



A STUDY OF CORELATION OF MICROALBUMINURIA WITH HYPOXIA IN ACUTE EXACERBATION OF COPD(CHRONIC OBSTRUCTIVE PULMONARY DISEASE)

General Medicine

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KEYWORDS

INTRODUCTION

- Chronic obstructive pulmonary disease (COPD) is defined as a disease state characterised by persistent respiratory symptoms and airflow obstruction. It includes chronic bronchitis, small airway disease & emphysema.
- As per WHO, the third leading cause of death in the world by 2030 will be COPD. In COPD inhaled particles and gases lead to chronic inflammation of the airways with airflow limitations, which is not fully reversible.
- COPD is a heterogenic disease with both pulmonary & extrapulmonary symptoms characterized by long-term poor air flow. In particular, cardiovascular disease remains one of the leading causes of mortality and morbidity in COPD patients, independent of the well-recognized risk factors, including age, sex & smoking status.
- Microalbuminuria(MAB) is one of the precise indicators of cardiovascular risk. A consistent association has been shown between the presence of MAB and poor cardiovascular outcomes in subjects with hypertension and diabetes mellitus, more importantly, in the general population.
- MAB is a condition in which excretion of albumin in the urine is elevated at amounts not detectable by conventional semiquantitative tests. MAB is now measured by albumin and creatinine ratio in a random urine sample.
- As MAB is indicative of endothelial dysfunction, it was studied that decreased oxygen concentration in blood during exacerbation episodes of COPD will lead to increased glomerular filtration & hence protein leakage in the form of MAB.
- A limited number of studies have evaluated the presence of MAB in patients with COPD, mostly during exacerbations. Hence this study was undertaken to know the correlation of MAB with hypoxia in COPD exacerbation episodes.

AIMS AND OBJECTIVES :-

To study the correlation of MAB with hypoxia in patients with acute exacerbation of COPD.

- Inclusion Criteria:-**
 - Clinically diagnosed cases of acute exacerbation of COPD.
 - Age above 18 years.
- Exclusion Criteria:-**
 - Age <18 years
 - Patients with CKD
 - Pregnancy & lactation
 - Known cases of congestive cardiac failure, IHD, LBBB, arrhythmias, malignancies & hepatic failure.

METHODOLOGY

- The observational cross-sectional study was done in the department of General medicine, MRMC, Kalaburagi. The data was collected from 30 diagnosed cases COPD patients presenting to Emergency Medicine Department of MRMC, Kalaburagi in time period from October 2023-May 2024.
- The patients gender, age, the main symptoms at presentation, i.e. exacerbation of their pre-existing symptoms of COPD, and

routine investigations with ABG and spot urine-albumin creatinine ratio were noted and assessed. 2D echo was also done.

- Along with ABG & UACR, 24hr urine protein was sent and analysed for hypoxia & microalbuminuria
- Data was entered into Microsoft excel data sheet and analyzed using SPSS V25. Chi-square test, Fisher exact test, Independent t-test will be applied. Sensitivity and specificity are calculated. $P < 0.05$ is considered as statistically significant.

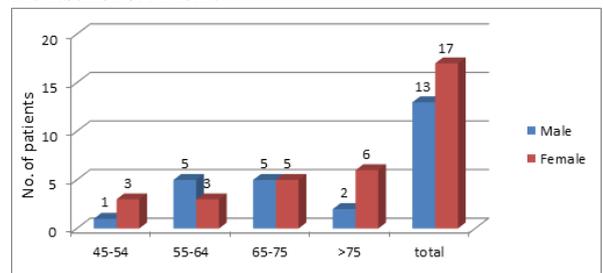
Classification of Albuminuria (According to KDIGO 2012 Practice Guidelines for the Evaluation and Management of Chronic Kidney Disease:

Classification	UACR (mg/mmol)	24 hour Urine albumin(mg/24hr)
Normal	<30	8-10
Microalbuminuria	30-300	30-300
Macroalbuminuria	>300	>300

RESULTS

- Our study included 30 COPD patients who met inclusion criteria. Of these majority were males, 13 (43.3%) of 30, & males were 17 (56.7%) of 30.
- Among these 4(5.3%) were aged between 41-50 yrs, 18(24.0%) were aged between 51-60 yrs, 28(37.3%) were aged between 61-70 yrs, 19(25.4%) were aged 71-80 yrs & 6 were aged >80 yrs(8.0%) with mean age being 67.48+9.86 yrs.
- MAB(UACR=30-300mg/g Cr) was present in 19(63.33%) of total COPD patients, & 1(3.33%) patient had macroalbuminuria (UACR>300mg/g Cr), with mean UACR 100.8 mg/g of creatinine.
- Among 30 COPD patients, the arterial PO₂ levels of 17(56.66%) were <55mmHg, 1(3.33%) was 55-60mmHg, 7(23.33%) were 60-70mmHg & 5(16.66%) were >70mmHg respectively. The mean PO₂ level was 53.40mmHg.

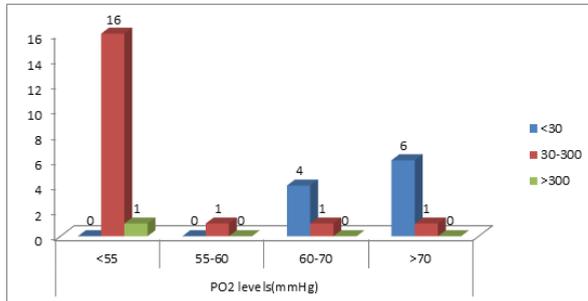
Multiple Bar Diagram Represents Age and Gender Wise Distribution of Patients



- As per MMRC dyspnea scale, 13(43.3%) patients were seen in MMRC scale 3, 9(30.0%) of patients were seen in MMRC scale 2 and 8(26.7%) of patients were seen in MMRC scale 4.
- Among the patients, 17(56.7%) patients had normal PCO₂(<45mmHg) & 13(43.3%) of patients had abnormal PCO₂(>45mmHg)

- Our Study revealed that there is statistically highly significant negative correlation between UACR v/s PO₂ & PH (with $p < 0.05$). And statistically significant positive correlation between UACR vs PCO₂ and MMRC grades ($p < 0.001$).

Distribution of Patients According to Uacr & Arterial Oxygen Levels at Presentation



DISCUSSION

- Our study revealed that MAB was observed in 63% of the patients, inversely correlating with PO₂ & PH, and positively correlating with PCO₂ & MMRC grades.
- Urinary ACR was increased in patients who were more symptomatic & severely hypoxic and vice-versa.
- We observed that patients with COPD who were more hypoxic and more hypercapnic had more MAB than compared to COPD patients without MAB which was statistically significant.
- As hypoxia results in endothelial dysfunction due to loss of physiological equilibrium of vasodilation & vasoconstriction which results in loss of peritubular capillaries in tubulo-
interstitium.

CONCLUSION

- COPD patients have more prevalence of MAB and the levels of MAB increases as the severity of COPD increases due to hypoxia and endothelial dysfunction.
- MAB is a simple, non-invasive and inexpensive test which can be performed without much resources.
- As MAB is a marker of cardiovascular events, similarly it can also be considered in COPD patients with high risk for cardiovascular events.

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