

**Microalbuminuria in patients with chronic obstructive pulmonary disease**<sup>1</sup>Vikas Jaiswal, HOD, Department of Pulmonology, Popular Group of Hospital Varansi, India<sup>2</sup>Davinder Kumar Kundra, Unit Head, Department of Pulmonology (Respiratory and Sleep Medicine), Manipal Hospital Dwarka, Delhi, India<sup>3</sup>Sachin Baliyan, Senior Consultant, Oncoplus Hospital, New Delhi**Corresponding Author:** Davinder Kumar Kundra, Unit Head, Department of Pulmonology (Respiratory and Sleep Medicine), Manipal Hospital Dwarka, Delhi, India**How to citation this article:** Vikas Jaiswal, Davinder Kumar Kundra, Sachin Baliyan, “Microalbuminuria in patients with chronic obstructive pulmonary disease”, IJMACR– October– 2026, Volume – 9, Issue – 5, P. No. 07 – 11.**Open Access Article:** © 2026 Vikas Jaiswal, et al. This is an open access journal and article distributed under the terms of the creative common’s attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non - commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.**Type of Publication:** Original Research Article**Conflicts of Interest:** Nil**Abstract**

**Background:** During exacerbation of COPD-MAB was increased in recent researches. The link between lower forced expiratory volume in 1 s (FEV<sub>1</sub>) and emphysema severity with endothelial dysfunction was also endorsed by researchers. Furthermore, MAB may point toward endothelial dysfunction. It was studied that decreased oxygen concentration in blood during exacerbation episodes of COPD will lead to increased glomerular filtration and hence more protein leakage in the form of MAB.

**Methods:** All subjects were evaluated by taking a detailed clinical history. The duration of COPD, number of exacerbations, symptoms and treatment history was enquired from each patient enrolled in the study with detailed systemic examination of each patient. For the diagnosis of MAB, care was taken when collecting samples for the urine UACR. An early morning sample

was preferred. The patient was instructed to avoid heavy exercises 24 h before the test. In our study we labelled a patient to have MAB when the urine ACR was more than 30 mg/gm.

**Results:** The difference in the distribution of micro albuminuria among levels of Gold staging was statistically significant ( $p < 0.05$ ).

**Conclusion:** Microalbuminuria is significantly associated with GOLD severity staging and acute exacerbations. The determination of microalbuminuria is simple and inexpensive. These markers can serve to diagnose in COPD patients in resource limited and emergency setting. This study suggests that endothelial and microvascular mechanisms are promising targets for early detection of COPD and management

**Keywords:** Microalbuminuria, COPD, Severity

## Introduction

Chronic obstructive pulmonary disease (COPD) a preventable and treatable disease which consists of constant expiratory limitation of the flow of air which is not fully reversible.<sup>1</sup>

Detection of COPD is thought in a patient coming with symptoms of cough, excessive production of sputum, or dyspnea and/ or exposure to factors which causing the disease will be present.<sup>2</sup>

Microalbuminuria (MAB) is the 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 ( $\mu\text{g}$ ) and creatinine (mg) ratio in a random urine sample.<sup>7</sup> Currently, the National Kidney Foundation recommends to use spot urine albumin/creatinine ratio in the first voided, morning, and midstream specimen to detect albuminuria.<sup>3</sup>

MAB is defined as the urine albumin creatinine ratio (UACR) between 20 mg/g in men and 30 mg/g in women and the upper threshold of 299 mg/g for both sexes.<sup>4</sup>

More recently, MAB is used to screen people who are at a high risk for cardiovascular events and the progression of kidney disease.<sup>5</sup>

During exacerbation of COPD-MAB was increased in recent researches. The link between lower forced expiratory volume in 1 s ( $\text{FEV}_1$ ) and emphysema severity with endothelial dysfunction was also endorsed by researchers. Furthermore, MAB may point toward endothelial dysfunction. It was studied that decreased oxygen concentration in blood during exacerbation episodes of COPD will lead to increased glomerular filtration and hence more protein leakage in the form of MAB.<sup>6</sup>

We will be hypothesized that Microalbuminuria is elevated in patients with COPD independently of other cardiovascular risk factors. To test this hypothesis, we will be determine the prevalence of Microalbuminuria in a group of patients with COPD.

## Materials and Methods

**Study design:** Hospital based cross-sectional observational study.

**Study duration:** From the approval of thesis to till achievement of the sample size, whichever is earlier.

**Sampling Method:** Systematic random sampling

### Inclusion criteria

1. Those who will give informed consent
2. Diagnosed cases of COPD

### Exclusion criteria

1. Patients with any other acute or chronic infections.
2. Patients with Diabetes Mellitus, Hypertension, CAD
3. Patients not giving informed consent.

### Data Collection

All subjects were evaluated by taking a detailed clinical history. The duration of COPD, number of exacerbations, symptoms and treatment history was enquired from each patient enrolled in the study with detailed systemic examination of each patient. For the diagnosis of MAB, care was taken when collecting samples for the urine UACR. An early morning sample was preferred. The patient was instructed to avoid heavy exercises 24 h before the test. In our study we labelled a patient to have MAB when the urine ACR was more than 30 mg/gm.

### Data Analysis

To collect required information from eligible patients a pre-structured pre-tested proforma will be used. Data will be collected and will be analysed by required statistical test.

## Results

Table 1: Age wise distribution of study subject

| Age in yrs      | No of cases | Percentage |
|-----------------|-------------|------------|
| <45 yrs         | 02          | 02.00      |
| 45-60 yrs       | 35          | 35.00      |
| >60 yrs         | 63          | 63.00      |
| Total           | 100         | 100.00     |
| Mean age in yrs | 63.21±10.12 |            |

Table no 1 shows that maximum patients were found >60 yrs age group. The mean age was 63.21±10.12 yrs.

Table 2: Sex wise distribution of study subject

| Sex    | No of cases | Percentage |
|--------|-------------|------------|
| Male   | 87          | 87.00      |
| Female | 13          | 13.00      |
| Total  | 100         | 100.00     |

Table no 2 shows that maximum patients were male (87.00%) and 13.00% patients were female.

Table 3: Symptoms wise distribution of study subject

| Symptoms       | No of cases | Percentage |
|----------------|-------------|------------|
| Breathlessness | 100         | 100.00     |
| Expectoration  | 60          | 60.00      |
| Cough          | 70          | 70.00      |
| Wheezing       | 18          | 18.00      |
| Chest pain     | 30          | 30.00      |

In present study, all patients were present with breathlessness, 70.00% patients were present with cough, 60.00% patients were present with expectoration. 30.00% patients were present with chest pain and 18.00% patients were present with wheezing.

Table 4: Distribution of Micro Albuminuria of the subjects in the study population

| Micro Albuminuria | No of cases | Percentage |
|-------------------|-------------|------------|
| Yes               | 82          | 82.00      |

|       |     |        |
|-------|-----|--------|
| No    | 18  | 18.00  |
| Total | 100 | 100.00 |

Among the study population, more than three fourths of the subjects, 82.00% of the subjects had Micro Albuminuria

Table 5: Association between Micro Albuminuria and GOLD criteria

| GOLD stage | Micro Albuminuria |    | p-value |
|------------|-------------------|----|---------|
|            | Yes               | No |         |
| A          | 7                 | 7  | 0.001   |
| B          | 4                 | 2  |         |
| C          | 22                | 6  |         |
| D          | 49                | 3  |         |
| Total      | 82                | 18 |         |

The difference in the distribution of micro albuminuria among levels of Gold staging was statistically significant ( $p < 0.05$ ).

## Discussion

In this study, Among the study population, 63.00% of the subjects were in >60.00 years age group followed by 35.00% subjects each in 45 – 60 years and 5.00% in less than 45.00years age group. There is increase of COPD patients over age, which is explained by the effect of age in the COPD manifestation. Normally there is decline in FEV1 over age i.e it will usually reduce to half from age of 25 to 75. However, there is an accelerated reduction by two thirds in COPD patients over age.<sup>7</sup>

In this study, 87.00% of the subjects were males and 13.00% were females. In all age groups, the distribution of males is 5-7 many times the number of females. The main confounding factors are tobacco usage and occupational exposure, which is more among males. The males are more in 61 – 70 years age group and least in less than or equal to 50 years age group. However, females are more in 51 – 60 years age group and no

females in less than or equal to 50 years age group. Women with COPD will present differently, may have a different pattern of comorbidities, and may have improved survival after acute exacerbations.<sup>8</sup>

Thus, 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 because hypoxia results in endothelial dysfunction due to loss of physiological equilibrium of vasodilation and vasoconstriction which results in loss of peritubular capillaries in tubulointerstitium.<sup>9</sup> As MAB is now used as a screening tool for patients of cardiovascular risk, patients with COPD should be regularly advised for urine routine microscopy to detect MAB which will alert them for development of further cardiovascular events and hence take necessary precautions and treatment for the same. There is a possibility to assess a therapeutic role of blockers of RAAS system in reducing cardiovascular events in COPD.<sup>10</sup>

## Conclusion

Microalbuminuria is significantly associated with GOLD severity staging and acute exacerbations. The determination of microalbuminuria is simple and inexpensive. These markers can serve to diagnose in COPD patients in resource limited and emergency setting. This study suggests that endothelial and microvascular mechanisms are promising targets for early detection of COPD and management

## References

1. Global Initiative for Chronic Obstructive Lung Disease (GOLD): Global Strategy for the Diagnosis, Management and prevention of Chronic Obstructive Pulmonary Disease. (2017 REPORT). Available from: <http://www.goldcopd.org>
2. Mohan A, Premanand R, Reddy LN, Rao MH, Sharma SK, Kamity R, Bollineni S. Clinical presentation and predictors of outcome in patients with severe acute exacerbation of chronic obstructive pulmonary disease requiring admission to intensive care unit. *BMC Pulm Med*. 2006 Dec 19;6:27. doi:10.1186/1471-2466-6-27. PMID: 17177991; PMCID: PMC1764756.
3. Marshall SM. Screening for microalbuminuria: Which measurement? *Diabetic Med*. 1991;8:706–11.
4. Cogo A, Ciaccia A, Legorini C, Grimaldi A, Milani G. Proteinuria in COPD patients with and without respiratory failure. *Chest*. 2003;123:652–3.
5. Polatli M, Cakir A, Cildag O, Bolaman AZ, Yenisey C, Yenicerioglu Y. Microalbuminuria, von Willebrand factor and fibrinogen levels as markers of the severity in COPD exacerbation. *J Thromb Thrombolysis*. 2008;26:97–102.
6. Barr RG, Mesia-Vela S, Austin JH, Basner RC, Keller BM, Reeves AP, et al. Impaired flow-mediated dilation is associated with low pulmonary function and emphysema in ex-smokers: The Emphysema and Cancer Action Project (EMCAP) Study. *Am J Respir Crit Care Med*. 2007;176:1200–7.
7. Pinto-Sietsma SJ, Mulder J, Janssen WM, Hillege HL, de Zeeuw D, de Jong PE. Smoking is related to albuminuria and abnormal renal function in nondiabetic persons. *Ann Intern Med*. 2000;133:585–91.
8. Shin KK, Jang Y, Koh SJ, Chae JS, Kim OY, Park S, et al. Influence of IL6–572C>G polymorphism on inflammatory markers according to cigarette smoking in Korean healthy men. *Cytokine*. 2007;

39:116–22.

9. Nangaku M. Chronic hypoxia and tubulointerstitial injury: A final common pathway to end-stage renal failure. *J Am Soc Nephrol.* 2006; 17:17–25.
10. Casanova C, de Torres JP, Navarro J, Aguirre-Jaíme A, Toledo P, et al. Microalbuminuria and hypoxemia in patients with chronic obstructive pulmonary disease. *Am J Respir Crit Care Med.* 2010; 182:1004–10