

## FREQUENCY OF UNDIAGNOSED ISCHEMIC HEART DISEASE IN PATIENTS ADMITTED WITH ACUTE EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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### **Contribution**

SA, AA, UA conceived the idea, planned the study and drafted the manuscript. NUL, RA helped in acquisition of data and did statistical analysis. MZ, MH drafted the manuscript and critically reviewed manuscript. All authors contributed significantly to the submitted manuscript.

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### **ABSTRACT**

**Objective:** To determine the frequency of undiagnosed ischemic heart disease in patients admitted with acute exacerbation of COPD (AECOPD).

**Methodology:** This cross sectional study was done from 1<sup>st</sup> January to 31<sup>st</sup> December 2015 at Pulmonology Department of Khyber Teaching Hospital Peshawar on patients admitted with acute exacerbation of COPD. Ischemic heart disease was diagnosed if a patient was found to have unstable angina, myocardial infarction or had echo findings suggestive of ischemic cardiomyopathy or regional wall abnormality. Data was gathered on a structured proforma where demographics, history of common risk factors and presence of ischemic heart disease and its further type was documented. Data entered on SPSS version 19 and analyzed.

**Results:** A total of 412 patients were admitted with the diagnosis of AECOPD. Mean age of the study sample was  $61.6 \pm 12.5$  years, with 41% males. Frequency of undiagnosed ischemic heart disease was found to be 18%. Among them 47% had unstable angina, 23% had myocardial infarction and 30% had ischemic cardiomyopathy on echocardiography.

**Conclusion:** One in five patients admitted with AECOPD had undiagnosed ischemic heart disease documented as ACS or ischaemic cardiomyopathy.

**Key Words:** Chronic Obstructive Pulmonary Disease (COPD), Coronary Artery Disease (CAD), Acute Exacerbation of COPD

## INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is the fourth leading cause of death and by year 2030 will be the third leading cause of death.<sup>1</sup> Coronary artery disease (CAD) and COPD frequently co-exist and therefore increase mortality and morbidity.<sup>2-4</sup> Prevalence of COPD varies from 9-14% in general population and therefore, a large number of patients do present with acute exacerbation of COPD. Studies have shown that COPD and CAD share common risk factors mostly smoking and others such as age, hypertension, diabetes, obesity, lack of physical activity and poor diet. Both diseases have underlying similar pathological mechanisms. Inflammatory process is one of the main pathogenic mechanism identified.

Acute exacerbation of COPD (AECOPD) is defined as an increase in sputum volume, purulence and /or dyspnea beyond normal day to day variation that leads to either hospital admission or change in medication.<sup>1</sup> It is also being documented that outcomes of patients hospitalized with AECOPD are largely dependent on presence of comorbidities.<sup>5</sup> Therefore, it is essential not only to identify but also treat the comorbidities timely to improve the outcomes. AECOPD increases systemic inflammation and have shown to be an independent risk factor for myocardial infarction.<sup>6</sup>

When specifically worked out, incident CAD is found in almost 50% of patients of COPD in older age. CAD tends to remain under treated and undiagnosed among patients diagnosed and treated as COPD.<sup>7</sup> However, in acute exacerbation they usually present to the Pulmonology OPD or referred directly to Pulmonology ward and hence, if not specifically looked for, the underlying ischemic heart disease may be missed in such patients. Actively looking for presence of CAD in such patients would not only improve the outcome of hospitalization but also starting concomitant treatment would improve the quality of life of such patients and may reduce the risk of exacerbations.<sup>8,9</sup> We conducted this study with the objective to determine the frequency of undiagnosed ischemic heart disease in patients hospitalized with acute exacerbation of COPD.

## METHODOLOGY

In this cross sectional study patients admitted to Pulmonology Department of Khyber Teaching Hospital, Peshawar, with the diagnosis of acute exacerbation of COPD from 1st January 2015 till 31st December 2015 were recruited. Patients already on treatment of ischemic heart disease or cardiac failure or having previous myocardial infarction were excluded. Those having concomitant chronic kidney disease, pneumonia, liver disease, carcinoma or bronchiectasis were excluded. Information regarding their demographics, smoking history, occupation, duration of COPD, presence of risk factors such as

hypertension, diabetes, obesity, dyslipidaemia and any evidence of ischemic heart disease was gathered on a structured proforma. CAD was determined if there was clear documentation of acute coronary syndrome and initial acute management of COPD or documentation of ECG findings suggestive of ischemia or echo findings of regional wall abnormality or ischemic cardiomyopathy. All data gathered was entered in SPSS version 19.

## RESULTS

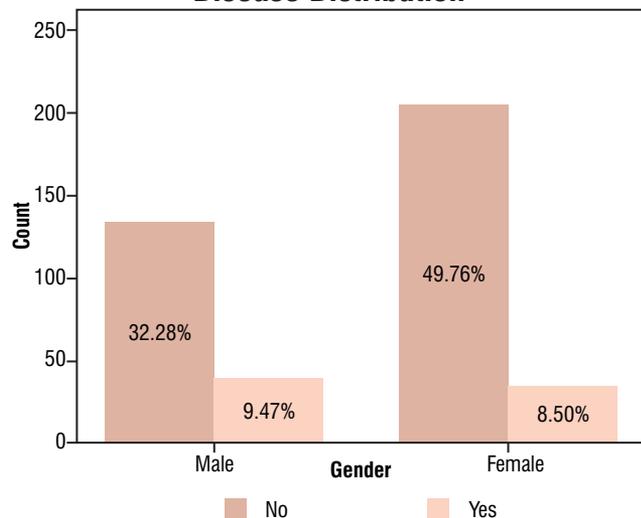
Total of 770 patients were admitted with the diagnosis of acute exacerbation of COPD in the study. Out of these, 412 patients who fulfilled the inclusion criteria were selected. Mean age of the study sample was  $61.6 \pm 12.5$  years, with (172) 42% males. Moreover, 53% were living a married life and 47% were widows or widowers. Out of all COPD patients, 74 (18%) were found to be suffering from ischemic heart disease. Male to female ratio of COPD patients suffering from CAD were 39 to 35. However, 39 out of 172 males and 35 out of 240 females were suffering from undiagnosed CAD. ( $p < 0.050$ ) Figure 1.

Distribution of common cardiovascular risk factors among these COPD patients were 166(40%) had diabetes, 227(50%) hypertension, 105(25%) dyslipidaemia and 88(21%) had obesity. Out of total 74 COPD patients were diagnosed as CAD, 35(47%) had unstable angina, 17 (23%) had myocardial infarction and 22(30%) had ischemic cardiomyopathy. COPD patients with ischemic heart disease were further categorized according to age and results are shown in Figure 2, depicting unstable angina most common in age categories 40-60 years.

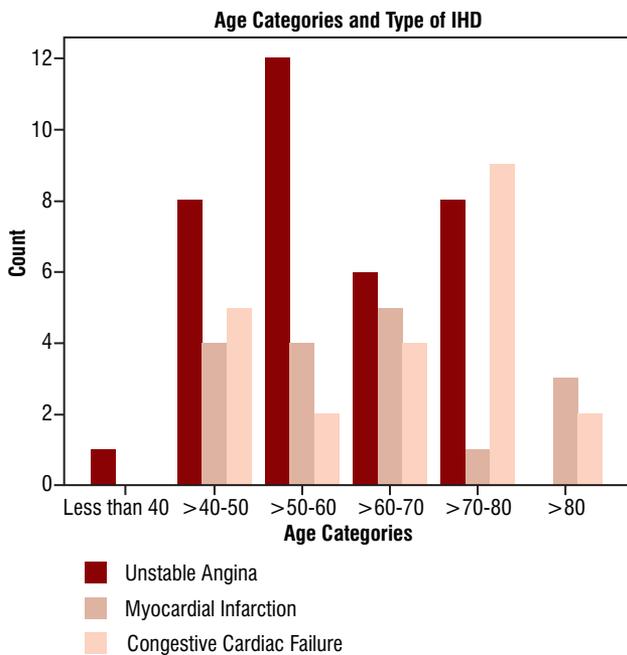
## DISCUSSION

In our study we found that 74 (18%) COPD patients admitted to Pulmonology Department were having undiagnosed

**Figure 1: Gender and Ischemic Heart Disease Distribution**



**Figure 2: Type of Ischemic Heart Disease Distribution in Different Age Categories**



ischemic heart disease. In literature, we found a close association between COPD and coronary artery disease and this percentage may vary from 17 to 50 % in different studies<sup>6,10-12</sup>. However, in our study we have tried to exclude all patients who previously had any history of CAD, or on any CAD treatment. These patients were admitted purely as suffering from COPD. COPD patients with acute exacerbation were also reported in the literature to be having 2.27 increase risk of Myocardial Infarction and increase risk of mortality.<sup>4,8,13-16</sup> In our study, out of 18% whose underlying coronary artery disease were unmasked during this admission, 17 (23%) developed MI. Pertinent point to note was that 35 (47%) COPD patients who were timely diagnosed as unstable angina and hence managed appropriately to prevent myocardial injury. Hence, this study indirectly highlights the importance of actively looking for and managing comorbidities leading to improve survival and reduce morbidity.<sup>12,17-20</sup>

In our study we found that more males as compare to female COPD patients were suffering from IHD and this difference is statistically significant. Though males are more likely to have IHD as compare to females and this difference becomes equal after 50 years (i.e. after menopause) but in our study of COPD patients, this difference persisted. One possible explanation can be pack year smoking history as males COPD patients had more pronounced smoking or tobacco history as compared to females.<sup>21,22</sup>

COPD and CAD patients share the common risk factors, especially age and smoking or tobacco history. Presence of

other common cardiovascular risk factors like hypertension, diabetes, dyslipidaemia and obesity leading to poor physical activity also make COPD patients more prone to develop IHD.<sup>4,5,23-27</sup> Differentiating coronary events in patients presenting with acute exacerbation of COPD remains as a diagnostic challenge in clinical setting and various inflammatory markers are being evaluated to timely diagnose or predict the short or long term outcome.<sup>28-32</sup> However, identifying and managing co morbidities especially cardiovascular risk factors in COPD patients definitely improve outcome.<sup>1,26</sup>

**LIMITATIONS**

We cannot make definite inference from our results and cannot generalize to all COPD patients. However, this study can be used as a basis for more robust and prospective studies to establish exact frequency of undiagnosed CAD in COPD patients. Moreover, identification and management of co morbidities for better outcome of COPD patients is of importance.

**CONCLUSION**

There is a considerable proportion of COPD patients admitted to Pulmonology department, having undiagnosed CAD.

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