



Anaemia in Patients with Chronic Obstructive Pulmonary Disease Admitted In a Tertiary Health Care Centre in Kerala

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Abstract

Background: Polycythemia, traditionally thought to be highly prevalent in COPD, occurs less frequently nowadays with more rigorous correction of hypoxaemia. Conversely, recent reports suggest that anaemia in patients with COPD is highly prevalent and associated with increased mortality. The purpose of the present study is to determine the prevalence of abnormalities in Hb levels in patients with COPD attending a tertiary health care centre in Kerala, as well as to explore the associations between Hb levels and clinical outcomes.

Objectives: To study the proportion of anaemia in patients with chronic obstructive pulmonary disease attending a tertiary health care centre in Kerala

Methods: This was a cross-sectional study done among 120 patients with COPD. Samples were selected by consecutive sampling method, data collected using a proforma and it was analyzed using SPSS.

Results: In this study, 120 COPD patients diagnosed based on GOLD clinical criteria were recruited. 53 patients were in anemic group while 67 patients in nonanemic group. The prevalence of anemia in COPD patients in the present study was 44.2%. The mean hemoglobin levels in anemic group were 10.87 ± 1.73 g/dl, whereas in nonanemic group, it was 14.57 ± 1.6 g/dl. It was found that the most common morphological type of anaemia was normocytic normochromic (49.1%) followed by microcytic hypochromic (37.7%).

Conclusion: Presence of anaemia is significantly associated with worse hospital outcome in the form of increased ICU admission, increased requirement of NIV and mechanical ventilation and increased mortality.

Keywords: COPD, anaemia, haemoglobin, mortality, exacerbation.

Introduction

Anaemia, a well-recognised comorbidity in many chronic illnesses, is associated with reduced health-related quality of life, morbidity and mortality. There is very limited information within

the current literature that describes the distribution of haemoglobin and its impact on outcomes in COPD population. Polycythemia, traditionally thought to be highly prevalent in COPD, occurs less frequently nowadays with more rigorous

correction of hypoxaemia⁽¹⁾. Conversely, recent reports suggest that anaemia in patients with COPD is extremely prevalent and related to increased mortality⁽²⁾. Although the association between anaemia and dyspnoea is generally well established, the contribution of haemoglobin⁽³⁾ to breathlessness and the other clinical manifestations in patients with COPD is unknown. It may be of great interest as a potential target for directed therapy⁽⁴⁾. The purpose of the present study is to determine the prevalence of abnormalities in Hb levels in patients with COPD attending a tertiary health care centre in Kerala, as well as to explore the associations between haemoglobin levels and clinical outcomes.

Aims and Objectives

1. To study the proportion of anaemia in patients with chronic obstructive pulmonary disease
2. To study the morphological pattern of anaemia in patients with chronic obstructive pulmonary disease
3. To compare the outcome of acute exacerbation of chronic obstructive pulmonary disease among anaemic and non anaemic patients

Materials and Methods

Study Design: Hospital based cross sectional study carried out over a period of one year

Study Population: 120 patients who are admitted in wards and ICU of General medicine and Pulmonary medicine departments at a tertiary care centre in South Kerala

Inclusion Criteria

1. All patients admitted with COPD who consented for the study
2. Age more than 40 years

Exclusion Criteria

1. Patients with concomitant other pulmonary diseases like Asthma, Diffuse Parenchymal Lung Disease, Bronchiectasis, Pulmonary Tuberculosis and Lung Cancer
2. CXR showing features other than COPD

3. Patients with past history of pulmonary tuberculosis
4. Patients with chronic renal disease, chronic liver disease, congestive cardiac failure
5. Patients who are diagnosed cases of bone marrow suppression

Study Procedure

- All patients who satisfy the inclusion criteria will be enrolled. Information will be collected through self structured questionnaire from each patient. All patients and their relatives will be interviewed followed by a complete clinical examination.
- Diagnosis of COPD will be made according to GOLD 2020 criteria.
- Information regarding socio demographic characteristics, history of smoking, duration of illness and number of exacerbations will be collected using semi structured questionnaire.
- Severity of dyspnea is scored by Modified MMRC scale.
- Investigations including complete blood count, random blood sugar, renal function test, liver function test, serum electrolytes, Chest X ray and ECG will be collected.
- Anaemia is defined as Hb <13g/dl in men and Hb <12 g/dl in women according to WHO criteria.
- Anemic patients will be further evaluated with serum ferritin and peripheral smear to know the morphological pattern of anaemia.
- COPD patients will be grouped into four groups based on their symptom burden and risk of exacerbation and proportion of anaemia in each group will be measured.
- Details regarding number of death, number of ICU admission, number of days spent in ward/ ICU, number of exacerbations in the past will be collected and compared among anaemic and non- anaemic patients.
- The course in the hospital of anaemic and non-anaemic patients will be assessed in

the form of requirement of supplemental oxygen/NIV/ Mechanical ventilation and will be compared.

Data Analysis

All the data collected were coded and entered in Microsoft Excel sheet which was re-checked and analysed using SPSS statistical software version 22. Quantitative variables were summarised using mean and standard deviation. Categorical variables were represented using frequency and percentage. Independent sample t-test was used to test statistical significance of difference between

means of variables among two independent groups. Pearson Chi-square test and Fisher’s Exact test were used for comparing categorical variables between groups. A p value of <0.05 was considered statistically significant.

Results

A total of 120 cases of chronic obstructive pulmonary disease, who satisfied inclusion and exclusion criteria were enrolled in the study after obtaining the informed consent from the patient.

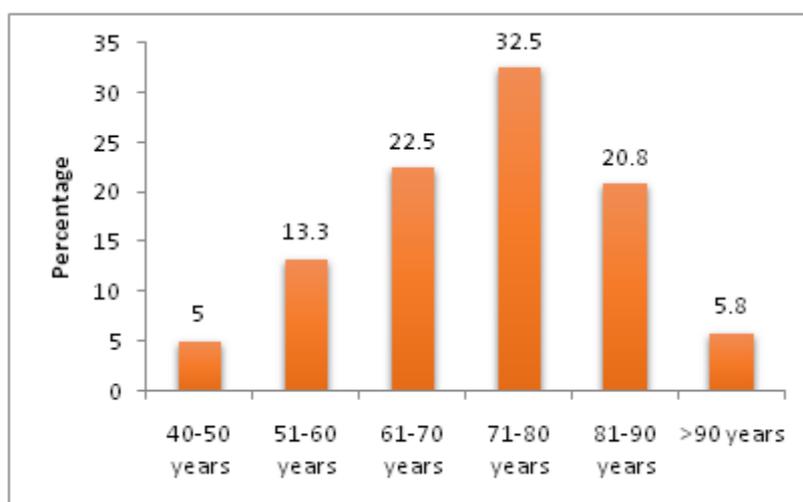


Figure 1: Bar diagram showing age distribution of the sample

The age group distribution was from 47 to 95 years. The mean age of distribution was 73.14±11.91 years. Majority of the study group

was between 71 to 80 years. Proportion of anemic patients were higher in age group of 51–60 and >90 years in comparison to nonanemic patients.

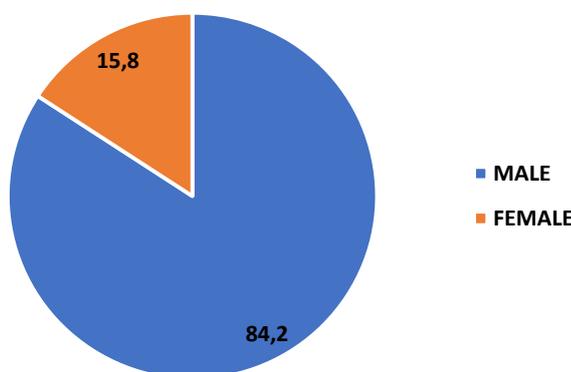


Figure 2: Pie chart representing distribution of the sample according to sex

Of the 120 study subjects, 101 patients were males (84.2%) and 19 patients were females (15.8%).

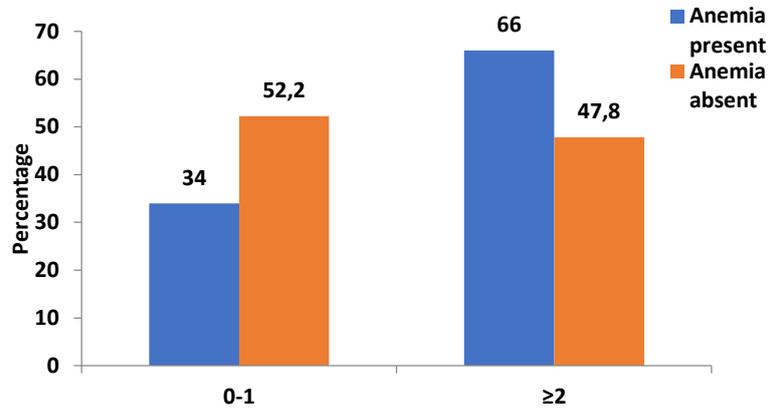


Figure 3: mMRC grade in anemic and non-anemic COPD patients

The mean Hb of the study group was 12.94 g/dl and the mean PCV was 38.20. The mean hemoglobin and PCV of anemic patients were 10.87g/dl and 30.43 respectively. The mean haemoglobin and PCV of non-anaemic patients

were 14.57 g/dL and 44.34 respectively. Among the study group, 44.2 % of patients were anaemic and the rest 55.8 % of patients were non-anaemic. Thus the prevalence of anaemia in the present study population was 44.2%.

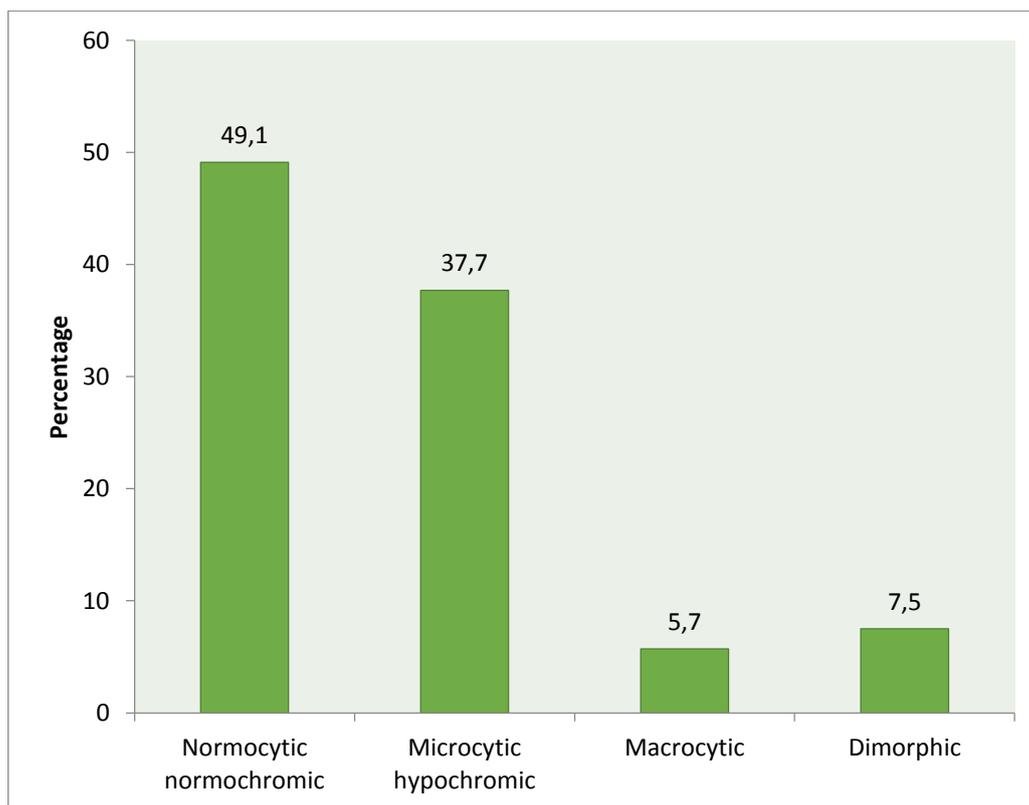


Figure 4: Bar diagram showing percentage distribution of study sample based on morphological type of anaemia

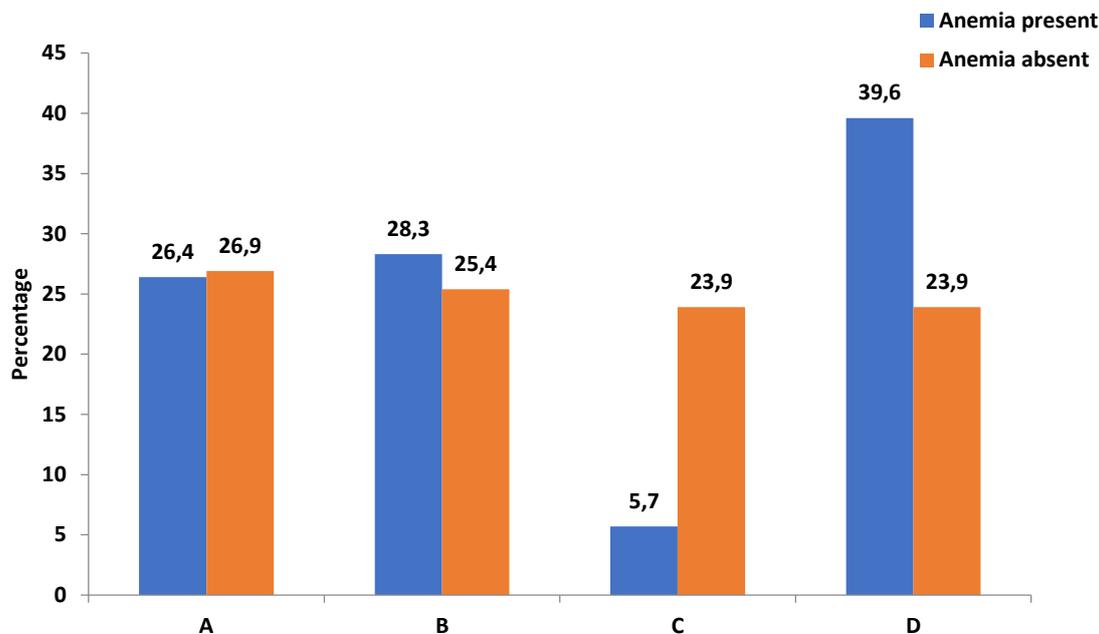


Figure 5: Figure showing percentage distribution of COPD group in anemic and non-anemic COPD patients

It was found that 30.8 % of COPD patients who were admitted belonged to COPD group D. The proportion of anaemic patients was significantly

greater in group D. In the rest 3 groups, proportion of non anaemic patients was higher.

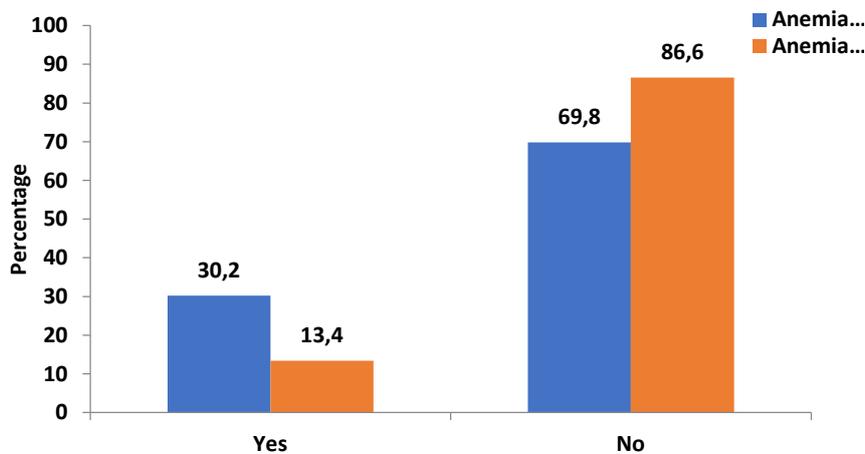


Figure 6: ICU admission in anemic and non-anemic COPD patients

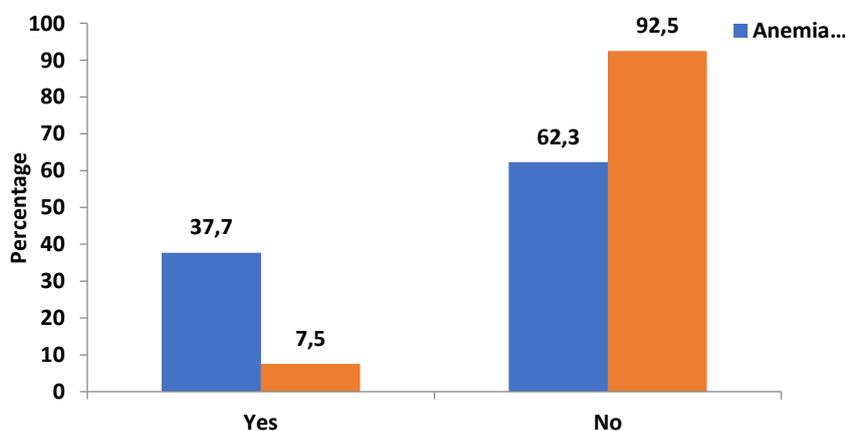


Figure 7: Death in hospital in anemic and non-anemic COPD patients

20.8 % of COPD patients who were admitted died in hospital and among those patients 80% were anaemic and this relation was statistically significant with the P value of 0.001.

Discussion

Anemia is one of the extrapulmonary manifestations of COPD. In this study, 120 COPD patients diagnosed based on GOLD clinical criteria were recruited. As per the WHO criteria for patients to be anemic in our study, it was found that 53 patients in anemic group while 67 patients in nonanemic group.⁽⁵⁾

The prevalence of anemia in COPD patients in the present study was 44.2%. Of the 120 study subjects, 101 patients were males (84.2%) and 19 patients (15.8%) were females. The mean hemoglobin levels in anemic group were 10.87 ± 1.73 g/dl, whereas in nonanemic group, it was 14.57 ± 1.6 g/dl. Difference in body mass index (BMI) of anemic and nonanemic group was not found to be significant although mean BMI of anemic patients was slightly lower than nonanemic. This was in close relation to the study conducted in a Tertiary Care Center of Kerala by Abraham M. Ittyachen et al where the prevalence of anemia in COPD patients was 50%.⁽⁶⁾

The age of the patients ranged from 45 to 95 years. The mean age of the study population was 73.14. It was found that the most common morphological type of anaemia was normocytic normochromic (49.1%) followed by microcytic hypochromic (37.7%). In the study conducted by Parveen et al, normocytic normochromic type of anemia was present in 32 (88.89%) patients while the rest had normocytic hypochromic type of anemia.⁽⁷⁾ We assume that normocytic normochromic anaemia is anaemia of chronic disease and the most common microcytic hypochromic anaemia is iron deficiency anaemia. Proportion of anemic patients was found to be higher (66%) than non anemic of mMRC Grade 2, 3 and 4, while proportion of non anemic patients was higher of mMRC Grade 0 and 1 (52.2%). Difference in mMRC grade of patients of anemic and non anemic group was found to be statistically

significant ($P = 0.045$) as observed in the study conducted by Sarika Pandey et al⁽⁸⁾.

COPD patients were classified into four groups A, B, C and D based on mMRC, number of exacerbations and number of hospitalizations for COPD exacerbation in past 1 year. Proportion of anemic patients was higher in group D (57%) while proportion of non anaemic patients were (43%) ($P = 0.03$). Proportion of anemic patients was found to be higher (64%) than nonanemic patients among ICU admitted patients. 30.2% of anaemic patients needed ICU admission whereas only 13.4% of non anaemic patients needed ICU admission. Proportion of anemic patients was found to be higher than nonanaemic patients among those who needed NIV and mechanical ventilation. 80% of COPD patients who died in hospital were anaemic whereas only 20% of patients who died were non anaemic. 37.7% of anemic patients died in hospital whereas only 7.5% of non anaemic patients died in hospital. Mortality in anaemic and non anaemic group was found to be statistically significant. (p value < 0.01)

Conclusion

- 1) The prevalence of anemia in COPD patients in the present study is 44.2%.
- 2) The most common morphological type of anaemia is normocytic normochromic (49.1%) followed by microcytic hypochromic (37.7%).
- 3) Presence of anaemia is significantly associated with worse hospital outcome in the form of increased ICU admission, increased requirement of NIV and mechanical ventilation and increased mortality.
- 4) The duration of hospital stay does not correlate with anaemia.
- 5) Efforts should be made to prevent, diagnose, and treat anemia as early as possible in COPD patients as a means of improving their overall prognosis, reducing the increase in hospitalizations, reducing the length of stay, and thereby improving their health-related quality of life in patients with COPD.

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