appendicitis. Eur J Clin Chem Clin Biochem 1991, 29: 749- 52.
5. The value of laboratory tests in patients suspected of acute appendicitis. van Dieijen-Visser MP, Go PM, Brombacher PJ. Department of Clinical Chemistry, De Wever . Hospital, Heerlen, The Netherlands. Eur J Clin Chem ClinBiochem.1991Nov; 29(11):749-52.