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Original Research Paper

General Surgery

EVALUATION OF C- REACTIVE PROTEIN AS A NEW DIAGNOSTIC MARKER FOR ACUTE APPENDICITIS

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KEYWORDS :

INTRODUCTION

Appendectomy is one of the most common emergency procedures performed in contemporary medicine[1, 2]. The diagnosis of appendicitis can be elusive, and a high index of suspicion is important in preventing serious complications from this disease[2, 3]. Accurate diagnosis of acute appendicitis can often be challenging, with significant overlap in signs and symptoms with many other surgical and non-surgical conditions.[4] Several scoring like ALVARADO are designed **to** improve diagnostic accuracy[1] An elevated level of C reactive protein, an acute phase protein, is one of many downstream indicators of inflammation. The test for CRP is a simple and effective screening test for occult bacterial infection or tissue injury[5]. Recently, the role of serum C-reactive protein was found to be having some positive evidence regarding diagnosis of acute appendicitis[2]. The present study is done to assess the C reactive protein as a diagnostic tool for acute appendicitis.

AIMS AND OBJECTIVES

To study the efficacy of CRP in predicting acute appendicitis and its correlation with TLC and USG, histopathological findings.

METHODOLGY

This is a cohort; single centered and prospective study conducted in the Department of General Surgery, in Narayana Medical College, Nellore during the period from October 2015 to October 2017.
Patients above 12 years with clinically conformed appendicitis were included. Investigations like, USG abdomen and TLC and CRP were sent. ALVARDO score was noted. Operated cases were taken and CRP is correlated with other modalities.

RESULTS

TABLE NO 1: AGE DISTRIBUTION

Age in years	Number of patients	Percentage
12-20	51	36.42
21-30	41	29.28
31-40	24	17.14
41-50	12	8.57
51-60	9	6.42
61-70	3	2.14

TABLE NO 2: DISTRIBUTION OF SYMPTOMS & SIGNS

Symptoms	Number of cases	Percentage
Migratory pain	74	52.85
Anorexia	96	68.57
Nausea/Vomiting	85	60.71
Fever	63	45
Tenderness in right lower quadrant	140	100
Rebound tenderness	68	48.57

In the present study 40%of patients present in < 24 hours duration, 35% of patients in 24-48 hours duration, 25% of patients in > 48 hours duration.

TABLE NO 3: LEVELS OF CRP IN THE STUDY GROUP

CRP (mg/L)	Number of cases	Percentage
<5	35	25
5-34	74	52.85
35-84	26	18.57
>84	5	3.57

TABLE NO 4: CRP AND TLC LEVELS IN THE STUDY GROUP

	Elevated level	Normal level
CRP	105(75%)	35(25%)
TLC	97(69.28%)	43(30.17%)

In the present study histopathological findings of inflamed appendix in 99 of patients, gangrenous appendicitis in 27 patients and normal appendix in 14 of patients.

TABLE NO 5: USG WITH HPE PROVEN ACUTE APPENDICITIS

USG findings	HISTOPATHOLOGY		Total
	Appendicitis	Normal appendix	
Acute appendicitis	94	2	96
Normal	32	12	44

Sensitivity, Specificity, Positive predictive value, Negative predicative value of Ultrasonography in predicting appendicitis were 74.60%, 85.71%, 97.92% and 27.27% respectively. Diagnostic accuracy was 75.71%

TABLE NO 6: CORRELATION OF INFLAMMATION WITH LEVEL OF CRP

Histopathology	CRP LEVEL(mg/L)				
	<5	5-34	35-84	>84	TOTAL
Normal appendix	7	7	0	0	14
Inflamed appendix	27	59	12	1	99
Gangrenous/Perforated appendix	1	8	14	4	27

TABLE NO 7: CORRELATION OF CRP WITH HPE PROVEN ACUTE APPENDICITIS

CRP LEVEL	TYPE OF APPENDIX		
	Normal appendix	Inflamed appendix	Gangrenous appendix
>5 mg/L	7	72	26
<5 mg/L	7	27	1
Total	14	99	27

Chi square value =11.4703
P value =0.00323 very significant

TABLE NO 8: DISTRIBUTION OF PATIENTS ACCORDING TO TLC LEVELS

TLC level	Type of appendix	
	Appendicitis	Normal appendix
>10,000 cells/cumm	91	6

<10,000 cells/cumm		35	8
Total		126	14

Sensitivity, Specificity, Positive predictive value, Negative predicative value of CRP in predicting appendicitis was 77.78%, 50%, 93.33% and 20% respectively. Diagnostic accuracy was 75%.

TABLE NO 9: CORRELATION OF TLC LEVEL WITH HPE PROVEN ACUTE APPENDICITIS

CRP LEVEL	TYPE OF APPENDIX		
	Normal appendix	Inflamed appendix	Gangrenous appendix
>10,000 cells/cumm	6	67	24
<10,000 cells/cumm	8	32	3

Chi square value =9.5911
P value =0.008266

The Sensitivity, Specificity, Positive predictive value and Negative predicative value of total leukocyte count in predicting appendicitis was 72.22%, 57.14%, 93.81% and 18.60 % respectively. Diagnostic accuracy was 70.71%.

DISCUSSION

Kumari B et al6 A. Jangjoo et al7 in their study concluded that, if CRP test been added to the clinical diagnosis and other laboratory investigations then the diagnosis of acute appendicitis can be made with fair degree of accuracy.

The negative appendectomy rate in the present study was 10%, this is comparable with the negative appendectomy rate in several study series. Vinoth kumar. R et al8 showing negative appendectomy rate of 10%, Memisoglu et al9 showing negative appendectomy rate of 17.3%. The negative appendectomy rate in the present study is in accordance with the international standards which range from 5–15 percent

TABLE NO 10: ACCURACY OF USG IN VARIOUS STUDIES

Study	Sensitivity	Specificity	PPV	NPV
Ghimire R et al[10]	68.62%	100%	100%	15.78%
Nshuti et al[11]	60%	66%	89%	31%
Shehzad Ahmed Abbasi et al[12]	44.4%	89.3%	91.4%	38.5%
Present study	74.60%	85.71%	97.92%	27.27%

TABLE NO 12: ACCURACY OF CRP IN VARIOUS STUDIES

Study	Sensitivity	Specificity	PPV	NPV
Trishul Senapati Aakala et al[2]	75.55%	50%	93.15%	18.51%
Ghimire R et al[10]	84.31%	66.6%	97.72%	20%
R Vinodh kumar et al[8]	94.4%	60%	95.5%	54.5%
Bulent Kaya et al[13]	72%	75%	98%	13%
Present study	77.78%	50%	93.33%	20%

TABLE NO 23: ACCURACY OF TLC IN VARIOUS STUDIES

Study	Sensitivity	Specificity	PPV	NPV
A. Jangjoo et al[7]	85 %	63%	91%	50%
L van den Worm et al[14]	42.96%	73.81%	64.89%	53.45%
Kumari B et al[6]	88.23%	60%	92.59%	47.36%
Trishul Senapati Aakala et al[2]	95.55%	50%	94.5%	55.55%
Present Study	72.22%	57.14%	93.81%	18.60%

CONCLUSION

This study suggests that serum C-reactive protein level is a new laboratory marker for diagnosing acute appendicitis; however diagnosis of appendicitis is mainly remains clinical, it helps in diagnosis of acute appendicitis.

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