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## Anemia in COPD Patients

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## ABSTRACT

Many chronic diseases have been shown to affect haematopoiesis, resulting in shortening of red blood cell (RBC) lifespan and sequestration of iron in macrophages, and leading to so-called anemia of chronic disease (ACD). COPD has been defined by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) as a disease state characterized by air-flow limitation that is not fully reversible. Anemia is such a common and simple finding that we may underestimate its physiologic relevance in COPD **Objective**: The aim of this study was to evaluate anemia in COPD patients.

**Material and Methods**: This was a case study of clinically diagnosed 100 COPD patients. The present study was conducted on 100 subjects of COPD patients in the department of Medicine. The total number of subjects was 100 which were clinically diagnosed with history suggestive of COPD (cough with sputum production in chronic bronchitis and breathlessness in emphysema), physical findings suggestive of airway obstruction (rhonchi, decreased intensity of breath sounds and prolonged expiration) and importantly a spirometery confirmed diagnosis of COPD as per GOLD criteria.

**Results:** Anemic patients were significantly older than nonanemic patients with mean age  $64.47 \pm 7.97$  vs  $60.71 \pm 8.85$  p<0.012. Mean hemoglobin levels was  $9.56 \pm 1.23$  g/dl in anemic patients while it was  $13.66 \pm 1.42$  g/dl in non- anemic patients p<0.000. out of 21 anemic patients 17 (80.95%) had normocytic normochromic type of anemia whereas 4 (19.04%) had normocytic hypochromic type of anemia p<0.819.

**Conclusion:** Majority of anemic patients were males. Anemia was detected with the frequency of 21%. Normocytic normochromic type of anemia was present in 17(80.95%) patients where as rest had normocytic hypochromic type of anemia. Decreased serum iron levels, transferrin saturation and TIBC were observed in majority of anemic patients..

Keywords: Chronic obstructive pulmonary disease, Anemia.

## **INTRODUCTION**

Many chronic diseases have been shown to affect haematopoiesis, resulting in shortening of red blood cell (RBC) lifespan and sequestration of iron in macrophages, and leading to so-called anemia of chronic disease (ACD).<sup>1</sup> The mechanism of anemia development in Chronic obstructive pulmonary disease (COPD) might be similar to that in other chronic diseases .A characteristic finding of the disorders associated with ACD is increased production of cytokines that mediate the immune or

inflammatory response, such as tumor necrosis factor, interleukin–1 and the interferon's.<sup>2</sup> COPD has been defined by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) as a disease state characterized by air-flow limitation that is not fully reversible.<sup>3</sup> COPD is a disease of increasing public health importance around the world. GOLD estimate

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suggests that COPD will rise from 6<sup>th</sup> to 3<sup>rd</sup> most common cause of death worldwide by the year 2020.<sup>3</sup>

Recent GOLD report<sup>4</sup>has changed the characteristics of COPD staging. In the 2006 GOLD report more emphasis is given to the role of inflammation in COPD.<sup>4</sup> Anemia is such a common and simple finding that we may underestimate its physiologic relevance in COPD.<sup>5</sup> While in states like chronic heart failure and renal insufficiency, anemia has been extensively studied and investigated; little attention has been given to it in COPD. COPD fulfills the criteria of a chronic, inflammatory multisystem disease leading to expectations of anemia.

**Objective:** The aim of this study was to evaluate anemia in COPD patients.

Material and Methods: This was a case study of clinically diagnosed 100 COPD patients. The present study was conducted on 100 subjects of COPD patients in the department of Medicine, Govt. Medical College & Hospital Srinagar. In this case study patients attending Govt; Medical College & Hospital from 20016 to 2017 were included. The total number of subjects was 100 which were clinically diagnosed with history suggestive of COPD (cough with sputum production in chronic bronchitis and breathlessness in emphysema), physical findings suggestive of airway obstruction (rhonchi, decreased intensity of breath sounds and prolonged expiration) and importantly a spirometery confirmed diagnosis of COPD as per GOLD criteria<sup>6</sup>; only those patients

who had a FEV1/FVC ratio of less than 70% were included in the study. A written informed consent was also taken from the cases. Venous 5 ml blood sample was collected using aseptic techniques. Serum was separated from the blood by centrifugation at 3000 rpm for 10 mints. Serum was stored at -80 <sup>o</sup>C until analysis. The repeated thawing and freezing of serum was avoided.

Results: The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were summarized in the form of means and standard deviations. The present study was conducted on 100 COPD patients in the age group 40-70 years. Among the 100 patients 60 were male and 40 were female. Anemia was found in a total of 21 patients, in which 14(66.6%) were males and 7(33.3%) were females. Anemic patients were significantly older than nonanemic patients with mean age  $64.47 \pm 7.97$  vs 60.71 ± 8.85 p<0.012.Mean hemoglobin levels was  $9.56 \pm 1.23$  g/dl in anemic patients while it was 13.66 + 1.42 g/dl in non- anemic patients p<0.000. out of 21 anemic patients 17 (80.95%) had normocytic normochromic type of anemia whereas 4 (19.04%) had normocytic hypochromic type of anemia p<0.819.Iron profile of the anemic patients depicts that 80% of patients had low serum iron level, 52% had decreased transferrin saturation and 85.71% had decreased total iron binding capacity (TIBC)

Iron profile		Male (n=14)	Female (n=7)	Total (n=21)	p value	
Serum Iron	Decreased(<59)	12 (85.71%)	5(71.42%)	17 (80.95%)	0.592(NS)	
(g/dl)	Normal(59 to 158)	2 (14.28%)	2 (28.57%)	4 (25.04%)	0.382(113)	
Transferrin	Decreased(<16)	7 (50.0%)	4 (57.14%)	11 (52.38%)		
Saturation (%)	Normal(16 to 50)	7 (50.0%)	3 (42.85%)	10 (47.61%)	) 1.000(NS)	
	Decreased (< 259)	12 (85.71%)	6 (85.71%)	18(85.71%)	0.408(NS)	
TIDCg/ul)	Normal(259 to 388)	2 (14.28%)	1 (14.28%)	3 (14.28%)	0.490(113)	

11011110111011101110111011101110111011	Iron	Profile	in the	anemic	patients	(n=21)
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Discussion: COPD is a disease of increasing public health importance around the world. GOLD estimate suggests that COPD will rise from 6<sup>th</sup> to 3<sup>rd</sup> most common cause of death worldwide by the year 2020.<sup>3</sup>Mathias John et al found that anemia occurred frequently in COPD patients.<sup>5</sup> Anemia in COPD was an independent risk factor for reduced functional capacity. The studied patients had a mean age of 60.4 + 8.8 years (59.3 + 8.0 in males and 61.0 + 9.7 in females). This is comparable to mean age (61  $\pm$  1 vears) of subjects studied by Matthias John in 2005<sup>5</sup> and Gonenc<sup>6</sup> (63.7 + 1.24 years) in 2006. In our study 66.6% of patients were males where as females constituted 33.3% of subjects. In the study by  $C.Cote^7$  mean Hb level was 11.8 + 1.0 g/dl and 15.0+ 1.2 g/dl in anemic and non-anemic patients respectively. Mean hemoglobin (Hb) level in studied patients was 9.5  $\pm$  1.23 g/dl and 13.66  $\pm$  1.42 g/dl in anemic and non-anemic patients respectively which is consistent with another study by Matthias John <sup>5</sup>with mean Hb of  $11.9 \pm 0.4$ g/dl and 14.7 + 0.2 g/dl in anemic and non-anemic patients respectively.

Out of 21 anemic patients, 17 (80.95%) patients had normocytic normochromic type of anemia whereas 4 had normocytic hypochromic type of anemia. These findings are consistent with those reported in earlier studies by Matthias John<sup>5</sup> and LT Bart<sup>8</sup>. Iron profile of the studied patients revealed that serum iron levels were decreased in three fourths of anemic patients, transferrin saturation was decreased in half of patients and total iron binding capacity (TIBC) was decreased in 85.7% of anemic patients. There was no difference in Iron profile between male and female patients. Although no study on iron profile in anemic COPD patients was available for comparison, the results are consistent with iron profile in anemia of chronic diseases in studies by Robert T. Means<sup>9</sup> and LT Bart.<sup>8</sup>

**Conclusion:** Majority of anemic patients were males. Anemia was detected with the frequency of 21%. Normocytic normochromic type of anemia was present in 17(80.95%) patients where as rest had normocytic hypochromic type of anemia. Decreased serum iron levels, transferrin saturation and TIBC were observed in majority of anemic patients.

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