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High Sensitive CRP as Predictor for Severity of Airflow Obstruction in Patients with Chronic Obstructive Pulmonary Diseases

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ABSTRACT
BACKGROUND*: Chronic obstructive pulmonary disease (COPD) is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation which is not reversible due to airway and /or alveolar abnormalities usually caused by significant exposure to noxious particles or gases. Airflow limitation, also known as airflow obstruction in COPD determined for clinical purposes by Spirometry, which involves forced expiratory maneuvers after the subject has inhaled to total lung capacity. C-reactive protein (CRP) is a potential biomarker of systemic inflammation that is synthesized predominantly by the hepatocytes in response to tissue damage or inflammation.It is considered as prototypic downstream marker of inflammation. Serum CRP is more sensitive than other inflammatory markers due to its rapid variations in response to changes in severity of inflammation. High concentration of serum CRP reported in COPD patients which might be a major cause for reduction in FEV_1.In patients with COPD, assessment of inflammatory process is important for estimating the severity of disease as well as for evaluation of the treatment response.*
METHODS *: study was carried out in the Department of Medicine, Assam Medical College & Hospital, Dibrugarh attending OPD and in various ward of medicine,satisfying the inclusion and exclusion criteria. continuous variables were expressed as mean +-standard deviation.categorical variable were expressed as frequency and percentage.p value were considered statistically significant when it was less than* ***.RESULTS*** *:In our study ,The most common age group was found to be 60-69 years (38.89) followed by ≥ 70 years (31.11%). Out of 90 patients included in the study, 52 (57.78%) were male and 38 (42.22%) were female. Male to female ratio was 1.37:1. Among our study participants,67 (74.4%) had a significant elevation of hs-CRP>3mg/l, whereas 23 (25.6%) had hs-CRP<3 mg/l. In our present study,the mean hs-CRP in stage1 of GOLD was 0.77 ± 0.21 mg/l, 4.46 ± 1.54 mg/l in stage 2 of GOLD, 8.83±1.79 mg/l in stage3 of GOLD, 13.54±1.65 mg/l in stage4 of GOLD. An inverse relation was seen between FEV_1 and hs-CRP, which was statiscally significant (p<0.001). Dhar et al[96] conducted a study in 2016 and found that CRP was inversely correlated with FEV_1that was statistically significant.SJ Wuet al[89]found the co-relations between changes of serum CRP levels and FEV_1 were negativeand that was statistically significant. Broekhuizen R et al[91] in 2006 conducted a study and found that CRP level was higher in GOLD stage 3 and 4 as compared to stage 2, which was statically significant*
CONCLUSIONS : *COPD is a common debilitating disease in elderly and the usual bedside test for assessing the severity is the pulmonary function test.The use of PFT is limited by poor effort tolerance in elderly COPD patients along with other comorbidities associated with aging like Dementia, Alzheimer's disease, cerebrovascular accident (CVA). Our study found that hs-CRP were higher in patients with COPD particularly in smokers.The hs-CRP correlated statistically with the severity of airflow obstruction in a significant way and hence can be use as useful inflammatory marker for the prediction of lung function in COPD*
KEY WORDS*: Chronic obstructive pulmonary disease (COPD),High sensitive CRP.*

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I. Background:

Chronic obstructive pulmonary disease (COPD) is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation which is not reversible due to airway

and /or alveolar abnormalities usually caused by significant exposure to noxious particles or gases. C-reactive protein (CRP) is a potential biomarker of systemic inflammation that is synthesized predominantly by the hepatocytes in response to tissue damage or inflammation.[5]It is considered as prototypic downstream marker of inflammation. Serum CRP is more sensitive than other inflammatory markers due to its rapid variations in response to changes in severity of inflammation. High concentration of serum CRP reported in COPD patients which might be a major cause for reduction in FEV. In patients with COPD, assessment of inflammatory process is important for estimating the severity of disease as well as for evaluation of the treatment response. As acute phase reactants like CRP and cytokines that are present in peripheral circulation in COPD patients may lead to decline in lung function.[8] It is important to identify ongoing inflammatory process which can be done by detecting hs-CRP level in the peripheral circulation and relating with severity of airflow obstruction.

AIM AND OBJECTIVES: To determinethe highsensitive C-reactive protein (hs-CRP) level in chronic obstructive pulmonary disease patients.To assess the relation of highsensitive C-reactive protein(hs-CRP) level with severity of airflowobstruction in chronic obstructive pulmonary disease.

METHODS: This is a Hospital Based Cross Sectional Study conducted in the department of medicine at assam medical college and hospital,dibrugarh,india.we enrolled patients patients attending OPD and admitted in department of Medicine, Assam Medical College and Hospital during study period and fulfilled the inclusion and exclusion criteria were taken up for the study.

INCLUSION CRITERIA:

☑ Patients with symptoms suggestive of COPD as per GOLD guideline.
☑ Age 13 years and above.

EXCLUSION CRITERIA:

☒ Spirometry proved bronchial asthma
☒ Myocardial infarction
☒ Coronary heart disease
☒ Connective tissue disorders
☒ Patients on oral corticosteriods
☒ Infection such as pneumonia or tuberculosis

Patients not giving consent to participate.

STATISTICAL ANALYSIS:

Data was analysed using computer programme, statistical package for social science (SSPS for window, version 20.0 Chicago) and microsoft excel 2010. Results on continuous measurements are presented as mean ± standard deviation are compared using Analysis of variance (ANOVA). Discrete data are expressed as number (%) and are analysed using Chi square test. Pearson's correlation coefficient (r) was used to measure the association among continuous variables. For all analyses, the statistical significance was fixed at 5% level (p value <0.05).

II. Results:

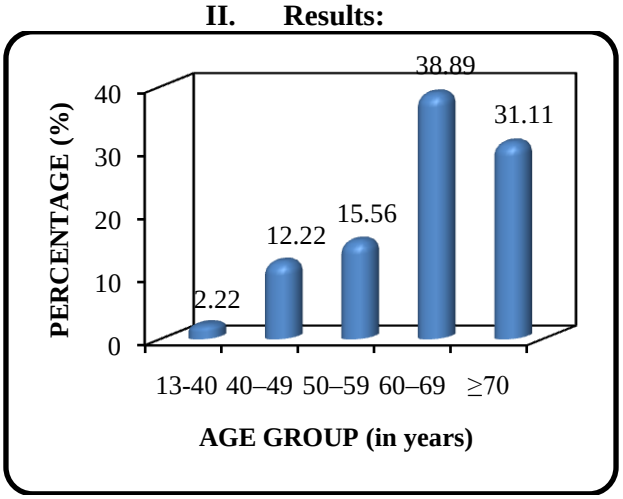

Fig1.1: AGE WISE DISTRIBUTION .The most common age group was found to be 60-69 years (38.89) followed by ≥ 70 years (31.11%). The minimum age was 35 years and the maximum age was 97 years. Mean age of patients in our study was 62.4 ± 11.80 years.

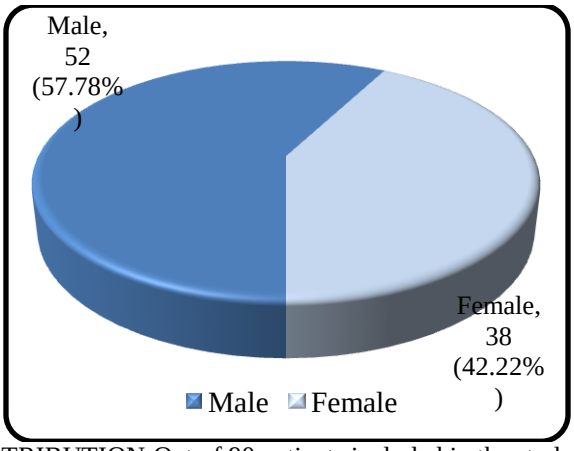

Fig 1.2: GENDERWISE DISTRIBUTION:Out of 90 patients included in the study, 52 (57.78%) were male and 38 (42.22%) were female. Male to female ratio was 1.37:1.

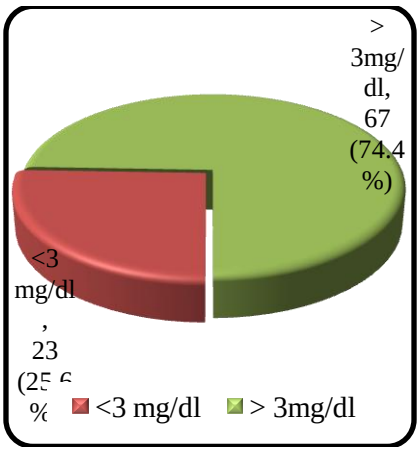

Fig 1.3: hs-CRP AMONG THE STUDY POPULATION .Among our study participants,67 (74.4%) had a significant elevation of hs-CRP>3mg/l, whereas 23 (25.6%) had hs-CRP<3 mg/l.

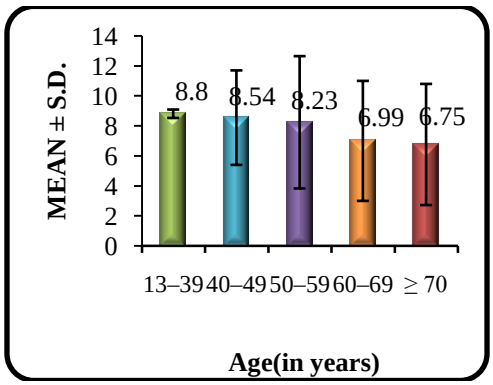

Fig 1.4: :DISTRIBUTION OF hs-CRP WITH AGE .From our study, the mean hs-CRP in age group 13-39 years,40-49years, 50-59 years, 60-69 years and ≥70 years were 8.80±0.28, 8.54±3.15,8.23±4.41,6.99±4.00,6.75±4.04 respectively. No statistical significant relation was seen between hs-CRP and Age.

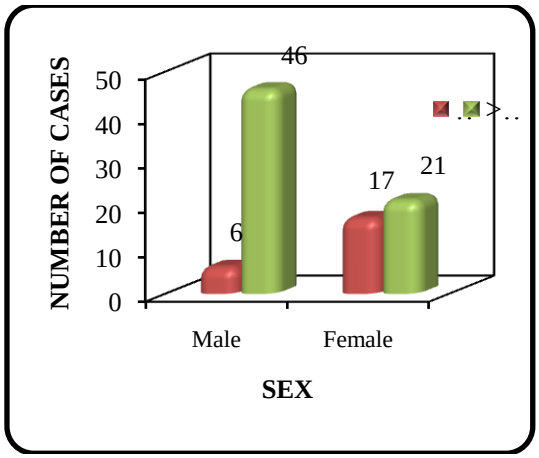

Fig 1.5: RELATION OF hs-CRP WITH SEX:In our study, out of 52 males, 46 had hs-CRP >3 mg/l and 6 had hs-CRP <3mg/l and out of 38 females, 21 had hs-CRP >3mg/l and 17 had hs-CRP < 3mg/l. Males had a higher level of hs-CRP as compared to females and therewas significant association between hs-CRP and Sex (p=0.003).

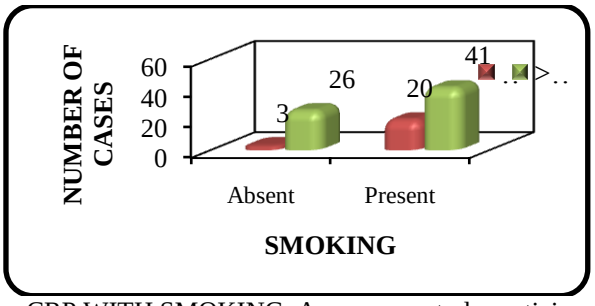

Fig 1.6: RELATION OF hs-CRP WITH SMOKING .Among our study participants, out of 61 patients with tobacco smoking, 41 had elevated hs-CRP>3mg/l and 20 had <3 mg/l hs-CRP and among29 non-smokers, 26 had hs-CRP >3mg/l and 3 had hs-CRP <3mg/l. Significant association was seen between smoking and hs-CRP (p<0.022).

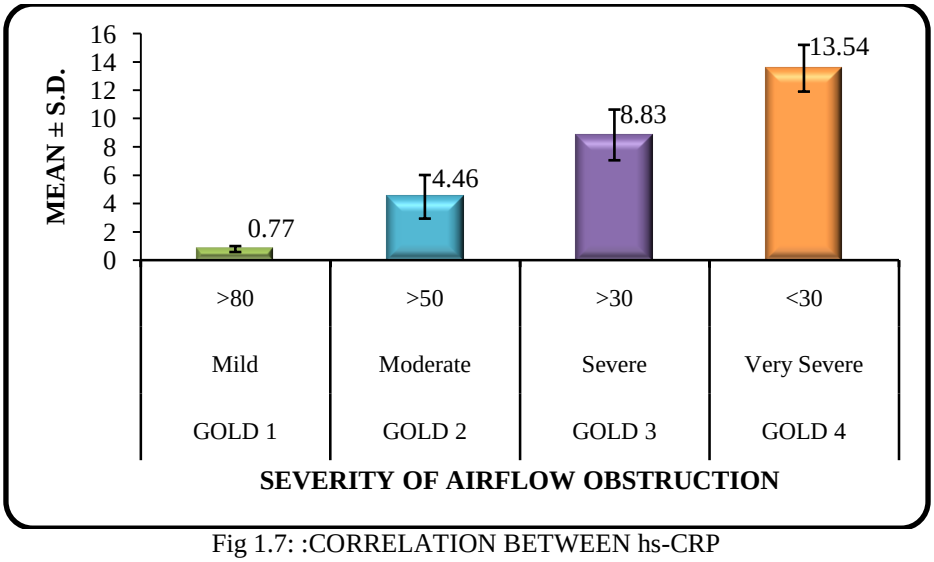

Fig 1.7: :CORRELATION BETWEEN hs-CRP AND SEVERITY OF AIRFLOW OBSTRUCTION In our present study,the mean hs-CRP in stage1 of GOLD was 0.77 ± 0.21 mg/l, 4.46 ± 1.54 mg/l in stage 2 of GOLD, 8.83±1.79 mg/l in stage3 of GOLD, 13.54±1.65 mg/l in stage4 of GOLD. An inverse relation was seen between FEV_1 and hs-CRP, which was statiscally significant (p<0.001).

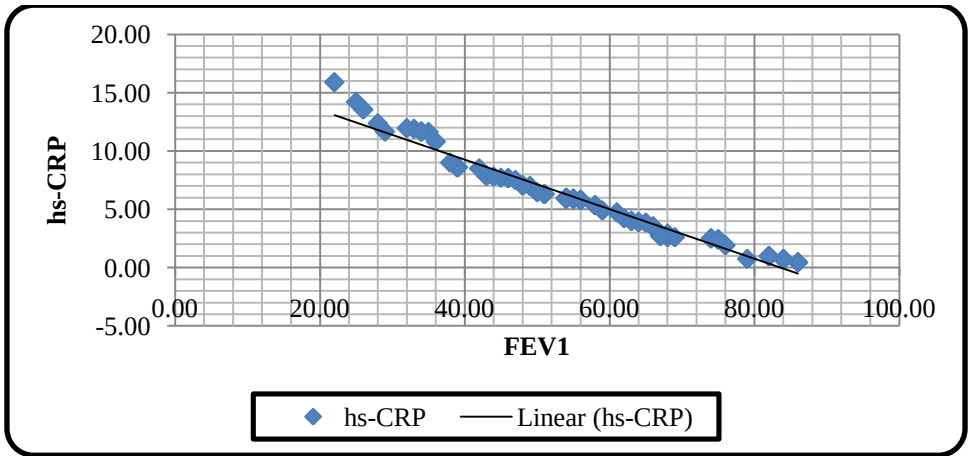

Fig 1.8: CORRELATION BETWEEN FEV1 AND hs-CRP In our study, we found that there was strongly negative co-relation between hs-CRP and FEV_1(r = -0.9801)

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