The Professional Medical Journal
www.theprofesional.com

DOI: 10.17957/TPMJ/16.3357

ORIGINAL PROF-3357

COMMUNITY ACQUIRED PNEUMONIA;

SERUM CRP LEVEL IN PATIENTS

zulfikar229@hotmail.com

Dr. Samar Raza[1], Dr. Tariq Zaffar Shaikh[2], Dr. Ghulam Hussain Baloch[3], Dr. Zaheer Ahmed[4], Dr. Syed Zulfiquar Ali Shah[5]

1. Postgraduate
Department of ICU (Intensive Care Unit)
Liaquat University Hospital
Hyderabad Sindh Pakistan
2. MD
Senior Registrar
Department of Medicine Unit-I
Liaquat University Hospital
Hyderabad / LUMHS,
Jamshoro, Sindh Pakistan
3. MD, Dip. Card
Associate Professor
Department of Medicine Unit-III
Liaquat University Hospital
Hyderabad / LUMHS,
Jamshoro, Sindh Pakistan
4. General Practitioner
Medeor 24 X7 Hospital,
Abu Dhabi
5. Department of Medicine
Liaquat University Hospital
Hyderabad, Sindh, Pakistan

Correspondence Address:
Dr. Syed Zulfiquar Ali Shah
House No: 279, Doctor's Colony
Hirabad, Hyderabad, Sindh, Pakistan
zulfikar229@hotmail.com

Article received on:
15/03/2016
Accepted for publication:
10/06/2016
Received after proof reading:
10/09/2016

ABSTRACT… Objectives: To determine the frequency of raised serum CRP level in patients with community acquired pneumonia. **Study Design:** Cross sectional descriptive study. **Period:** Six months. **Setting:** Liaquat University Hospital Hyderabad. **Patients and Methods:** All the patients with 20 -75 years of age, either gender diagnosed as community acquired pneumonia were further evaluated for C-reactive protein while the data was analyzed in SPSS version 16. **Results:** During six month study period, total 135 patients with community acquired pneumonia were evaluated for C-reactive protein. The mean ±SD for age of patients with CAP was 48.93±8.41 whereas it was 53.53±6.73 and 50.54±5.81 in male and female subjects respectively. The mean age ±SD of patient with raised CRP was 46.94±8.43. The mean ±SD of CRP in overall population was 08.8±1.52 while it was 07.94±1.32 and 10.83±1.64 in male and female individuals respectively. Of 135 subjects 84(62.2%) were males and 51(37.8%) were females while the CRP was elevated in 91(67.4%) patients. The age in relation to gender and CRP was statistically significant (p= 0.02 and 0.05) while the gender in relation to CRP was also statistically significant (p=0.03). **Conclusion:** The present study found that the CRP was raised in 91(67.4%) predominantly male individuals with community acquired pneumonia

Key words: CRP, pneumonia, streptococcus pneumonia, CAP, pneumoniae, community acquired pneumonia, C-reactive protein, Moraxella catarrhalis and Haemophilus influenzae

Article Citation: Raza S, Shaikh TZ, Baloch GH, Ahmed Z, Shah SZA. Community acquired pneumonia; serum CRP level in patients. Professional Med J 2016;23(9):1052-1056. **DOI:** 10.17957/TPMJ/16.3357

INTRODUCTION

Community Acquired Pneumonia (CAP) is the leading cause of infectious mortality in both developing and developed countries with a significant morbidity.[1] The physical findings are fever in 80, increase respiratory rate, audible crackles on auscultation and have signs of consolidation on examination.[2,3] The radiographic findings are important for determining the illness severity and evaluating the need for diagnostic purposes. WHO literature reported 450 million cases of CAP each year and mortality reported in 3.9 million.[4] In Pakistan the overall prevalence of CAP was 13% reported by Shaikh, et al.[5]

C-reactive protein (CRP) is an acute phase reactant and probably play a role in infectious agents opsonization and dead cells.[6,7] CRP can be used as a diagnostic tool as well as prognostic marker as serial measurements monitors the antibiotic treatment response.[8] Seppa, et al[9] reported that a CRP level ≥ 100 mg/L is associated with increased mortality in subjects with respiratory tract infections. Additionally Hedlund[10] observed the patients with raised CRP had longer duration of longer hospital stay and is a marker for risk stratification and severity of the disease.

Several studies reported the role of CRP in the diagnosis of infections but up till yet its diagnostic is not well established and its importance in differencing between bacterial and viral pneumonia yet also remains the matter of debate.[11-14] The prevalence of raised C-reactive protein in pneumonic patients reported by Chalmers JD, et al was 22%.[15]

Therefore the present study was conducted in medical department at Liaquat university hospital Hyderabad; Sindh, Pakistan with an objective to

evaluate the frequency of raised serum CRP level in patients with community acquired pneumonia, the study provide knowledge and information to health care provider regarding the medical workup of pneumonia.

PATIENTS AND METHODS

This cross sectional descriptive study of six months was conducted in the department of Medicine at Liaquat university Hospital Hyderabad / Jamshoro on the patients of 20 -75 years of age, presented with non specific symptoms i.e. fever >38°C, productive cough, pleuritic chest pain, dyspnea, had signs of consolidation on examination, radiographic evidence consistent with pneumonic patch and pleural fluid examination shown infective element were recruited and entered in the study. The informed consent was taken from every subject, the detail history was taken and all the parameters were performed accordingly and on the physical stability of the specific patients with the evidence of community acquired pneumonia. After that all relevant subjects evaluated for CRP by taking 3cc venous blood sample and sent to laboratory for analysis and the serum C-reactive protein ≥06 mg/L was considered as raised. The exclusion criteria of the study were patients with rheumatic fever, acute myocardial infarction, leprosy, and congestive heart failure, different infectious disorders like meningitis, infectious mononucleosis, typhoid and tuberculosis, malignancy, rheumatoid arthritis, gout and arthritis due to sepsis, the pregnant ladies and autoimmune disorders, subjects already on antibiotic / antiviral / immunosuppressive therapy and the patients with nosocomial infections. All maneuvers were performed by the collaboration of whole research teams while the data was collected on pre-designed proforma. The data of all patients was analyzed in SPSS version 16.00 while the frequency and percentage (%) was calculated for raised serum CRP level in patients with community acquired pneumonia in context to age and gender. The stratification was done for age, gender and raised CRP in patients whereas the post stratification chi-square test will be applied on categorical variables at 95% confidence interval and the p-value ≤0.05 was labeled as significant.

RESULTS

During six month study period, total 135 patients with community acquired pneumonia were evaluated for C-reactive protein. The mean ±SD for age of patients with CAP was 48.93±8.41 whereas it was 53.53±6.73 and 50.54±5.81 in male and female subjects respectively. The mean age ±SD of patient with raised CRP was 46.94±8.43 while the mean ±SD of CRP in overall population was 08.8±1.52 while it was 07.94±1.32 and 10.83±1.64 in male and female individuals respectively. On pleural fluid examination, the culture shown that majority of subjects 122 (90%) had pneumococcus infection while haemophilus influenzae and moraxella catarrhalis was detected in 10 (7.4%) and 03(2.2%) patients with community acquired pneumonia. The age and gender distribution in context to CRP are presented in Table I-III.

		Gender		Total	P-value
		Male	Female		
Age	20-29	6	8	14	
		7.1%	15.7%	10.4%	
	30-39	25	16	41	
		29.8%	31.4%	30.4%	
	40-49	27	9	36	
		32.1%	17.6%	26.7%	
	50-59	18	5	23	0.02*
		21.4%	9.8%	17.0%	
	60-69	5	6	11	
		6.0%	11.8%	8.1%	
	70-75	3	7	10	
		3.6%	13.7%	7.4%	
Total		84	51	135	
		100.0%	100.0%	100.0%	

Table-I. The distribution of age in relation to gender

		Raised CRP		Total	P-value
		Yes	No		
Age	20-29	12	2	14	
		13.2%	4.5%	10.4%	
	30-39	20	21	41	
		22.0%	47.7%	30.4%	
	40-49	25	11	36	
		27.5%	25.0%	26.7%	
	50-59	17	6	23	0.05*
		18.7%	13.6%	17.0%	
	60-69	9	2	11	
		9.9%	4.5%	8.1%	
	70-75	8	2	10	
		8.8%	4.5%	7.4%	
Total		91	44	135	
		100.0%	100.0%	100.0%	

Table-II. The distribution of age in relation to CRP

		Raised CRP		Total	P-value
		Yes	No		
Gender	Male	51	33	84	
		56.0%	75.0%	62.2%	
	Female	40	11	51	
		44.0%	25.0%	37.8%	0.03*
Total		91	44	135	
		100.0%	100.0%	100.0%	

Table-III. The distribution of gender in relation to CRP

DISCUSSION

C reactive protein (CRP) produced by the liver in reaction to various stimuli from inflammation to infection and is an important marker of infection by rising occurs within a few hours and surprising that there is association between CRP in pneumonia.[16]

In present study the mean age of overall patients with CAP was 48.93±8.41 where it was 55±21 and 51±21 years in male and female population reported by Almirall J, et al.[137] In current series the male population was predominant and it is consistent with the study by Gutiérrez F, et al.[18] In present study the most common pathogen detected was streptococcus pneumoniae while the similar observation was also reported by Wood head M.[19] The standard method for detecting pneumonia is chest radiography, but detail history and clinical examination is important to diagnose or exclude this infection. Former literature hypothesized that there are no specific clinical findings that can play a role for this illness.[20] However, It has been shown that the absence of these clinical signs on chest auscultation reduces the likelihood of pneumonia and further diagnostic tools may be unnecessary,[21,22] whereas in present study 94(69.6%) subjects had radiographic evidence of CAP.

In present study the raised CRP was observed in 91(67.4%) subjects with CAP, the elevation of CRP in CAP was also reported by Garcia Vazquez E, et al and Smith RP, et al.[23,24] Interleukin-6 (IL-6) triggers the release of CRP,[25] although tumor necrosis factor (TNF-α), IL-1 and other substances are also involved.[26] Evidence of a relationship with severity had shown that IL-6 and IL-10 levels correlate with severity of pneumonia including systemic inflammatory response syndrome criteria.[27-29] TNF alpha, IL-6, and IL-1 beta were observed to be raised in subjects admitted in ICU with pneumonia.[30] Studies had shown that raised CRP in community-acquired pneumonia is also linked with requirement for inpatient care,[31] and raised CRP levels leads to poorer clinical and radiological recovery, longer hospital stay and increased mortality.[32]

The CRP can be used to monitor the response of antibiotic therapy because temperature takes several days to settle down while CRP falls within 24 hours of appropriate antibiotic therapy while the present study did not measure CRP levels on every subsequent day whereas the British Thoracic Society recommended serial measurements of CRP and risk stratification improvements. Vazquez GE, et al[33] observed two different uses of CRP, firstly, as a diagnostic tool to distinguish between viral and bacterial infections because CRP levels lowers in viral infections and secondly, as a prognostic and follow-up tool, as serial measurements useful to determine the response to treatment and to identify complications. The positive correlation observed between raised CRP in pneumonia suggested that this marker may be useful tool for evaluating disease severity in individuals with CAP. Thus, the detection of CRP in CAP may prove to be a practical, rapid and accurate method and severity marker used in routine procedure.

CONCLUSION

The present study found that the CRP was raised in 91(67.4%) predominantly male patients with community acquired pneumonia. CRP measurement is useful diagnostic tool for subjects with community acquired pneumonia in the health care centers.

REFERENCES

1. Irfan M, Hussain SF, Mapara K, Memon S, Mogri M, Bana M, et al. **Community acquired pneumonia: risk factors associated with mortality in a tertiary care hospitalized patients.** J Pak Med Assoc.2009; 59(7):448-52.

2. Figueiredo LT. **Viral pneumonia: epidemiological, clinical, pathophysiological and therapeutic aspects.** J Bras Pneumol.2009; 35 (9):899-906.

3. Rudan I, Boschi-Pinto C, Biloglav Z, Mulholland K, Campbell H. **Epidemiology and etiology of childhood pneumonia.** Bulletin of the World Health Organization.2008; 86:408-416.

4. Madhi SA, Levine OS, Hajjeh R, Mansoor OD, Cherian T. **Vaccines to prevent pneumonia and improve child survival.** Bull World Health Organ. 2008; 86:365-372.

5. Shaikh IA, Shaikh MA. **Correlates of self-reported lifetime pneumonia Prevalence in adult pakistani population.** J Ayub Med Coll Abbottabad. 2007; 19(2):73.

6. Dehghan A, Kardys I, de Maat MP, Uitterlinden AG, Sijbrands EJ, Bootsma AH, A et al. **Genetic variation, C-reactive protein levels, and incidence of diabetes.** Diabetes.2007; 56 (3):872-8.

7. Ridker PM, Danielson E, Fonseca FA, Genest J, Gotto AM Jr, Kastelein JJ, et al. **Rosuvastatin to prevent vascular events in men and women with elevated C-reactive protein.** N Engl J Med.2008; 359(21):2195-207.

8. Carlos M. Luna. C - reactive protein in pneumonia let me try again. CHEST.2004; 125(4):1192-95.

9. Seppä Y, Bloigu A, Honkanen PO, Miettinen L, Syrjälä H. **Severity assessment of lower respiratory tract infection in elderly patients in primary care.** Arch Intern Med.2001; 161:2709-13.

10. Hedlund, J **Community-acquired pneumonia requiring hospitalization: factors of importance for the short-and long term prognosis.** Scand J Infect Dis Suppl.1995; 97:1-60.

11. Wang AY. **Prognostic value of C-reactive protein for heart disease in dialysis patients.** Curr Opin Investig Drugs.2005;6(9):879-86.

12. Povoa P, Coelho L, Almeida E, Fernandes A, Mealha R, Moreira P, et al. **C-reactive protein as a marker of infection in critically ill patients.** Clin Microbiol Infect.2005;11(2):101-8.

13. Seller-Pérez G, Herrera-Gutiérrez ME, Lebrón-Gallardo M, de Toro-Peinado I, Martín-Hita L, **Porras-Ballesteros JA. Serum C-reactive protein as a marker of outcome and infection in critical care patients.** Med Clin (Barc).2005; 125(20):761-5.

14. Holm A, Nexoe J, Bistrup LA, Pedersen SS, Nielsen LP, Pedersen C. **Aetiology and prediction of pneumonia in lower respiratory tract infection in primary care.** Br J Gen Pract.2007; 57(540):547-54.

15. Chalmers JD, Singanayagam A, Hill AT. **C-reactive protein is an independent predictor of severity in community-acquired pneumonia.** Am J Med.2008; 121(3):219-25.

16. Almirall J, Bolíbar I, Toran P, Pera G, Boquet X, Balanzó X, et al. **Contribution of C-reactive protein to the diagnosis and assessment of severity of community-acquired pneumonia.** Chest.2004; 125(4):1335-42.

17. Almirall J, BolõÂbar I, Vidal J, Sauca G, Coll P, Niklasson B, et al. **Epidemiology of community-acquired pneumonia in adults: a population-based study.** Eur Respir J.2000; 15:757-63.

18. Gutierrez F, Masiá M, Mirete C, Soldán B, Rodríguez JC, Padilla S, Hernandez I, et al. **The influence of age and gender on the population-based incidence of community-acquired pneumonia caused by different microbial pathogens.** J Infect.2006; 53(3):166-74.

19. Woodhead M. **Community-acquired pneumonia in Europe: causative pathogens and resistance patterns.** Eur Respir J.2002; 36:S20-27.

20. Bartlett JG, Mundy LM. **Community-acquired pneumonia.** N Engl J Med.1995; 333(24):1618-24.

21. Tarver RD, Teague SD, Heitkamp DE, Conces DJ. **Radiology of community-acquired pneumonia.** Radiol Clin North Am.2005; 43(3):497-512.

22. March Mde F, Sant'Anna CC. **Signs and symptoms indicative of community-acquired pneumonia in infants under six months.** Braz J Infect Dis.2005;9(2):150-5.

23. Garcia Vazquez E, Martinez JA, Mensa J, Sanchez F, Marcos MA, de Roux A, et al. **C-reactive protein levels in community-acquired pneumonia.** Eur Respir J.2003; 21(4):702-5.

24. Smith RP, Lipworth BJ, Cree IA, Spiers EM, Winter JH. **C-reactive protein. A clinical marker in community-acquired pneumonia.** Chest.1995; 108(5):1288-91.

25. Castell JV, Gomez-Lechon MJ, David M. **Acute phase response of human hepatocytes: regulation of acute-phase protein synthesis by interleukin-6. Hepatology.**1990; 12:1179-1186.

26. Moussa K, Michie HJ, Cree IA. **Phagocyte function and cytokine production in community acquired pneumonia.** Thorax.1994; 49(2):107-111.

27. Marik P, Kraus P, Sribante J. **Hydrocortisone and**

tumor necrosis factor in severe community acquired pneumonia. A randomised controlled study. Chest.1993; 104(2):389-392.

28. Atunes G, Evans SA, Lordan JL, Frew AJ. **Systemic cytokine levels in community-acquired pneumonia and their association with disease severity.** Eur Respir J.2002; 20(4):990-95.

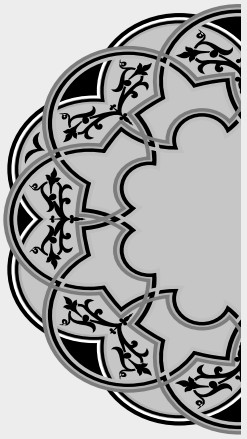
29. Glynn P, Coakley R, Kilgallen I. **Circulating interleukin 6 and interleukin 10 in community acquired pneumonia.** Thorax.1999; 54(1):51-5.

30. Puren J, Feldman C, Savage N, Becker PJ, Smith C. **Patterns of cytokine expression in community acquired pneumonia.** Chest.1995; 107:1342-49.

31. Admirall J, Bolibar I, Toran P, Pera G, Boquet X, Balanzo X. **Contribution of c-reactive protein to the diagnosis and assessment of severity of community-acquired pneumonia.** Chest.2004; 125 (4):1192-95.

32. Seppa Y, Bloigu A, Honkanen PO, Miettinen L, Syrjälä H. **Severity assessment of lower respiratory tract infection in elderly patients in primary care.** Arch Intern Med.2001;161:2709-2713.

33. Vazquez GE, Martinez JA, Mensa J, Sanchez F, Marcos MA, de Roux A et al. **C-reactive protein levels in community-acquired pneumonia.** Eur Respir J.2003; 21(4):702-5.



"Do not regret growing older;
it is a privilege denied to many."

Unknown

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Samar Raza	Contributions of conception and design, acquisition of data, analysis and interpretation of data	
2	Dr. Tariq Zaffar Shaikh	Drafting the article and shares its expert research opinion and experience in finalizing the manuscript	
3	Dr. Ghulam Hussain Baloch	Contributed in conception and interpretation of data and give his expert viewfor manuscript designing	
4	Dr. Zaheer Ahmed	Analysis and interpretation of data contributed in conception and shares its expert research opinion	
5	Dr. Syed Zulfiquar Ali Shah	Drafting and data collection and analysis / manupulate the data and drafting	