Section: Medicine

Original Research Article

STUDY OF C-REACTIVE PROTEIN IN RESPIRATORY TRACT INFECTION IN PATIENTS OF SOUTH KARNATAKA POPULATION

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Abstract

Background: CRP will help to evaluate the diagnostic accuracy of pneumonia detected radiologically and discriminate between bacterial and viral infections of respiratory tract. **Materials and Methods:** 95 adult's patients aged between 25 to 60 years with respiratory tract infection were studied. CBC, ESR, RBS and CRP levels was studied and chest x-ray was also taken in every patient to confirm respiratory tract infection. **Result:** Out of 95 patients 60 (63.1%) had pneumonia and 35 (36.8%) had COPD with acute exacerbation were studied. Mean value of CRP in pneumonia was 76.8 (±10), 16.7 (± 9.3) in COPD with acute exacerbation t test was 65.01 and $p<0.001$ (p value was highly significant). **Conclusion:** Present study show variations of CRP values in different respiratory infections like pneumonia and COPD with acute exacerbation to confirm the radiological diagnosis.

INTRODUCTION

CRP is an established marker of acute inflammation and its serum concentration is frequently determined to assess the grade of systemic inflammation.[1] E.g. Pneumonia, tuberculosis, rheumatic or intestinal diseases. CRP is an acute phase protein synthesized in liver. It was first described by Tillet and Francies Jr. in 1930. They described it is an serum factor responsible for precipitation of acute phase sera with C-substance of pneumococcal cell wall. It is also named because of C-polysaccharide of streptococcus pneumonia. CRP is 1,20,000 to 1,40,000 molecular weight pneumatic proteins comprising of five identical mono-covalently bound sub units arranged in cyclic symmetry of simple plane CRP has two major biological roles.[2,3] It is known to activate the complement system and able to modify the function of phagocyte leucocytosis. These effects support the concept that, this serum protein may have potential control role in host defence mechanism. Its production mainly by inter leakin-6, inter leakin-1R and tumour necrosis factor in response to infection or tissue infections is not proved. Rapid tests for CRP were introduced about 20 years ago. They were widely used globally, mostly in cases of respiratory tract infections (31% to 74% of cases).[4,5] Though CRP levels rose as result of tissue injury or inflammation, It is not specific for any particular disease and its measurements help the clinician to diagnose and monitor the disease progression as well as therapeutic response. Hence attempt was made to evaluate the respiration tract infections i.e. pneumonia COPD and compared the severity of both diseases to treat as per the severity and to know the therapeutic response in adults of both sexes.

MATERIALS AND METHODS

95 (Ninety-Five) patients aged between 25 to 60 years of age, regularly visiting to Medicine department of Akash Institute of Medical Sciences Devanhalli-562110 were studied.

Inclusive Criteria

Patients with respiratory tract infection more than 15 days having cough, pneumonia were selected for study.

Exclusion Criteria

Patients with malignancy of lungs, immune compromised patients. Patients already under treatment with oral cortico-steroids, Myocardial infarction, pulmonary oedema, pulmonary infarction, collagen vascular disorders and liver diseases were excluded from study.

Method

History and occupation of every patient was recorded. Chest x-ray was taken to confirm the diagnosis. Blood examination CBC, ESR, Sputum for AFB, RBS was studied. Serum sample was preserved at the time of presentation for measuring CRP. CRP was measured in neat (undiluted) sera

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and dilutation of 1/10, 1/20, 1/30, 1/40, 1/60, 1/100 using commercially available late X agglutation test (Humate X CRP). The value of CRP was calculated by multiplying the denominator of the dilutation by six to get the value in mg/1. The mid-value of positive and negative titre was used in the calculation. The duration of study was January-2022 to December-2022

Statistical Analysis

The obtained results of pneumonia and COPD exacerbation of CRP values were studied with percentage and CRP values in both groups were compared with z test. The statistical analysis was carried out in SPSS software. the ratio of male and female was 2:1.

RESULTS

[Table 1]: Distribution of patients of respiratory tract infections 60 (63.1%) pneumonia, 35 (36.8%) COPD with acute exacerbation.

Table 1: Distribution of patients of Respiratory tract infection

Infection	Number of patients	Percentage (%)
Pneumonia	60	63.1
COPD with acute exacerbation	35	36.8

[Table 2]: Comparison of CRP value in both groups Mean value of pneumonia was 76.82 (± 10.1), 16.70 (± 9.3) COPD with acute exacerbation, t test value 65.01 and p<0.001 (p value is highly significant).

Table 2: Comparison of CRP values in both groups of respiratory infections

Group	No. of patients	Mean value of CRP	t test	p value
Pneumonia	60	76.82 (± 10.1)	65.01	P<0.001
COPD with acute Exacerbations	35	16.70 (± 9.3)		

p<0.001 (p value is highly significant)

[Table 3]: Distribution of CRP values in both groups of respiratory tract infections pneumonia patients (60) – 38 (63.3%) had CRP value 0-50 (mg/L), 13 (21.6%) had CRP value 51-100, 6 (10%) had 101-150 (mg/L) CRP value, 1 (1.6%) had 201-250, 1 (1.6%) had 251-550, 1 (1.6%) had 551-600 CRP (mg/L) value. In COPR with acute exacerbation 32 (91.4%) patients had 0-50 CRP mg/L value, 3 (8.5%) patients had 51-100 CRP (mg/dl) value.

Table 3: Distribution of CRP values in both groups of respiratory tract infections

Values of CRP (mg/L)	No. of pneumonia patients (60)	Percentage (%)	No. of COPD Patient (35)	Percentage (%)
0-50	38	63.3	32	91.4
51-100	13	21.6	3	8.5
101-150	6	10		
151-200	0	0		
201-250	1	1.6		
251-550	1	1.6		
551-600	1	1.6		
Total	60	99.7%	35	99.9%

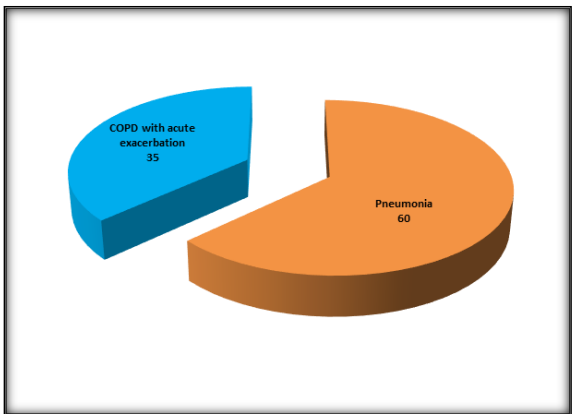

Figure 1: Distribution of patients of Respiratory tract infection

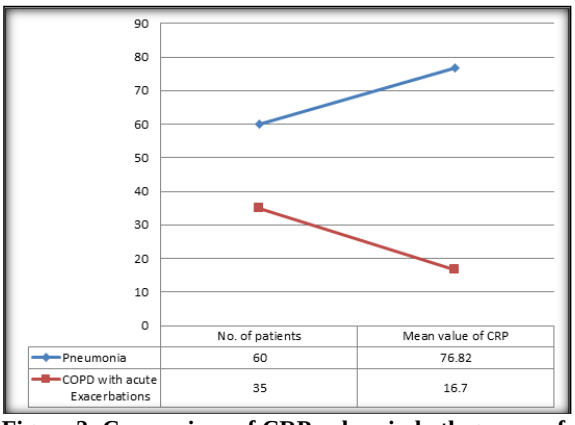

Figure 2: Comparison of CRP values in both groups of respiratory infections

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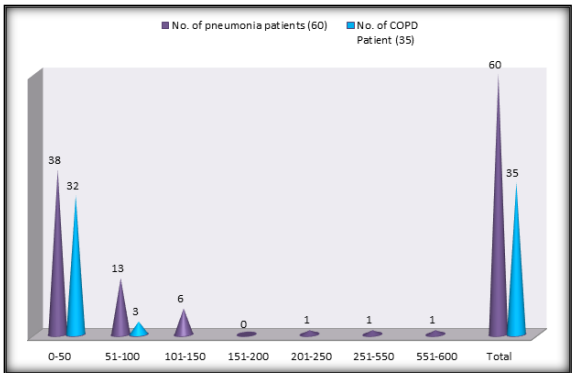

Figure 3: Distribution of CRP values in both groups of respiratory tract infections

DISCUSSION

The present study of C - reactive protein in respiratory tract infection in south Karnataka population out of 95 patients, 60 (63.1%) had pneumonia, 35 (36.8%) had COPD with acute exacerbation (Table-1). Mean value p pneumonia patient of CRP value was 76.8 (± 10.1), 16.7 (±9.3) in COPD with acute exacerbation t test was 65.01 and p<0.001 (p value was highly significant) (Table-2). Distribution of values in both group was – In pneumonia 38 (63.3%) had 0-50 CRP mg/L value, 13 (21.6%) had 51-100 CRP (mg/L) value, 1 (1.6%) had 201-250, 1 (1.6%) had 251-550, 1 (1-6%) had 551-600 CRP mg/dl. In COPD with acute exacerbation 32 (91.4%) patients had 0-50 CRP (mg/L), 3 (8.5%) had 51-100 CRP (mg/L) values. These findings are more or less in agreement with previous studied.[6,7,8] CRP (C - reactive protein) is a non-specific acute phase serum protein and useful biomarker for detection of inflammation and various active infections.[9] It has been shown to be beneficial in the clinical evaluation of respiratory tract infection in adults and children. Additionally, an elevated CRP has been used as indication to initiate antibiotics therapy.[10] C-reactive protein is an indication of pathology and disappearance of C - reactive protein is concomitant with effectiveness of drugs used in the treatment. This study was blinded comparison of chest radiography. The classical symptoms and signs of pneumonia were dyspnoea, thoracic pain, self-reported fever, respiratory rate > 20 min percussion, dullness, crackles, were not predictive of pneumonia. The final symptoms and signs model used to predict pneumonia included variables dry cough, diarrheal, and temperature 38oC plus ESR rate or c-relative protein best predicted pneumonia. Thus prediction rule of patients at low risk of pneumonia, including a CRP value > 20 mg/L can reduce antibiotic over prescribing in general practice. The most common pathogens were streptococcus pneumonia viruses and Chlamydia pneumonia followed by mycoplasm pneumonia, Legionella pnemophila and coxiella brunette, Lower levels of CRP were found in pneumonia caused by viruses and C brunette as well as in negative microbiological findings. The median CRP in hospitalised patients were significantly higher than out patients.[11] It is reported that, the serum CRP level is useful markers for establishing the diagnosis of community acquired pneumonia in adult's patients with lower respiratory tract infections. CRP values are especially high in patients with pneumonia caused by S. pneumonia or L. pneumonia. Moreover, high CRP values are suggestive of severity which may be of values suggestive of value in deciding about the appropriateness of in patient's care.[12]

CONCLUSION

Present study of CRP values in respiratory tract infections. Highly significant differences were observed between pneumonia and COPD with acute exacerbation. No relation between CRP value and organism could be found. Though no cut off value could be found to differentiate the two groups of infections but a value of more than 50 mg/L went in favour of pneumonia. Hence in the particular clinical setting CRP could probably be an important parameter for differentiating doubtful cases, but this present study demands further patho-physiological, pharmacological, genetic, immunological, nutritional studies because exact mechanism of elevation of c-reactive protein in response to specific pathogenesis is still un-clear.

Limitation of Study

Owing to tertiary location of research centre, small number of patients and lack of latest technologies, we have limited findings and results.

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