

Profile Of Copd Patients With Metabolic Syndrome

Dr. Moganti Veera Lakshmi Aparna

M.D., Professor

Dr. Ch.R.N. Bhushana Rao

M.D., Professor

Dr. B.Padmaja

M.D., Assistant Professor

Dr. P.Venkaiah

M.D., Assistant Professor

Dr. M. Srinitya

Md., Senior Resident

Department Of Pulmonary Medicine, Andhra Medical College, Visakhapatnam, Andhra Pradesh, India.

Abstract:

Background:

Copd is one of the major health problem worldwide, is now one of the top three causes of the death worldwide and 90% of the deaths occur in low and middle income countries. About 3 million people and odd died due to this disease in 2012 contributing for 6% of all the deaths worldwide. The metabolic syndrome is a combination of the most life endangering heart attack risk factors like diabetes and impaired fasting blood glucose levels, obesity, elevated cholesterol and increased blood pressure. This study focuses on the threat posed by both copd and ms to the patient's quality of life, assisting the treating physician in guiding early risk stratification for cardiovascular disease in timely intervention, thereby preventing and reducing disease morbidity and also mortality in patients with copd.

Materials and methods:

It is a hospital based observational study conducted in ghccd visakhapatnam with a sample size of 52.

Inclusion criteria: 1) patients diagnosed with copd.

Exclusion criteria:

1) patients with other inflammatory co-morbidity (rheumatological disease, inflammatory bowel disease)
2) patients on systemic steroid treatment. 3) patients with tb, pneumonia and other acute infections 4) patients not willing to participate in the study.

Results: in the present study 38 out of the 52 patients were males contributing upto 73% of the study population, whereas 14 out of 52 patients were females constituting upto 27% of the study population. In our present study 30 out of 52 patients had hypertension, 22 out of 52 patients had no hypertension, 58% of the copd patients with metabolic syndrome had higher blood pressure 42% of the patients were normotensive. In our present study, 18 out of 52 patients had diabetes, 34 out of 52 patients had no impaired fasting blood glucose/diabetes, thus 35% of the study population had diabetes, 65% had no impaired fasting blood glucose or diabetes.

Conclusion: ms is linked to an elevated risk of copd exacerbations and hospital admissions and the mean hospital stay in study was 7.36 ± 4 days. In these patients, elevated blood pressure, blood sugar levels, and deranged lipid profile may contribute to the disease outcome in general.

Key words : copd, metabolic syndrome, obesity, hypertension, diabetes, dyslipidemia.

Date of Submission: 01-04-2024

Date of Acceptance: 10-04-2024

I. Introduction

Chronic obstructive respiratory disease (COPD) is an obstructive disorder with chronic respiratory symptoms such as shortness of breath, cough with or without sputum production². Indoor and outdoor pollution may contribute to the development of COPD. COPD is one of the major health problem worldwide, is now one of the top three causes of the death worldwide and 90% of the deaths occur in low and middle income countries.

About 3 million people and odd died due to this disease in 2012 contributing for 6% of all the deaths worldwide. It is one of the major cause of chronic illness all around the world; people suffer from COPD for years and die prematurely due to the disease or its complications. Increasing exposure to the risk factors of COPD and increasing life expectancy of the population is leading to increased burden of COPD¹. The disease is estimated to be approximately present 4-5% of our country population. COPD has been associated with several pulmonary and extra pulmonary manifestations. The metabolic syndrome is a combination of the most life endangering heart attack risk factors like diabetes and impaired fasting blood glucose levels, obesity, elevated cholesterol and increased blood pressure.

According to IDF about 20-25% of the world's adult population are diagnosed as having metabolic syndrome. These people are at a greater risk of developing heart diseases and likely to die from heart attack or stroke than people without metabolic syndrome. They also have five fold increased risk of developing type 2 diabetes.

According to the NCEP ATP III definition, for a person to be labeled as having metabolic syndrome he/she should meet at least 3 of the 5 below mentioned criteria:

- 1) Waist circumference over 40 inches (men) or 35 inches (women)
- 2) Blood pressure over 130/85 mmHg
- 3) Fasting triglyceride level over 150 mg/dl
- 4) Fasting high-density lipoprotein cholesterol level less than 40 mg/dl (men) or 50 mg/dl (women)
- 5) Fasting blood sugar over 100mg/dl.

The pathogenesis of both COPD and metabolic syndrome is multifactorial in origin, complex and poorly understood. Systemic inflammation plays important role in the pathogenesis of both these diseases. There is so scarce data in India on the occurrence of Metabolic Syndrome in patients with COPD. The identification of MS as risk factor for lung disease is relatively new and requires further investigation. As a result, this study focuses on the threat posed by both COPD and MS to the patient's quality of life, assisting the treating physician in guiding early risk stratification for cardiovascular disease in timely intervention, thereby preventing and reducing disease morbidity and also mortality in patients with COPD.

II. Aims And Objectives

To study the clinical profile of the study population as defined by GOLD and NCEP-ATPIII definition respectively.

III. Material And Methods

Study design:

Hospital based observational study

Duration of the study:

January 2023-August 2023

Sample size:

52

Source of the data:

Patients attending Government TB and Chest Hospital, Visakhapatnam

Inclusion Criteria:

- 1) Patients diagnosed with COPD.

Exclusion Criteria:

- 1) Patients with other inflammatory co-morbidity (rheumatological disease, inflammatory bowel disease)
- 2) Patients on systemic steroid treatment.
- 3) Patients with TB, pneumonia and other acute infections
- 4) Patients not willing to participate in the study.

Procedure:

An observational study conducted from January 2023 to August 2023 in patients attending Government TB and Chest Hospital, Visakhapatnam with confirmed diagnosis of COPD according GOLD criteria were included.

Careful history was taken, enrolled patients underwent routine laboratory investigations like fasting blood sugar levels, fasting lipid profile, Serum CRP levels, blood pressure monitoring and anthropometric measurements.

Spirometry, Sputum CBNAAT, Gram stain and culture sensitivity, Chest X-ray were done.

Patients were labelled as having Metabolic syndrome (MS) if three out of the 5 criteria designed by NCEP ATP III were met.

A total of 52 COPD patients met the criteria of MS. Data regarding grade of dyspnea, clinical symptoms, COPD Assessment Test (CAT score), duration of hospitalization, previous history of exacerbations was enquired.

Pulmonary function tests:

Spirometry:

Spirometry was done using COSMED Omnia PFT Version 1.6.5 equipment, that got its approval according to the American Thoracic Society and European Respiratory Society (ATS/ERS) guidelines. FVC, FEV1, Reversibility testing after 15 minutes of bronchodilation with 400mcg inhaled salbutamol using a metered-dose inhaler along with spacer was performed. Three satisfactory efforts were recorded, and the best effort was taken into the consideration of this study.

Metabolic Syndrome was diagnosed if three out of the five components were present.

- 1) Central obesity - (waist circumference > 40 inches in men and >35 inches in women)
- 2) High triglycerides ≥ 150 mg/dl
- 3) Low HDL cholesterol - <40 mg/dl in males and <50 mg/dl in females.
- 4) Elevated Blood Pressure $\geq 130/85$ mmHg or on treatment .
- 5) Impaired fasting blood glucose ≥ 100 mg/dl.

Body mass index:

Weight in (kg)/ height in(m²)

Waist circumference:

Waist circumference was measured at halfway between the costal margin and iliac crest at the end of expiration.

Blood pressure (bp):

Bp was measured after 30 minutes of rest, in sitting posture and arm at the level of heart.

Blood collection methods:

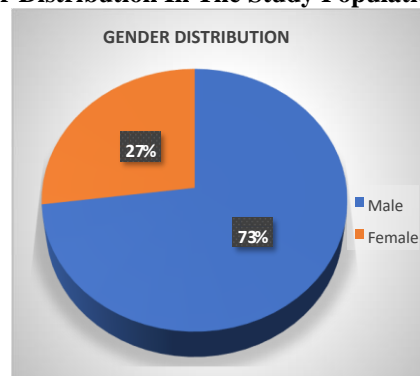
Blood sample was collected after an overnight fasting for blood glucose, total Cholesterol, triglycerides, hdl cholesterol.

IV. Results

In a prospective study done in patients attending Government TB and Chest hospital, Visakhapatnam, during January 2023 to August 2023, 52 COPD patients with MS, defined according to the NCEP ATP III criteria were enrolled and following were the results :-

In the present study 38 out of the 52 patients were males contributing upto 73% of the study population, whereas 14 out of 52 patients were females constituting upto 27% of the study population.

Pie Diagram Showing Gender Distribution In The Study Population



In the present study majority of the patients belong to 61-70 years age group followed by 51-60 years. Least number of participants were in 41-50 years of age group. Functional and physical changes in the lungs with ageing may be responsible for more prevalence among the elderly population.

AGE GROUPS (years)	MALES	FEMALES	TOTAL
41-50	5	1	6
51-60	10	3	13
61-70	17	8	25
71-80	6	2	8
TOTAL	38	14	52

V. Limitations

- Small sample size
- Single centre study
- Tertiary care centre study limiting the generalizability of the results.
- No long term follow up of the individuals.

VI. Conclusion

Patients with both MS and COPD had higher levels of systemic inflammatory markers. 57% of the patients had systemic HTN, 34.6% had diabetes and about 71% of the patients were obese 56% had elevated triglycerides, 40% had low HDL levels. According to these findings, physicians should screen COPD patients for MS and elevated circulatory inflammatory markers. The treatment of these disorders should include reduce the likelihood of cardiovascular morbidity and mortality in such patients.

About 70% of the patients experienced more than 1 exacerbation and MS may have an impact on the quality of healthy life and the number of COPD exacerbations. Keeping in mind that metabolic syndrome is common in the early stages and that its prevalence decreases as COPD progresses, patients admitted in hospital for an exacerbation may be diagnosed with advanced COPD. MS is linked to an elevated risk of COPD exacerbations and hospital admissions and the mean hospital stay in study was 7.36 ± 4 days. In these patients, elevated blood pressure, blood sugar levels, and deranged lipid profile may contribute to the disease outcome in general.

Thus, all primary care physicians should screen all COPD patients for MS during COPD diagnosis, follow up, and also during treatment. Treatment of entirely two different entities concurrently may help reduce the exacerbations and complications in such patients.

References

- [1] Global Initiative For Chronic Obstructive Lung Disease. 2022.
- [2] International Diabetes Federation. 2021 July; 10th.
- [3] Vujic T. Metabolic Syndrome In Patients With Chronic Obstructive Pulmonary Disease: Frequency And Relationship With Systemic Inflammation. Pubmed Central. 2016 Apr-Jun; 20(2).
- [4] Baniya S. Prevalence Of Metabolic Syndrome (Mets) In Stable Chronic Obstructive Pulmonary Disease (Copd) Patients And Status Of C-Reactive Protein Among Copd Patients With And Without Mets Visiting Tribhuvan University Teaching Hospital, Nepal. European Respiratory Journal. 2021; 58:Suppl. 65,Pa3640.
- [5] Ghatas T. The Relationship Between Metabolic Syndrome And Chronic Obstructive Pulmonary Disease. Egyptian Journal Of Bronchology. 2017; 11: 15.
- [6] Choi. Metabolic Syndrome In Early Chronic Obstructive Pulmonary Disease: Gender Differences And Impact On Exacerbation And Medical Costs. International Journal Of Chronic Obstructive Pulmonary Disease. 2019.
- [7] Chooriath N. Prevalence Of Metabolic Syndrome In Copd Patients Attending A Tertiary Care Setting, At Kozhikode District In Kerala. J Evid Based Med Healthc. 2021 September; 8(38).
- [8] Manglano Jd. Copd Patients With And Without Metabolic Syndrome: Clinical And Functional Differences. Intern Emerg Med. 2013 May.
- [9] Roy R. Metabolic Syndrome And Its Correlates Among Female Chronic Obstructive Pulmonary Disease Patients At A Rural Tertiary Health Care Center In Northern India. Cureus. 2022 August; 11.
- [10] Naik D. Chronic Obstructive Pulmonary Disease And The Metabolic Syndrome: Consequences Of A Dual Threat. Indian Journal Of Endocrinology And Metabolism. 2014 September-October; 18(5).
- [11] Karsanji U. Mortality Associated With Metabolic Syndrome In People With Copd Managed In Primary Care. European Respiratory Society. 2022 July.
- [12] Sahoo Kc. Prevalence Of Metabolic Syndrome In Chronic Obstructive Pulmonary Disease And Its Correlation With Severity Of Disease. Journal Of Family Medicine And Primary Care. 2022 May; 11(5).
- [13] Kupeli E. Metabolic Syndrome Is Associated With Increased Risk Of Acute Exacerbation Of Copd: A Preliminary Study. Endocr. 2010; 38: 76-82.
- [14] Lam Kbh. Airflow Obstruction And Metabolic Syndrome: The Guangzhou Biobank Cohort Study. European Respiratory Journal. 2009 June; 35(2): 317-323.
- [15] Zaibi H. Metabolic Syndrome In Chronic Obstructive Pulmonary Disease. European Respiratory Journal. 2018; 52(62): Pa719.

- [16] Shaikh J. Association Of Metabolic Syndrome With The Severity Of Chronic Obstructive Pulmonary Disease. *European Respiratory Journal*. 2020; 56(64).
- [17] Mannino D. Prevalence And Outcomes Of Diabetes, Hypertension And Cardiovascular Disease In Copd. *European Respiratory Journal*. 2008 October; 32(4): 962-969.
- [18] Gupta Pp. Clinical And Pulmonary Functions Profiling Of Patients With Chronic Obstructive Pulmonary Disease Experiencing Frequent Acute Exacerbations. *Lung India*. 2018 January-February ; 35(1): 21-26.
- [19] Bp R. Clinical Profile Of Copd Patients At A Tertiary Care Hospital. *European Journal Of Molecular & Clinical Medicine*. 2022; 9(1): 478-481.
- [20] Rachakonda R. Clinical And Radiological Profile Of Copd Patients Attending Tertiary Care Centre. *Journal Of Evolution Of Medical And Dental Sciences*. 2016 March; 5(21).
- [21] Breyer Mk. Prevalence Of Metabolic Syndrome In Copd Patients And Its Consequences. *Plos One*. 2014 June; 9(6): 8.
- [22] Mekov E. Metabolic Syndrome In Hospitalized Patients With Chronic Obstructive Pulmonary Disease. *Peerj*. 2015 July;: 17.
- [23] Karine M. The Metabolic Syndrome In Patients With Chronic Obstructive Pulmonary Disease. *Journal Of Cardiopulmonary Rehabilitation*. 2005 July; 25(4): 226-232.
- [24] Fekete M. Metabolic Syndrome In Patients With Copd: Causes And Pathophysiological Consequences. *Physiology International*. 2022 March;: 90105.
- [25] Clini E. Copd And The Metabolic Syndrome: An Intriguing Association. *Internal And Emergency Medicine*. 2013 June; 8(283-289).
- [26] Acharayya A. Association Of Metabolic Syndrome With Chronic Obstructive Pulmonary Disease In An Indian Population. *Lung India*. 2016 July-August; 33(4): 385-390.
- [27] Funakoshi Y. Association Between Airflow Obstruction And The Metabolic Syndrome Or Its Components In Japanese Men. *Internal Medicine*. 2010; 49(19): 2093-2099.
- [28] B.H P. Chronic Obstructive Pulmonary Disease And Metabolic Syndrome: A Nationwide Survey In Korea. *The International Journal Of Tuberculosis And Lung*. 2012 May; 16(5): 694-700.
- [29] Chung Jh. Association Between Sarcopenia And Metabolic Syndrome In Chronic Obstructive Pulmonary Disease: The Korea National Health And Nutrition Examination Survey (Knhanes) From 2008 To 2011. *Journal Of Chronic Obstructive Pulmonary Disease*. 2014 June; 12(1): 82-89.
- [30] Azzahra E. The Prevalence Of Metabolic Syndrome In Indonesian Patients With Stable Chronic Obstructive Pulmonary Disease. *Pakistan Journal Of Chest Medicine*. 2021 September; 27(3): 126-132.
- [31] Abdelghaffar Hb. Relation Between Metabolic Syndrome And Acute Exacerbation Of Copd. *European Respiratory Journal*. 2012; 40(P4826).