

A PROSPECTIVE OBSERVATIONAL STUDY OF PREVALENCE AND EFFECT OF ANEMIA IN COPD PATIENTS IN A TERTIARY CARE HOSPITAL

Dr.Thota Pujitha^{1*}, Dr. B V Srilakshmi Chittapuli², Dr. S. M. Ahmed³, Dr. K. Hema Sai Ramana Lakshmi⁴, Dr.A. Ravi Charan⁵

^{1*}Assistant Professor, Department of Respiratory Medicine, Gayatri Vidya Parishad Institute of Health Care and Medical Technology, Visakhapatnam.

²Assistant Professor, Department of Respiratory Medicine, Gayatri Vidya Parishad Institute of Health Care and Medical Technology, Visakhapatnam.

^{3,4}Third year Post Graduate, Department of Respiratory Medicine, Gayatri Vidya Parishad Institute of Health Care and Medical Technology, Visakhapatnam.

⁵DTCD, DNB, consultant pulmonologist, Apollo hospital, Visakhapatnam.

Corresponding Author: Dr.Thota Pujitha

Abstract

Introduction: The global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (COPD) defines COPD as a typical preventable and treatable disease. Described by a diligent wind current limit is typically progressive and associated with an improved chronic provocative reaction, in the airways and the lung, to harmful particles or gases.

Materials and Methods: It was a prospective observational study carried out at a tertiary care centre to evaluate the prevalence of anemia in patients with COPD and its impact on quality of life. The duration of study was one year. Anemia was defined according to WHO criteria, hemoglobin level <13g/dl in men and <12g/dl in women. 114 patients of COPD (confirmed on spirometry as per the GOLD 2017 guidelines) were enrolled after an explicit, written consent. Patient's detailed history was taken, including smoking status, pack year and biomass fuel exposure. Physical examination was conducted to include anthropometric details, routine blood investigations, chest radiograph (postero-anterior view) and a 6 minute walk test.

Results: Out of 114 patients enrolled in the study, 30 (26.32%) were found to be anemic and were classified as group I while rest 84(73.68%) were non - anemic and were classified as group II. The mean hemoglobin levels in group I (anemic group) was 11.42 g/dl whereas the mean hemoglobin level in group II was 14.54 g/dl. However there was no significant difference between those with and without anemia in their average age, gender distribution, dietary habits and pack years smoked.

Conclusion: The various factors significantly associated with anemia in our study were number of exacerbations of COPD leading to hospitalization, mMRC grade and quality of life. In conclusion, anemia occurs frequently in patients of COPD and is associated with poor quality of life and increased morbidity in the form of number of exacerbations and hospital admissions. Correcting anemia in these patients may improve their clinical outcome.

Key Words: chronic obstructive pulmonary disease, spirometry, anemia, mMRC grade and quality of life.

INTRODUCTION

The global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (COPD) defines COPD as a typical preventable and treatable disease. Described by a diligent wind current limit is typically progressive and associated with an improved chronic provocative reaction, in the airways and the lung, to harmful particles or gases.¹

Intensifications and comorbidities add to the general severity in individual patients. Systemic effects and/or comorbidities are significant occasions in the regular history of the disease and have an ability to increase the dismalness, financial weight, and mortality of COPD. Comorbidity is a disease interaction coexisting with COPD and is likely because of normal gamble factors. While coexisting illnesses are a direct result of the patient's basic COPD, it is known as a systemic impact.²

Therefore, the systemic effects of COPD are direct consequences of the disease with a cause-and-impact relationship. Screening of the comorbidities ought to be a significant component in the management of a COPD patient. The factors that have been linked to systemic consequence and comorbidities in COPD patients are systemic inflammation and shared risk factors, smoking and actual inactivity/deconditioning.³

Systemic inflammation is a generally concentrated on subject in COPD and has been possibly linked to comorbidities. Systemic inflammation in COPD might be the direct consequence of a systemic 'spill-over' of the ongoing pulmonary inflammation. Second, COPD is a piece of the chronic systemic inflammatory condition and pulmonary indications are one piece of the numerous organs split the difference, because of the consequences of systemic inflammation.⁴

Systemic appearances and comorbidities regularly detailed in COPD include cardiovascular disease, hunger, osteoporosis, gastroesophageal reflux, and clinical despondency and anxiety. lately, anemia has turned into another comorbidity that has gained significance in patients with COPD.

Anaemia, a well-recognized 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. Conversely, recent reports suggest that anaemia in patients with COPD is extremely prevalent and related to increased mortality. Although the association between anaemia and dyspnoea is generally well

established, the contribution of haemoglobin to breathlessness and the other clinical manifestations in patients with COPD is unknown.⁵

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 Visakhapatnam, as well as to explore the associations between haemoglobin levels and clinical outcomes.

MATERIALS AND METHODS

It was a prospective observational study carried out at a tertiary care centre to evaluate the prevalence of anemia in patients with COPD and its impact on quality of life. The duration of study was one year. Anemia was defined according to WHO criteria, hemoglobin level <13g/dl in men and <12g/dl in women.

114 patients of COPD (confirmed on spirometry as per the GOLD 2017 guidelines) were enrolled after an explicit, written consent. Patient's detailed history was taken, including smoking status, pack year and biomass fuel exposure. Physical examination was conducted to include anthropometric details, routine blood investigations, chest radiograph (postero - anterior view) and a 6 minute walk test.

The spirometry was carried out using Cosmed Spiropalm. Spirometric indices were measured using the best out of three satisfactory performances. The parameters recorded were forced expiratory volume in the first second (FEV1) in liters, forced vital capacity (FVC) in liters and FEV1/FVC ratio.

Patients with impaired mental capacity or with past diagnosis of asthma or those with pre - existing diseases like cancer, thyroid disease, liver disease, chronic kidney disease, Cardiovascular diseases or those with known deficiency of vitamin B12 or folate were excluded from the study.

RESULTS

Out of 114 patients enrolled in the study, 30 (26.32%) were found to be anemic and were classified as group I while rest 84(73.68%) were non - anemic and were classified as group II.

Table 1: Patient demographics

Characteristic	Anemic (n=30)	Non - anemic (n=84)	Total	P-Value
Age mean (SD)	62.16 (7.12)	61.50 (9.70)	62.10 (9.15)	0.650

Hb Mean SD	11.40 (1.40)	14.51 (1.15)	13.70 (1.85)	<0.0001
Male (n, %)	30 (100)	78 (92.86)	108 (94.12)	0.288
Religion				0.570
Hindu	28 (93.33)	74 (88.10)	102 (89.47)	
Muslim	2 (6.67)	10 (11.90)	12 (10.53)	
Dietary Habits				0.865
Vegetarian	20 (66.67)	58 (69.05)	78 (68.42)	
Non - vegetarian	10 (33.33)	26 (30.95)	36 (31.58)	
Anthropometry mean (SD)				
Height (cms)	165.12 (4.40)	161.02 (6.99)		0.040
Weight (kg)	54.60 (12.60)	50.85 (11.51)		0.296
BMI (kg/m ²)	20.01 (4.12)	19.52 (3.85)		0.816
Pack years smoked	26.70 (20.95)	32.10 (20.15)	31.00 (20.17)	0.441

The mean hemoglobin levels in group I (anemic group) was 11.42 g/dl whereas the mean hemoglobin level in group II was 14.54 g/dl. However there was no significant difference between those with and without anemia in their average age, gender distribution, dietary habits and pack years smoked.

Table 2: Distribution of Study Population according to 6 min Walk Test Distance

mMRC Grade	Group I (n=30)		Group II (n=84)		Total (N=114)	
	No	%	No	%	N	%
Grade 1	6	20.00	30	35.71	36	31.58
Grade 2	10	26.67	34	40.48	42	36.84
Grade 3	14	46.67	10	11.90	24	21.05
Grade 4	2	6.67	10	11.90	12	10.53

Table 3: Distribution of Study Population according to mMRC Grade

COPD stage	Group I (n=30)		Group II (n=84)		Total (N=114)	
	No	%	No	%	No	%
Stage I	0	0	2	2.38	2	1.75
Stage II	4	13.33	20	23.81	24	21.05
Stage III	10	33.33	34	40.48	44	38.60
Stage IV	16	53.33	28	33.33	44	38.60

Table 4: Distribution of Study Population according to Stage of COPD

No. of Exacerbations	Group I (n=30)		Group II (n=84)		Total (N=114)	
	No	%	No	%	No	%
0	8	26.67	66	78.57	74	64.91
1	12	40	16	19.04	28	24.56
2	8	26.67	2	2.38	10	8.77
3	2	6.67	0	0	2	1.75

Table 5: Distribution of Study Population according to Number of Exacerbations leading to Hospitalization

DISCUSSION

A total of 114 patients (108 males and 6 females) with COPD documented by spirometry were evaluated for frequency of anemia. A total of 30 cases of anemia were detected. The prevalence of anemia in our study was 26.32%.

The studied patients had a mean (SD) age of 62.11 (9.16) years. This is comparable to mean (SD) age 61 (1) years of subjects studied by Mathias John in 2005. Anemic patients were significantly older than non - anemic patients; mean (SD) age was 62.87 (7.39) and 61.83 (9.78) years in anemic and non - anemic patients respectively in our study whereas it was 72.8 (9.3) and 69.5 (8.8) years in anemic and non - anemic patients respectively in study by C. Cote which is comparable with our study.⁶

Smokers constituted 86% of the studied patients; smokers constituted 95% of patients in the study by Mathias John. More than 80% of smoker in our study were consuming 26-31 pack years of smoking which was equivalent to the smoking burden reported in the studies by C. Cote. There was no positive co - relation between smoking status and anemia in our studied patients which is similar to the studies by C. Cote.⁷

Most of our studied patients were in GOLD stage III and IV where as majority of patients were in GOLD stage III in another study by Mathias John. There was no correlation between lung function test and anemia. Similar results have been shown in the studies conducted by Mathias John, C. Cote, Marya Zilberberg and Gokul Krishnan.⁸

Mean (SD) hemoglobin level in studied patients was 11.42 (1.42) g/dl and 14.54 (1.20) g/dl in anemic and non - anemic patients respectively which is consistent with another study by Mathias John with mean hemoglobin of 11.9 (0.4) g/dl and 14.7 (0.2) g/dl in anemic and non - anemic patients respectively. In the study by C. Cote mean hemoglobin level was 11.8 (1) g/dl and 15 (1.2) g/dl in anemic and non - anemic patients respectively.⁹

The frequency of anemia in our study was 26.32% which is similar to frequency of 21% by Michael Halpern and 23% by John Mathias. There was no significant difference in frequency of anemia with respect to gender consistent with other studies by C. Cote, M. B. Stanbrook, Gokul Krishnan.¹⁰

The clinical parameter which had significant correlation with anemia in our study were number of exacerbations of COPD leading to hospitalization; similar results have been seen in studies conducted by Arnaud Chambellan.

CONCLUSION

114 patients (108 males and 6 females) with a mean (SD) age of 62.11 (9.16) years having COPD diagnosed by GOLD criteria were evaluated for frequency of anemia.

A total of 30 cases of anemia were detected giving a frequency of 26.32%. All of these anemic patients were males. Normocytic normochromic type of anemia was present in 26 (86.66%) patients while the rest had microcytic hypochromic type of anemia. Majority of patients were in GOLD stage III and IV with a mean FEV1 32.53 percent of the predicted in anemic COPD patients.

The various factors significantly associated with anemia in our study were number of exacerbations of COPD leading to hospitalization, mMRC grade and quality of life.

In conclusion, anemia occurs frequently in patients of COPD and is associated with poor quality of life and increased morbidity in the form of number of exacerbations and hospital admissions. Correcting anemia in these patients may improve their clinical outcome.

REFERENCES

1. Kent BD, Mitchell PD, McNicholas WT. Hypoxemia in patients with COPD: Cause, effects, and disease progression. *International Journal of COPD*. 2011.
2. Chambellan A, Chailleux E, Similowski T. Prognostic value of the hematocrit in patients with severe COPD receiving long-term oxygen therapy. *Chest*. 2005.
3. John M, Hoernig S, Doehner W, Okonko DD, Witt C, Anker SD. Anemia and inflammation in COPD. *Chest*. 2005;
4. Similowski T, Agustí A, MacNee W, Schönhofer B. The potential impact of anaemia of chronic disease in COPD. *European Respiratory Journal*. 2006.
5. WHO, Chan M. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Geneva, Switz World Health Organ. 2011;

6. Ittyachen A, Krishnamoorthy S, Bhatt A, Abdulla S, Roy J, Sugathan M, et al. Predictors of outcome in patients admitted with acute exacerbation of chronic obstructive pulmonary disease in a rural Tertiary Care Center. *J Fam Med Prim Care*. 2016;
7. Parveen S, Rangreze I, Ahmad SN, Mufti SA, Khan SS. Prevalence of Anemia in Patients with COPD and Its Potential Impact on Morbidity of COPD Patients. *Int J Clin Med*. 2014;
8. Pandey S, Garg R, Kant S, Gaur P. Chronic Obstructive Pulmonary Disease with Anemia as Comorbidity in North Indian Population. *Adv Biomed Res*. 2018;
9. Barba R, Casasola GG De, Marco J, Emilio Losa J, Plaza S, Canora J, et al. Anemia in chronic obstructive pulmonary disease: A readmission prognosis factor. *Curr Med Res Opin*. 2012.
10. McHorney CA, Ware JE, Lu JFR, Sherbourne CD. The MOS 36 - Item Short - Form Health Survey (SF - 36®):III. tests of data quality, scaling assumptions and reliability across diverse patient groups. *Med Care*1994; 32 (4): 40 - 66.