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A STUDY ON IMPACT OF ANEMIA IN CHRONIC DISEASE IN COPD

A. Vikneswari*[1,2] and T. Tamizh Mani[3]

*[1]Department of Pharmacy Practice, Bharathi College of Pharmacy, Bharathinagara, Mandya, Karnataka – 571422, India.

[2]Department of PG Studies, Pacific University, Udaipur, Rajasthan, India.

[3]Department of Pharmacognosy, Bharathi College of Pharmacy, Bharathinagara, Mandya, Karnataka – 571422, India.

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***Corresponding Author**
A. Vikneswari
Department of Pharmacy Practice, Bharathi College of Pharmacy, Bharathinagara, Mandya, Karnataka – 571422, India.

ABSTRACT

Anemia is common in patients with chronic diseases. However, little is known regarding the prevalence of comorbid anemia and its impact on quality of life, healthcare utilization and mortality in patients with COPD. Chronic obstructive pulmonary disease COPD, a common preventable and treatable disease, is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases. Exacerbations and co-morbidities contribute to the overall severity in individual patients. COPD is expected to become the third leading cause of death worldwide by 2020. We did study of anemia and its association with COPD patient. In our cohort of 244 patients, anemia present in 75.45% of all COPD patients, this was higher than the findings from previous studies. Out of 184 anemic patients 89 are found as mild, 74 having moderate, 16 patients are having severe and 5 patients are having life threatening anemia. The distribution of anemia in male and female is 134 (74.46%) and 47 (25.54%) respectively which is statistically significant. There was an inverse association with SPO2 and severity of anemia. Among COPD patients, anemia of chronic disease was found to more common than iron deficiency anemia in COPD patients. Anemia of chronic disease is relatively common in COPD patients but is an underestimated issue.

KEYWORDS: Anemia in chronic disease, COPD, SPO_2.

INTRODUCTION

Anemia is common in patients with chronic diseases. However, little is known regarding the prevalence of comorbid anemia and its impact on quality of life, healthcare utilization, and mortality in patients with COPD.[1] Anemia of chronic disease (ACD) is defined as anemia present in chronic infectious and inflammatory conditions or neoplastic disorders, which is not due to marrow deficiencies and occurs even though the presence of iron stores and vitamins is adequate. It is the most common form of anemia observed next to iron deficiency anemia.[2] The common conditions associated with ACDs are acute and chronic infections, cancer, autoimmune disorders, chronic kidney diseases (CKDs), chronic inflammatory conditions and COPD. ACD is a commonly present, poorly understood condition that affects patients with a variety of diseases, including chronic infections, malignancies and rheumatological diseases.[3] It is characterized by impaired erythropoietin response, diminished red blood cell (RBC) survival and an impairment in iron absorption and macrophage iron retention, which hinders iron delivery to erythroid precursor cells.

Chronic obstructive pulmonary disease COPD, a common preventable and treatable disease, is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases. Exacerbations and co-morbidities contribute to the overall severity in individual patients.[4] COPD is expected to become the third leading cause of death worldwide by 2020.[5]

Systemic inflammation in chronic obstructive pulmonary disease may also initiate or worsen comorbid diseases. Anemia is one important comorbidity. The low level of haemoglobin is strongly and independently associated with increased functional dyspnoea and decreased exercise capacity and is therefore an important contributor to functional capacity as well as a poor quality of life.[6] The occurrence and prevalence of anemia in patients with COPD has rarely been studied. Anemia is such a common and simple clinical finding that we may underestimate its physiological relevance in COPD.[7] Although COPD is traditionally associated with polycythaemia rather than anemia, the systemic inflammation that is now recognized as a feature of COPD makes it a possible cause of ACD. If present in COPD, anemia could worsen dyspnea and limit exercise tolerance.[8]

Recent reports suggest that anemia in patients with COPD is highly prevalent and associated with increased mortality.[9, 10] The World Health Organization (WHO) defines anemia as a haematocrit level, 39% in males and 36% in females.[11]

Our study is directed towards the objective to analyze the anemic condition in COPD patient by collecting their hemoglobin value and identify the relationship between anemia and SPO_2 value in COPD condition.

MATERIAL AND METHODS

We studied 244 patients with COPD after obtaining informed consent from them. The patients were enrolled from the general medicine department of the hospital. The study was approved by the Institutional ethics committee of the MIMS teaching hospital, Karnataka.

Hemoglobin values were collected from the patients' case sheets and the SPO_2 values were measured by using pulse oximeter.

Inclusion criteria

The patients included in the study were men and women, aged 40 years or more with the history of suggestive COPD (cough with sputum production in chronic bronchitis and breathlessness in emphysema). Anemia was graded by hemoglobin level 9.5 – 10 gm/dl – mild, 8-9.5 gm/dl – moderate, 6.5 – 7.9 gm/dl – severe and < 6.5 gm/dl is life threatening.

Exclusion Criteria

1. Patient had recent surgery of the eye , chest or abdomen
2. All patients with insufficient mental capacity
3. Patients with cancer, thyroid disease, severe liver disease, chronic kidney disease chronic heart failure, rheumatoid arthritis and tuberculosis exposure.
4. Pregnant women or breastfeeding women

RESULT

A total of 244 patients were included in the study. 190 were males and 54 were female. Mean age for our study population was 63.21 $\pm$ 11.26 years. Among these 244 patients, 181 were smokers, 54 were ex-smoker and 131 were non smokers. (Table 1).

Table 1. Demographic details

Parameter	Frequency
Total Population	244
Age (Mean ± SD)	63.21 ± 11.26
Gender Male Female	 190 54
Anemia	184
Smoking History Smoker Ex – smoker Non smoker	 181 54 131

184 patients were found to be anemic. The anemic patients were categorized based on their haemoglobin values in to mild (9.5 – 10gm/dl), moderate (8 – 9.5gm/dl), severe (6.5 – 7.9gm/dl) and life threatening anemia (<6.5gm/dl). Out of 184 anemic patients 89 are found as mild, 74 having moderate, 16 patients are having severe and 5 patients are having life threatening anemia. (Table 2).

Table 2 Distribution of study group

Parameter		Frequency	Percent
Anemia	Present	184	75.41%
	Absent	60	24.59%
Gender	Male	190	77.9%
	Female	54	22.1%
	Total	244	100%

The distribution of anemia in male and female is 134 (74.46%) and 47 (25.54%) respectively which is statistically significant. (Table 3).

Table 3 Anemia distribution of study group

Parameter	Male	Female	Total	P - value
Anemia	137 (74.46%)	47 (25.54%)	184	< 0.05 Significant
No anemia	53 (88.33%)	7 (11.67%)	60	
Total	190	54	244	

(Chi-square 5.056, d.f =1, P < 0.05).

Out of 244 patients, SPO2 values were measured from 85 patients by using pulse oximeter. SPO2 values were graded as normal (≥ 95), borderline (92 – 95), long term oxygen therapy (92) and need hospitalization (<90). 14 patients need long term therapy and 21 patients were need hospitalization. (Table 4).

Table 4 Determination of SPO2 value

SPO2 value		Frequency	No of Anemia patient
≥ 95	Normal	14	4
92- 95	Borderline	36	14
< 92	Long term oxygen therapy	14	10
< 90	Hospital admission	21	12
Total		85	40

Our study showed that there is no significant association between SPO2 and anemia. (Table 5).

Table 5 Association among study group and SPO2 measurement

Study group		SPO2 value				Total
		Normal ≥ 95	Borderline 92- 95	Long term oxygen therapy < 92	Hospital admission < 90	
Anemia	Count	4	14	10	12	40
	Percent	10 %	35 %	25 %	30 %	100 %
No anemia	Count	10	22	4	9	45
	Percent	22.2 %	48.8 %	9 %	20%	100 %
Total	Count	14	36	14	21	85
	Percent	16.47%	42.35%	16.47%	24.71%	100%

DISCUSSION

Anemia of chronic disease is relatively common in COPD patients but is an underestimated issue. COPD ia a chronic inflammatory multisystem disease leading to the expectation of anemia. After iron deficiency, chronic inflammatory disease are the most common conditions producing anemia.[12]

ACD is the second most common form of anemia worldwide after anemia caused by iron deficiency and the commonest type of anemia among patients with chronic diseases.[13, 14] 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 the so-called anaemia of chronic disease.[14] Theoretically, chronic obstructive pulmonary disease (COPD) is another candidate likely to be associated with ACD, when considered in relation to the already-known systemic effects of the disease.[15] The systemic inflammation that is common in COPD and can be evidenced by raised levels of inflammatory markers, cytokines and chemokines in some patients[16-18], with inflammatory peaks during exacerbations.[19,20]

The expression of neutrophil adhesion molecules is increased, the release of neutrophils from the bone marrow is also raised and there are changes in neutrophil function and deformability. This may lead to increased sequestration of neutrophils in the pulmonary microcirculation.[21-23] During smoking or exacerbations of COPD, these changes are magnified. This systemic inflammation may be an important determinant of the nutritional imbalance that characterizes many patients with COPD.

In our cohort anemia is present in 75.41% of all COPD patients which is higher than the finding from previous studies. Our study shows that anemia occurs relatively frequently in COPD patients and most common is anemia of chronic disease type, because systemic inflammation likely to play a major role in the setting of COPD, particularly since it has been identified as the cause of one third of all anemia cases observed in the community – dwelling elderly population.[24]

The clinical symptoms of anemia often do not stand in the foreground in patients with chronic diseases. It has been suggested that anemia to some extent contributes to exercise limitation and dyspnea in chronic illness[15], fulfills the criteria of a chronic, inflammatory, multisystem disease leading to the expectation of anemia. While anemia in chronic heart failure or renal insufficiency has been frequently investigated, it is understudied in COPD.[25]

CONCLUSION

Anemia of chronic disease is relatively common finding in COPD.

LIMITATION

Our study being a hospital based study may not truly reflect the frequency of anemia in COPD patients in community at large.

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