

# CRP Levels in Patients Attending a Tertiary Care Hospital.

Mishra Neeti<sup>1</sup>, Tripathi Shailendra Mohan<sup>2</sup>, Yadav Rajesh<sup>3</sup>, Jaiswal Abhishek<sup>4</sup>, Kumar Gaurav<sup>1</sup>

<sup>1</sup>Assistant Professor, Department of Microbiology, TSM Medical College and Hospital Lucknow.

<sup>2</sup>Associate Professor, Department of Geriatric Mental Health, King George's Medical University, Lucknow, UP, India.

<sup>3</sup>Professor, Department of Microbiology, TSM Medical College and Hospital Lucknow.

<sup>4</sup>Tutor, Department of Microbiology, TSM Medical College and Hospital Lucknow.

Received: December 2018

Accepted: December 2018

**Copyright:** © the author(s), publisher. It is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## ABSTRACT

**Background:** It is an acute phase protein, which rises due to inflammation, infection and injury. It is synthesized by liver in response to IL-6 secreted by activated macrophages and T cells in acute and chronic inflammatory conditions. Changes in serum CRP concentration occur more quickly than ESR and therefore CRP may be a better reflection of current inflammation. **Methods:** Blood was collected by vene-puncture from the patients and separated sera were obtained from individuals elderly as well as young person's were tested by quantitative & qualitative method. **Results:** In our study, two groups were included in this study, i.e. elderly group & young group. 108 & 40 total cases were included in elderly group & young group respectively. In the elderly group out of 108 cases 35.2% were positive rest were negative for C - reactive protein as well as in young group 35% positive & 65% were negative found in the present study. **Conclusion:** In cases of joint pains CRP tests can give a better picture before going for higher and more expensive investigations.

**Keywords:** CRP, Infection, Depression, Inflammation, IL-6.

## INTRODUCTION

CRP is an acute phase protein. Inflammation, infection and injury are the main cause of its rises.<sup>[1]</sup> In acute and chronic inflammatory conditions, it is produced by liver in response to IL-6. IL-6 is secreted by activated macrophages and T cells. Due to changes in serum CRP concentration rise more rapidly than ESR. Therefore, CRP is a better marker of acute inflammation.<sup>[2]</sup> The increased risk of infection that happens with ageing is probably related to impairment of local and systemic defence mechanisms. Worldwide, in elderly people, investigation of immune function has revealed defects in both cell-mediated and humoral immunity.<sup>[3,4]</sup> It contributes to an increased susceptibility to influenza, bacterial pneumonia, herpes zoster, tuberculosis, cancer, and lymphoproliferative disorders.<sup>[5]</sup> The inflammatory response and elaboration of polypeptide mediators of inflammatory processes, has not been as thoroughly studied as immune system. It has been clinically

observed that reduced febrile response to infection in elderly subjects is the possibility of abnormal inflammatory responses.<sup>[6,7]</sup> The critical-phase response, a systemic response to tissue injury or infection characterized by alteration in the synthesis and secretion of plasma proteins by hepatocytes are the main accompaniments of inflammatory processes. Both in the development of insulin resistance and metabolic syndrome, inflammation plays an important role. For screening, monitoring the natural history of the disease, and measuring the response to therapeutic interventions, it is better to develop a robust biomarker that can predict metabolic syndrome instead of examining individual variable features.<sup>[8]</sup> Several researches revealed that high concentrations of high sensitivity C-reactive protein (hs-CRP), a proinflammatory cytokine is related with insulin resistance and metabolic syndrome. It may predict beginning of diabetes mellitus and cardiovascular events. It has been suggested to include hs- CRP as one of the major diagnostic criteria for metabolic syndrome.<sup>[9]</sup>

It is well known that atherosclerosis starts early in life and the cardiovascular risk factors in childhood track into adulthood. It can lead to CVD in future.<sup>[10,11]</sup> CRP is an inflammatory marker. It is produced by hepatocytes which are under transcriptional control by the pro-inflammatory cytokine interleukin 6 (IL-6) (Pepys & Hirschfield,

### Name & Address of Corresponding Author

Dr. Tripathi Shailendra Mohan,  
Associate Professor,  
Department of Geriatric Mental Health,  
King George's Medical University,  
Lucknow, UP, India.

2003).<sup>[12]</sup> The neuroendocrine system which consists of Hypothalamic-Pituitary-Adrenal [HPA] axis is strongly affected by the inflammatory cytokines. It also affects the CNS where many symptoms of illness like fever, decreased appetite, withdrawn behavior, and sleep changes can be produced;<sup>[13]</sup> Depression is also related with activation of the inflammatory response.<sup>[14,15]</sup> The various inflammatory cascade mechanisms have given new insights and provided several markers. C-reactive protein (CRP) is one the best marker among them.<sup>[16]</sup>

**MATERIALS AND METHODS**

**Study population**

Two group were included in this study. 108 cases were involved in elderly group & 40 cases were involved in young group.

**Study Area**

The group study was carried out in the Department of Microbiology of TSM Medical College & Hospital, Lucknow.

**Study Duration**

Duration of this study was six month.

**Data collection**

Blood was collected by vene-puncture from the patients and separated sera were obtained from

individuals elderly as well as young person's.<sup>[17]</sup> Were tested with quantitative & qualitative method.

**Qualitative Method**

SERO CHEK AGAPPE kit used.

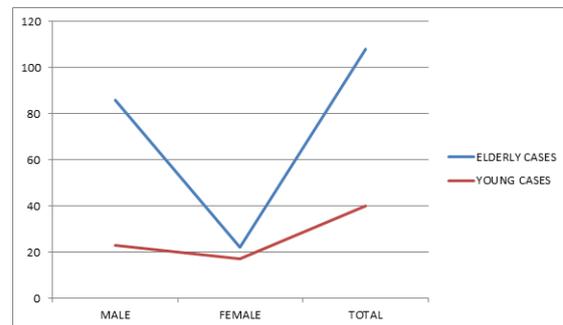
**Quantitative Method**

It was done by NEPLOMETRY.

**RESULTS**

**Table 1: Distribution of cases according to gender.**

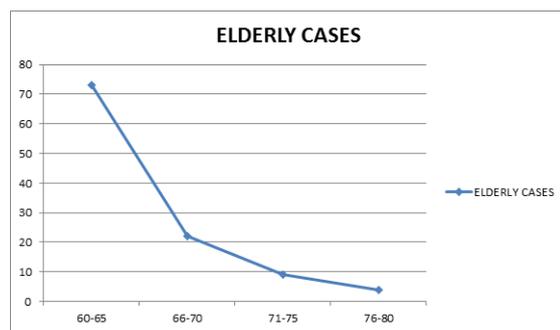
Gender	Elderly Cases	Percentage	Young Cases	Percentage
Male	86	79.6%	23	57.5%
Female	22	20.3%	17	42.5%
Total	108	100%	40	100%



**Figure 1: This chart showed distribution of cases according to gender.**

**Table 2: Distribution of cases according to age**

Age	Elderly Cases	Percentage	Age	Young cases	Percentage
60-65	73	67.5%	21-30	6	15%
66-70	22	20.3%	31-40	9	22.5%
71-75	9	8.4%	41-50	13	32.5%
76-80	4	3.7%	51-60	12	30%
Total	108	100%	Total	40	100%

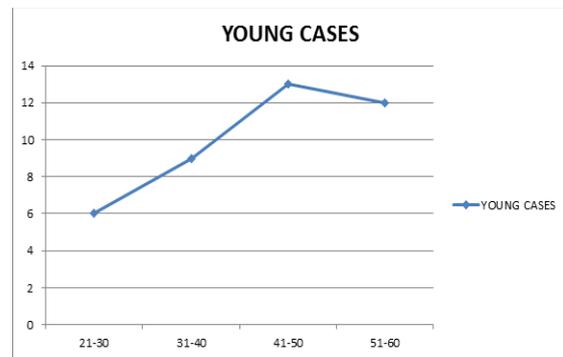


**Figure 2: This chart showed distribution of elderly cases according to age**

In our study, two groups were included in this study, i.e. elderly group & young group. 108 & 40 total cases were included in elderly group & young group respectively. Among the 108 total cases 79.6% were male & 20.3% were female in elderly group. But in case of young group there were 57.5% male & 42.5% female. In this study we found that 60-65 (67.5%) age group most commonly occur followed by 66-70(20.3%), 71-75(8.4%), 76-80(4%) in elderly group as well as in young group 41-50 (32.5%) age

group cases most commonly occur followed by 31-40(22.5%), 21-30(15%), 51-60(30%). In the elderly group out of 108 cases 35.2% were positive rest were negative for C - reactive protein as well as in young group 35% positive & 65% were negative found in the present study.

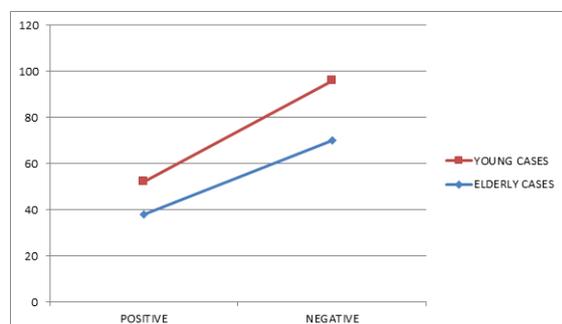
A concentration equal to or greater than 6 mg/ml indicates positive whereas concentration lower than 6mg/ml indicates negative results.



**Figure 3: This chart showed distribution of young cases according to age**

**Table 3: Positive c- reactive protein in all cases**

CRP	Elderly cases	Percentage	Young cases	Percentage
Positive	38	35.2%	14	35%
Negative	70	64.8%	26	65%
Total	108	100%	40	100%

**Figure 4: This chart showed positive & negative c-reactive protein in all cases**

## DISCUSSION

The present study consists of two groups. These were elderly group and young group. Sample size of the present study was total 148. The total cases were included in elderly group & young group was 108 and 40 respectively. In elderly group, 79.6% were male & 20.3% were female out of 108 cases. In young group, there were only 57.5% male & 42.5% female. In our study we found that in elderly group, 60-65 (67.5%) age group most commonly occur followed by 66-70(20.3%),71-75(8.4%),76-80(4%). In young group 41-50 (32.5%) age group cases most commonly occur followed by 31-40(22.5%),21-30(15%),51-60(30%). For C - reactive protein, out of 108 cases 35.2% were positive rest were negative in elderly group and in young group 35% positive & 65% were negative.

Stanley P. et al also studied elderly and young patients. The results of his study also support the hypothesis that with ageing in humans, both quantitative and qualitative alterations of acute-phase protein production occur., In a group of 131 healthy elderly persons, the median concentration of the major human acute-phase protein, CRP was greater (3.0/ig/ml) than in 47 younger individuals (0.9/ig/ml). In non-parametric statistical testing, the distribution of CRP concentrations differed significantly. Previous studies on CRP concentrations in sera of healthy young adults aged <63 years have disclosed median CRP amounts of 0.6-0.8/ig/ml concentrations which is similar to our young subjects, but less than the older group.<sup>[18-20]</sup>

CRP test is cheap, consistent, reproducible and is easily available in most of the hospital. Some researchers also prefer CRP to other markers such as PCT. It very much reliable in sepsis diagnosis.<sup>[21,22]</sup> Does the utilization of a marker make any difference to the patient? It has been studied that the period in which CRP measurement was routinely performed

was compared retrospectively with a preceding period of the same duration, involving 144 and 187 patients respectively. Though the results were not statistically significant, yet the routine determination of CRP was related to the low rate mortality and morbidity.<sup>[23]</sup> Though, this finding needs further validation.

## CONCLUSION

In conclusion, serial CRP measurement, rather than a single determination at the time of admission, is a simple and valuable instrument in the diagnosis of sepsis and infection as well as in monitoring the response to therapy.

## REFERENCES

- Jessica,W,Smith., Thomas,B,Martins., Evelyn,Gopez., Troy, Johnson., Harry,R, Hill., Thomas,D,Rosenberg. (2012). Significance of C-reactive protein in in osteoarthritis and total knee arthroplasty outcomes. *TherAdvMusculoskel Dis*, 4(5) 315–325.
- Christine Castro, D.O. and Mark Gourley, M.D. (February, 2010). Diagnostic Testing and Interpretation of Tests for Autoimmunity: *J Allergy ClinImmunol*, 125(2 Suppl 2), S238–S247. doi:10.1016/j.jaci.2009.09.041
- Alder WH, Nagel JE. Clinical immunology. In: HazzardWR, Andres R, Bierman EL, Blass JP, eds. Principles ofgeriatric medicine and gerontology, 2nd edn. New York:McGraw-Hill, 1990;60-71.
- Burns EA, Goodwin JS. Immunology and infectiousdisease. In: Cassel CK, Riesenberg DE, Sorensen LB,Walsh JR, eds. Geriatric medicine, 2nd edn. New York:Springer-Verlag, 1990;312-24.
- Effros RB. Immunosenescence-related diseases in theelderly. *Immunol Allergy CUn North Am* 1993; 13:695-712.
- Gleckman R, Hilbert D. Afebrile bacteremia: a phenomenonin geriatric patients. *JAMA* 1981 ;248:1478-81.
- Norman D, Grahn D, Yoshikawa T. Fever and aging. *JAM GeriatrSoc*1985;33:859-63.
- Gowdaiah P, R M, Nirgude D, Hosamani P. Highsensitivity C-reactive protein in metabolic syndrome. *IntJ Adv Med*. 2016;607–10.
- Ridker PM, Wilson PWF, Grundy SM. Should Creactiveprotein be added to metabolic syndrome and toassessment of global cardiovascular risk? *Circulation*.2004 Jun 15;109 (23): 2818–25.
- Reis EC, Kip KE, Marroquin OC, Kiesau M, Hippias L,Peters RE, et al. Screening children to identify familiesat increased risk for cardiovascular disease. *Pediatrics*.2006 Dec;118(6):e1789-1797.
- Li S, Chen W, Srinivasan SR, Bond MG, Tang R,Urbina EM, et al. Childhood cardiovascular risk factorsand carotid vascular changes in adulthood: the BogalusaHeart Study. *JAMA*. 2003 Nov 5;290(17):2271–6.
- Pepys MB, Hirschfield GM. C reactive protein: a critical update. *The journal of clinical investigation*. 2003; 111(12):1805-12.
- Raison CL, Cowles MK, Miller AH. Immune System and Central Nervous System Interactions.In: Sadock Benjamin J, Sadock Virginia A, Ruiz Pedro, editors. Kaplan &Sadock's Comprehensive Textbook of Psychiatry. 9th Edition.Lippincott Williams & Wilkins, 2009.
- Maes M, Smith R, Scharpe S. The monocyte T lymphocyte hypothesis of major depression. *Psychoneuroendocrinology*. 1995; 20:111-116.

15. Maes M. Depression is an inflammatory disease, but cell-mediated immune activation is the key component of depression. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*. 2011; 35:664-675.
16. Pedro Póvoa. C-reactive protein: a valuable marker of sepsis: *Intensive Care Med* (2002) 28:235–243
17. Hodder SL, Ford AB, FitzGibbon PA, Jones PK, Kumar ML, Mortimer EA Jr. Acute respiratory illness in elderly community residents. *J Am Geriatr Soc* 1995;43:24-9.
18. Stanley p. Ballou, gerard b. Lozanski, sally hodder, debra l. Rzewnicki, lorraine c. Mion, jean d. Sipe, amasa b. Ford, irving Kushner. Quantitative and Qualitative Alterations of Acute-phase Proteins in Healthy Elderly Persons: Age and Ageing 1996.25:224-230.
19. Claus DR, Osmond AP, Gewurz A. Radioimmunoassay of human C-reactive protein and levels in normal sera. *J Lab Clin Med* 1976;87:120-8.
20. Shine B, de Beer FC, Pepys MB. Solid phase radioimmunoassays for human C-reactive protein. *Clin Chim Ada* 1981;117:13-23.
21. Suprin E, Camus C, Gacouin A, Le Tulzo Y, Lavoue S, Feuillu A, Thomas R (2000) Procalcitonin: a valuable indicator of infection in a medical ICU? *Intensive Care Med* 26:1232–1238
22. Vincent JL (2000) Procalcitonin: THE marker of sepsis? *Crit Care Med* 28:1226–1228
23. Ugarte H, Silva E, Mercan D, DeMendonca A, Vincent JL (1999) Procalcitonin used as a marker of infection in the intensive care unit. *Crit Care Med* 27:498–504

**How to cite this article:** Mishra N, Tripathi SM, Yadav R, Jaiswal A, Kumar G. CRP Levels in Patients Attending a Tertiary Care Hospital. *Ann. Int. Med. Den. Res.* 2019; 5(1): MB14-MB17.

**Source of Support:** Nil, **Conflict of Interest:** None declared