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Role of C-Reactive Protein and total Leucocyte as Diagnostic Adjuvant in Managing Acute Appendicitis

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Abstract
Abdominal pain is normally encountered in emergency department by Surgeon and commonest cause of abdominal pain is found to be appendicitis. Though diagnosis is purely clinical certain blood investigations and other modalities of investigation play a role. In this study to role of C-reactive protein and Total leucocyte count has diagnostic adjuvant in managing appendicitis is evaluated.
Methods: *C-Reactive protein and total leucocyte count investigations were made for all patients with clinical suspicion of appendicitis. Post operative HPE reports is cross checked with C-Reactive proteins and white blood cell count and specificity and sensitivity were made out and statistical data analyzed.*
Results: *In present study Total leucocyte count has more sensitivity and specificity (95.56%, 80%), followed by C-reactive protein (88.89%, 80%).*
Conclusion: *When both test (Total leucocyte count & C-reactive protein) are combined the sensitivity and specificity increases significantly. It plays important role in doubtful cases for arriving diagnosis.*
Keywords: *Appendicitis, C-reactiove protein, Total leucocyte count.*

Introduction

In spite of advance in Modern radio graphic imaging and diagnostic laboratory investigations the diagnosis of appendicitis remains essentially clinical. C-Reactive protein is a acute phase reactant, which is elevated in cases appendicitis, unlike the total white blood cell count which decreases with course of time[(1,2)]. C-Reactive protein is the first protein to be discovered, which acts as an acute phase reactant. It has been named for its calcium dependant interaction with the somatic C-Polysaccharides of pneumococci. TLC is one of the component of the modified Alvarado scoring system.

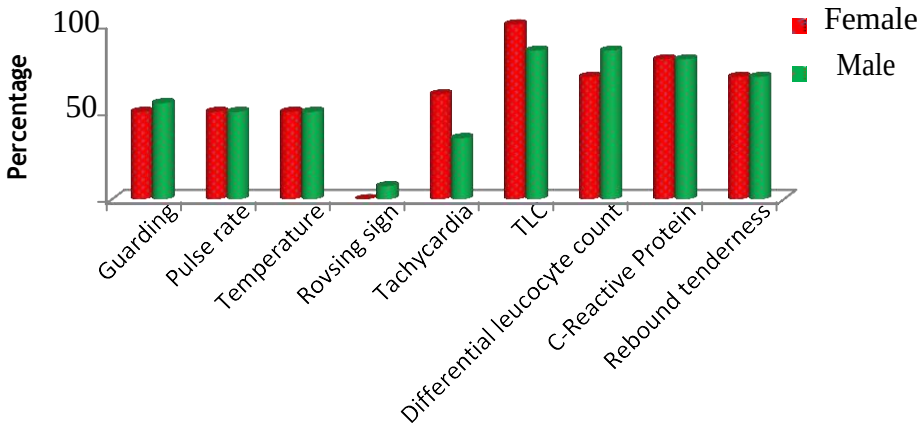
Materials and Methods

100 patients admitted in various surgical units and diagnosed as acute appendicitis are taken for

emergency appendicectomy in General Surgery Department of Rajah Muthiah Medical College, Chidambaram during the period of October 2016 to September2018. Clinical diagnosis of acute appendicitis was done based on alvarado and components.

Table 1 Clinical signs and blood investigations according to gender

Clinical features	Gender		Total (n=100)
	Female (n=20)	Male (n=80)	
Guarding	10 (50%)	44 (55%)	54 (54%)
Pulse rate	10 (50%)	40 (50%)	50 (50%)
Temperature	10 (50%)	40 (50%)	50 (50%)
Rovsing sign	0 (0%)	6 (7.5%)	6 (6%)
Tachycardia	12 (60%)	28 (35%)	40 (40%)
TLC	20 (100%)	68 (85%)	88 (88%)
Differential leukocyte count	14 (70%)	68 (85%)	82 (82%)
C-Reactive Protein	16 (80%)	64 (80%)	80 (80%)
Rebound tenderness	14 (70%)	56 (70%)	70 (70%)
PSOAS	2 (10.0%)	0	2 (2.0%)



Urine microscopy was done in all cases. C-Reactive protein and Total Leucocyte Count was performed in all cases. Total Leucocyte Count of more than 10000 cell/Cu.mm. C-Reactive protein more than 6 mg / dl., was considered positive.

After, obtaining concent apatient was operated and specimen was sent for Histo Pathological examination. The Histo Pathological report was considered as final diagnosis.

Result

Of the 100 patients only 20% occurred in females and the remaining 80% of cases occurred in males. Males between age group of 21 to 30 (52.5%) are the commonest groups. In females however, there were 20 patients in all 3 brackets of age group i.e. 21-30 (60%), 31-40(20%), 16-20(10%) and >50years is 1(10%).

Table 2 Correlation of TLC and Histo Pathological Examination Report according to gender

TLC	Histopathological Examination Report		Total
	Acute appendicitis	Normal appendix	
POSITIVE	86 (95.6%)	2 (20.0%)	88 (88.0%)
NEGATIVE	4 (4.4%)	8 (80.0%)	12 (12.0%)
Total	90 (100.0%)	10 (100.0%)	100 (100.0%)

P<0.001**,t significant, Fisher Exact test

Sensitivity-95.56%
Specificity-80.0%
PPV-97.73%
NPV-66.67%
Accuracy-94.0%

Table 3 Evaluation of the role of CRP Count in Diagnosis

Of Acute Appendicitis by Correlation with HPE Reports

Out of 100 patients of appendicitis (confirmed by HPE), 80% (80) had elevated CRP rest 20% (20) patients had normal CRP.

CRP	Histopathological Examination Report		Total
	Acute appendicitis	Normal appendix	
POSITIVE	78 (86.7%)	2 (20.0%)	80 (80.0%)
NEGATIVE	12 (13.3%)	8 (80.0%)	20 (20.0%)
Total	90 (100.0%)	10 (100.0%)	100 (100.0%)

P=0.004**, significant, Fisher Exact test

Sensitivity-86.67%

Specificity-80.00%

PPV-97.50%

NPV-40.0%

Accuracy-86.0%

Discussion

Present study on100 patients who have been clinically diagnosed, 80% were male and 20% were females. In females appendix removed which appears to be normal, probably due to pathology in fallopian tube and ovaries[(3)]. Laparoscopy has been recommended in young females with right iliac fossa pain as it usually gives precise diagnosis and reduces negative appendicectomy rate[(4)]

In our study the efficacy of C-Reactive protein in diagnosis of appendicitis had a sensitivity of 86.67% and specificity of 80%. The sensitivity and specificity of Total Leucocyte Count was 95.56% and 80% respectively.

Various studies has shown C-Reactive marker is not a good indicator in appendicitis. Al Abed Ya et al has shown sensitivity and specificity as 76.4% and 55.7% respectively[(5)]. Amlesh T et al showed the sensitivity and specificity of C-reactive protein was 91% and 42%.[(6)].

Serum C-Reactive protein which was seen pre operatively and found to be normal in cases suspected of appendicitis most probably associated with normal appendicitis. Hence, unnecessary appendicectomy could be avoided by deferring surgery in these patients.

Conclusion

Therefore, we are concluding, that diagnostic accuracy of C-reactive protein is not higher than WBC. Thus the combination of C-reactive protein and WBC has higher diagnostic accuracy in appendicitis.

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