



A STUDY TO INVESTIGATE THE PREVALENCE OF METABOLIC SYNDROME IN STABLE CHRONIC OBSTRUCTIVE PULMONARY DISEASE PATIENTS

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ABSTRACT

BACKGROUND: Chronic Obstructive Pulmonary Disease (COPD) is associated with several extra-pulmonary systemic manifestations including metabolic syndrome. Metabolic syndrome is an aggregate of inter-related cardio-metabolic risk factors, comprising glucose intolerance, abdominal obesity, dyslipidemia and hypertension, which are associated with an increased risk of cardiovascular disease and type-2 diabetes. The objective of study was to assess prevalence of metabolic syndrome among COPD patients.

METHODS: This cross-sectional study was conducted from April 2017 to March 2018. Total 67 COPD patients were classified according to GOLD guideline. International Diabetes Federation (IDF) guideline was used for metabolic syndrome (MetS).

RESULTS: Prevalence of MetS was 29.85%, highest (47.06%) in GOLD stage-II, followed by stage-I (40%).

CONCLUSIONS: The presence of metabolic syndrome is common in patients with COPD and all COPD patients should be considered for its screening.

KEYWORDS : Chronic Obstructive Pulmonary Disease, Metabolic Syndrome

INTRODUCTION

Chronic obstructive pulmonary disease is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and / or alveolar abnormalities usually caused by significant exposure to noxious particles or gases¹. The term chronic systemic inflammatory syndrome is proposed to take account of inflammatory nature of COPD and its co morbid conditions such as MetS. Metabolic syndrome has multiple risk factors that arise from insulin resistance accompanying abnormal adipose deposition and function. It is a risk factor for coronary heart disease, diabetes, fatty liver, and several cancers. Obesity is seen in approximately 18% of patients with COPD and is far more common in early stages (stage-I and II)².

Several studies^{3,4} from North America have shown a prevalence of metabolic syndrome in COPD patients in a range 29-58%. Tanni et al⁵ reported MetS in 36% of COPD patients. Indian data on the prevalence of MetS or its components in COPD are sparse. Dave et al⁶ reported MetS in 42% COPD cases.

The aim of this study was to investigate the prevalence MetS in stable COPD patients.

METHODS

This prospective study was conducted in 67 COPD patients attending the Department of Tuberculosis and Respiratory Diseases, G.S.V.M. Medical College, Kanpur from April- 2017 to March -2018.

INCLUSION CRITERIA:

- Stable COPD Patients.

EXCLUSION CRITERIA:

- Other respiratory diseases such as pulmonary tuberculosis, bronchial asthma, interstitial lung diseases, obstructive sleep apnea and lung cancer.
- Known case of Ischemic heart disease and chronic renal failure.
- Unstable COPD patients with acute exacerbation.

Patients attending hospital with cough and breathlessness were evaluated for COPD as per GOLD-2017. All routine blood

investigations including complete lipid profile and plasma glucose estimation (FBS & OGTT) were done. Spirometry with reversibility was performed.

Metabolic syndrome is defined as per New International Diabetes Federation IDF definition (IDF)⁷:

- **Central obesity** (defined as waist circumference >90 cm for men and >80 cm for women, with ethnicity specific values for other groups)
- Plus any two of the following four factors:
- Raised TG level: >150 mg/dl (1.7 mmol/L), or specific treatment for this lipid abnormality.
- Reduced HDL cholesterol: <40 mg/dl in males and < 50 mg/dl in females, or specific treatment for this lipid abnormality.
- Raised blood pressure: systolic BP \geq 130 or diastolic BP 85 mm Hg, or treatment of previously diagnosed hypertension.
- Raised fasting plasma glucose (FPG) \geq 100 mg/dl (5.6 mmol/L), or previously diagnosed type 2 diabetes.
- If above 5.6 mmol/L or 100 mg/dL, Oral Glucose Tolerance Test is strongly recommended but is not necessary to define presence of the syndrome.

STATISTICAL ANALYSIS

Statistical analyses were performed using SPSS 22.0 software package and instat graphpad software. Variables were analyzed using student's t test and p value less than 0.05 was considered significant.

RESULTS

Total 67 patients were included for final analysis after exclusion criteria. Mean age of male was 58.67 ± 9.87 years while mean age of female was 57.23 ± 10.40 years. Overall percentage of obese, overweight, normal weight and underweight were 31.3%, 23.9%, 29.8% and 14.9% respectively. 50% female and 22.2% male were obese. Mean BMI of male was 24.33 ± 6.64 kg/m² and mean BMI of study population was 26.22 ± 7.22 kg/m². The mean waist circumference of male was 86.91 ± 13.31 cm while in female it was 87.18 ± 14.51 cm.

Most parameters of lipid profile were deranged in study population. Among all parameters of lipid profile, raised triglyceride was found in majority of patients (69.4%) followed

by LDL (63.2%) and total cholesterol (63.2%). In female HDL was decreased in majority (58.3%) followed by LDL (36.8%) and total cholesterol (36.8%).

Raised Fasting Blood Sugar (FBS) was more in female (54.5%) than males (31.1%). Overall 38.8% patients had raised FBS or on antidiabetic drugs previously. (Table-1)

Table 1 : Comparison of various parameters between MetS and non-MetS COPD patients.

| Parameter | COPD with metabolic syndrome (n=20) | COPD without metabolic syndrome (n=47) | Name of test (student t test) | p value | Significant/ Non-significant |
|---------------------|-------------------------------------|--|-------------------------------|---------|------------------------------|
| Waist circumference | 101 ± 11.17 | 81.30 ± 10.86 | 2.0047 | 0.329 | Not significant |
| TG | 202.26 ± 97.72 | 140.86 ± 94.81 | 2.0287 | 0.41 | Not significant |
| HDL | 50.26 ± 12.12 | 54.77 ± 12.76 | 2.0094 | 0.592 | Not significant |
| Fasting blood sugar | 133.22 ± 21.06 | 99.39 ± 20.06 | 2.0223 | 0.381 | Not significant |
| Systolic BP | 148.09 ± 29.31 | 126.41 ± 15.34 | 2.0527 | 0.0001 | Significant |

Prevalence of Metabolic Syndrome in our study was 29.85%. Metabolic syndrome was most common in GOLD stage-II (47.06%). (Table-2)

Table-2

| GOLD STAGE | TOTAL PATIENTS | | | METABOLIC SYNDROME | TOTAL |
|------------|----------------|--------|----|--------------------|------------|
| I | 5 | MALE | 3 | 1 | 2(40%) |
| | | FEMALE | 2 | 1 | |
| II | 17 | MALE | 14 | 6 | 8(47.06%) |
| | | FEMALE | 3 | 2 | |
| III | 35 | MALE | 22 | 4 | 9(25.71%) |
| | | FEMALE | 13 | 5 | |
| IV | 10 | MALE | 6 | 0 | 1(10%) |
| | | FEMALE | 4 | 1 | |
| TOTAL | 67(100%) | | | | 20(29.85%) |

DISCUSSION

Prevalence of metabolic syndrome in our study was 29.85% (40.91%in female and 24.44% in male). Metabolic syndrome was most common in GOLD stage-II (47.06%) followed by stage-I (40%) followed by stage-III (25.71%) and it was only 10% in stage- IV. Henrik Watz et al⁸ reported metabolic syndrome in 47.5% patients with highest (53%) in stage- II, 50% in stage-I, 44% in stage-IV and 37% in stage-III. Jesús Diez-Manglano et al⁹ found the overall prevalence of metabolic syndrome in COPD patients was 42.9%, being more frequent in female (59.5%). Marquis et al¹⁰ found frequency of Metabolic syndrome in patients with COPD was 21% and the frequency decreases to about 10% at GOLD stages III and IV. There was no evidence that the relation between airflow obstruction and metabolic syndrome varied with smoking.

Maximum patients of metabolic syndrome (45.5%) were in stage-I & II combined and only 22.2% of patients were in stage- III & IV combined in our study. However, no significant variation was found in triglyceride levels, HDL levels, raised BP and raised FBS among various stages of COPD. It means that all parameters except central obesity were present in population and they were not affected by different GOLD stages.

Mean BMI of males in our study was 24.33 ± 6.64 kg/m² while in case of females it was 30.07 ± 6.95 kg/m². Overall mean BMI of study population was 26.22 ± 7.22 kg/m², similar to Emel BULCUN et al¹¹ and Z.Yasar et al¹².

CONCLUSION

Metabolic Syndrome is more common in COPD patients leading to significant morbidity and mortality. Thus, it is essential to focus on a comprehensive way of management of COPD and its comorbidities rather than primarily treating the pulmonary symptoms.

REFERENCES :

1. Global Initiative for Chronic Obstructive Lung Disease (GOLD). GOLD 2017 global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease, 2017 report.
2. Steuten LM, Creutzberg EC, Vrijhoef HJ, Wouters EF COPD as a multico

mponent disease: inventory of dyspnoea, underweight, obesity and fat free mass depletion in primary care. *Pri Care Resp J.* 2006 Apr 1;15(2):84-91.

3. Park SK, Larson JL. Metabolic syndrome and associated factors in people with chronic obstructive pulmonary disease. *West J Nursing Res.* 2014 May;36(5):620-42.
4. Poulain M, Doucet M, Drapeau V, Fournier G, Tremblay A, Poirier P, et al. Metabolic and inflammatory profile in obese patients with chronic obstructive pulmonary disease. *Chronic Resp Dis.* 2008 Feb;5(1):35-41.
5. Tanni SE, Zamuner AT, Coelho LS, Vale SA, Godoy I, Paiva SA. Are metabolic syndrome and its components associated with 5-year mortality in chronic obstructive pulmonary disease patients?. *Metab Syndrome Related Disord.* 2015 Feb 1;13(1):52-4.
6. Lopez AD, Shibuya K, Rao C, Mathers CD, Hansell AL, Held LS, et al. Chronic obstructive pulmonary disease: current burden and future projections. *Euro Res J.* 2006 Feb 1;27(2):397-412.
7. Zimmet P, Magliano D, Matsuzawa Y, Alberti G, Shaw J. The metabolic syndrome: a global public health problem and a new definition. *J atheroscler thrombosis.* 2005;12(6):295-300.
8. Henrik Watz, Benjamin Waschki, Anne Kirsten, Kai-Christian Müller; Gunther Kretschmar, Thorsten Meyer, Olaf Holz, HelgoMagnussen. The Metabolic Syndrome in Patients With Chronic Bronchitis and COPD. *2009 CHEST*; 136 (4):1039
9. Jesús Diez Manglano, José Barquero-Romero, Pedro Almagro, F Javier Cabrera, Francisco López García, Lorena Montero, Joan B. Soriano. COPD patients with and without metabolic syndrome: clinical and functional differences. *Internal and Emergency Medicine.* 2013;1-27
10. Karine Marquis, François Maltais, Véronique Duguay, Anne-Marie Bezeau, Pierre Le Blanc, Jean Jobin, Paul Poirier. The Metabolic Syndrome in Patients With Chronic Obstructive Pulmonary Disease. *Journal of Cardiopulmonary Rehabilitation.* 2005;25:226-232
11. Emel Bulcun, Aydanur Ekici, Mehmet Ekici. Metabolic syndrome and chronic diseases in patients with chronic obstructive pulmonary disease. *İzmir Göğüs Hospital journal.* 2015; 29:1-10
12. Z. Yasar, M. Buyuksirin, FD. Ucsular, A.Kargi, F.Erdem, F. Talay, O.K. Kurt. Is an elevated neutrophil-to-lymphocyte ratio a predictor of metabolic syndrome in patients with chronic obstructive pulmonary disease? *European Review for Medical and Pharmacological Sciences.* 2015;19:956-962