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Original Research Article

Presence of Anemia in COPD Patients and Its Correlation with Disease Severity: An Observational Study

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ABSTRACT

Background and Objective: Chronic obstructive pulmonary disease (COPD) is a common and important condition with a rising global incidence. It is projected to be the fourth leading cause of death worldwide by 2020. Chronic obstructive pulmonary disease (COPD) is associated with important extra pulmonary manifestations, including anemia, weight loss, depression, reduced exercise tolerance etc which all are not commonly looked for while treating COPD patients which intern leads to their poor health status. Objective of this study is to find the presence of anemia in COPD patients and its correlation with disease severity.
Materials and Methodology: 100 patients from IPD of C.U. Shah medical hospital were taken for the study that fulfilled the eligibility criteria.
Result: Results were analyzed with the SPSS 16 for windows. Majority of the cases suffering from COPD were found to be anemic. We have use Pierson co-relational analysis to check any co relation between disease severity and serum Hb percentage, which was not significant statistically.
Conclusion: This study shows that anemia is being more prevalent in most of the sufferers of COPD but it is not correlated with the disease severity. It should be included in the screening and as well as management of patients of COPD to reduce its ill health effects and thereby reducing the disease burdens on the patient's health.

Key words: Anemia, COPD, HB.

INTRODUCTION

COPD is slowly progressive disorder characterized by airflow obstruction. The Global Initiative for Obstructive Lung Disease (GOLD) defines the condition as "A preventable and treatable disease with some significant extra pulmonary effects that may contribute to the severity in individual patients. Its pulmonary component is characterized by airflow limitation that is not fully reversible. [1] COPD is associated with significant morbidity and mortality worldwide. [2] COPD patients suffer from various co morbidities associated with negative impact on patients and further complicating the condition. The anemia is associated with increased mortality and morbidity including increased hospitalization and increased health care costs. [3-5]

Chronic obstructive pulmonary disease (COPD) is associated with important extra pulmonary manifestations; including weight loss, skeletal muscle dysfunction, cardio vascular disease, depression, osteoporosis, reduced exercise tolerance, and poor health status. [6,7] Co morbidity is a disease process which coexisting with COPD and is probably due

to common risk factors. However, little is known in regard to the prevalence of co morbid anemia and its impact on quality of life, healthcare utilization, and mortality in patients with COPD. [8]

Therefore it is important to screen the co morbidities while managing patients of COPD to alleviate there ill effects. Systemic effect in COPD is a term used to describe a condition where there is coexistence of illness due to the direct consequences of the disease with a cause - and-effect relationship. [9,10] Moreover, presence of anemia in patients with COPD is an independent prognostic predictor of premature mortality with a greater likelihood of hospitalization. The true prevalence of anemia in patients with COPD is unknown. [11]

World Health Organization's (WHO) definition of anemia is based on a hemoglobin level of less than 13 g/dl in men and 12 g/dl in women. [12] But no study has been reported for any specific cut off in the setting of COPD and hypoxemia, as we know that hypoxemia can increase the hemoglobin level. Anemia in COPD can have various causes. Anemia of chronic disease (ACD) is probably thought to be the predominant mechanism of anemia related to chronic systemic inflammation of COPD. Prevalence of anemia in the general population increases with age and COPD is a disease that affects the aging population. Mechanisms of anemia in COPD are probably multi factorial. They may be anemia of chronic disease related to inflammation, iron and vitamin deficiency, co morbidities, or treatment related. [13] Many literature has emphasized on anemia of chronic disease or anemia of inflammation as the predominant mechanism responsible for the development of anemia in COPD. Anemia of chronic disease (ACD) is results due to immune-related mechanism that occurs in many chronic disease processes; for example, infection, autoimmune diseases, cancer, chronic kidney disease, and so on. [14]

Fatigue and dyspnea are one of the major symptoms of anemia, and these can be related to reduced oxygen carrying capacity of blood. [15,16] Furthermore, this symptom complex in patients with COPD contributes the morbidity and mortality associated with impaired quality of life and reduced exercise capacity. [16]

In this observational study we have observed the HB level in order to detect the presence or absence of anemia in patients admitted in the C.U. Shah medical hospital and along with this we have correlated it with disease severity of COPD.

MATERIALS & METHODS

Total 143 Patients were randomly taken and first screened to confirm the presence of COPD along with clinical diagnosis, out of which 31 patients were excluded as they did not fulfilled the inclusion criteria, 10 patients refused to participate in the study and 2 patients died during this period, therefore only 100 patients took part in the study on the basis of selection criteria. Both male and female Patients admitted with signs and symptoms of COPD diagnosed clinically, in C.U. Shah Medical College and Hospital, Surendranagar.

Inclusion criteria: Known cases of COPD were taken of Age >12 Years, (12 years is the minimum age group we have taken because below 12 years comes under pediatrics which is out of our scope of practice) having a History of cough > 2 months with or without expectoration. Both Male and Female patients were taken.

Exclusion criteria: Patients having Age < 12 Years, COPD with other pulmonary illness such as Interstitial lung disease, Pulmonary TB, Restrictive Lung disease, Bronchial Asthma, Occupational lung disease, COPD with other cardiac illness such as heart failure. Patients who have

already been detected as a known case of anemia or taking any medication to treat anemia.

Procedure: All patients who were screened and fulfilled the selection criteria were given conventional medical treatment like bronchodilators and corticosteroids during their hospital stay and during that stay there blood samples were taken to know the Hb level, the samples were taken on day of admission itself in order to alleviate any effect of medication on Hb level, and PFT findings were done to know the severity of the condition.

Screening criteria: All patients were screened by means of clinical & subjective examination to confirm COPD.

Symptoms of Presentation: In this study 98% of patients having history of dyspnoea and 91 % of patients having history of cough.

Table1: clinical & subjective detail

Symptoms	No. Of Cases	Percentage (%)
Cough	91	91
Dyspnoea	98	98

Severity Index (As Per Gold): According to gold classification the cases has been divided into mild, moderate and severe. According to value of FEV1/FVC ratio maximum numbers are in the category of mild severity which is 67%, 33% cases were moderate variety and 0% of pt were severe.

Table 2: PFT findings details

Severity	FEV1/FEC	No. Of Cases	Percentage(%)
Mild	60-69	67	67
Moderate	40-59	33	33
Severe	<40	0	0

RESULT

Mean and SD of minimum and maximum values of age of males and females are shown in Table 3 which gives the details of the subjects who completed the study.

Mean and SD of gender distribution values are shown in table no 4 which gives the details of both males and females who completed the study.

Table 3: Demographic detail:

Gender(n)	Mean(age)	SD
Male(82)	58.15	±8.68
Female(18)	59.7778	±8.96

Table 4: Gender distribution

Sex	*No. Of Cases(N=100)*	*Percentage (%)*
Male	*82*	*82*
Female	*18*	*18*

Table 5: Hb level details

Hb Level	Male (N)	Percentage (%)	Female (N)	Percentage (%)
>13	01	1.21%	01	5.55%
12-13	23	28.04%	06	33.33%
<12	58	70.73%	11	61.11%

Mean Hb level and SD of Males is 11.14±1.29 whereas of females it is 11.58±1.05.

Table 6: Disease severity by FEV1/FVC ratio: The mean and SD values of FEV1/FVC in male and females are given in table no 7.

GENDER	MEAN(FEV1/FVC)	SD
Male	60.42	±6.20
Female	60.94	±4.99

Table 7: Correlation of HB and disease severity (FEV1/FVC) in Males and Females.

Gender	HB (MEAN±SD)	FEV1/FVC (MEAN±SD)	R -VALUE (Correlation)
Male	11.14± 1.29	60.42± 6.20	.469
Female	11.58±1.05	60.94±4.99	.083

Table 7: Correlation of HB and COPD disease severity (FEV1/FVC) in males and female

Correlations			
		M_HB	M_RATIO
M_HB	Pearson Correlation	1	.469**
	Sig. (2-tailed)		.000
	N	82	82
M_RATIO	Pearson Correlation	.469**	1
	Sig. (2-tailed)	.000	
	N	82	82

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations			
		F_HB	F_RATIO
F_HB	Pearson Correlation	1	.083
	Sig. (2-tailed)		.742
	N	18	18
F_RATIO	Pearson Correlation	.083	1
	Sig. (2-tailed)	.742	
	N	18	18

Interpretation: In our study out of 100 subjects, 98.77% males were found anemic and only 61.11% females were found anemic. Hence on the observational bases we have found anemia being prevalent co morbidity among COPD patients which in turn can give negative affect on health status of the patients thereby can make the person prone to other complications and poor health condition.

Apart, from this we have also correlated that weather there is any relation between the disease severity and the Hb levels using Pierson co-relational analysis and through which we have found that there is no direct correlation between the two variables with the r value of 0.469 in males and 0.083 in females which indicates positive correlation.

DISCUSSION

The present study has focused to find out the presence of anemia in COPD patients who were admitted in the C.U. Shah medical hospital and to know about any correlation between disease severity and serum Hb. Through this observational study it has been found that most of male 98.77% were found anemic and only 61.11% females were found anemic and there is no direct correlation between Hb level and disease severity of COPD.

The causes of anemia in patients with COPD are probably multi factorial and include nutritional deficits, stress ulcer (especially those on steroids), and carboxy hemoglobin effects of cigarette smoking. A particularly important cause of anemia in these patients may relate to the chronic inflammatory nature of COPD. The anemia of chronic inflammation, which was previously termed the anemia of chronic disease, is one of the major causes of normocytic anemia in man. [17]Apart from this many researchers have worked in this field and having their own way of explanation about the pathophysiology behind the occurrence of anemia in COPD patients.

According to Weiss G, Goodnough LT Although the precise cause of anemia in COPD patients is unknown, there appears to be a relationship with certain pro-inflammatory markers(fig1) which suggests that at least a component of the anemia is attributable to inflammation (i. e. the anemia of chronic inflammation). [18]

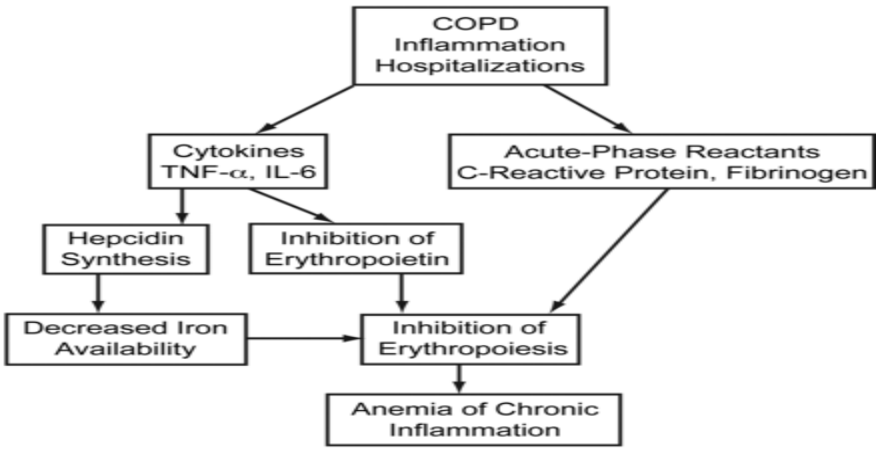

Fig1: Possible mechanisms of anemia development in COPD.

Our study has been supported by Donald S Silverberg et al who in his study tried to find the prevalence of anemia and its treatment in COPD patients, and concluded that anemia is common in COPD patients but it's rarely looked for or treated. [19]

Through the study it has been found that anemia is a very common co morbidity which further can complicate the patient condition and in turn can result in various negative impact on the overall health status of the patient .The main Aim of our study was to detect each and every case which might have been neglected, which can further worsen or results in deliberating effects on patients health status, and we have also tried to find that does any correlation exist between the Hb level and disease process, and it has been

found many patients were being neglected or were not aware about the presence of anemia, thereby by early detection about the presence of anemia we can help the patient to lowers the hospital stay and thereby can also improve the quality of life of the patients. It has been found a strong relationship between COPD and presence of anemia with no correlation between disease severity and Hb level.

The finding of our study has also been supported by Malay Sarkar, Puja Negi et al who in their study find that the prevalence of anemia in patients with COPD varies from 7.5% to 33%. [2]

The findings of our study has also been supported by Malay Sarkar, Puja Negi et al who in their study has concluded the presence of anemia in sufferers of COPD, but in their result they found less percentage of anemia while in our study we have observed more percentage of anemia presence in COPD patients .Hence the above mentioned study supports our study in a way as we have also found presence of anemia in our patients but we have not commented or compared the percentage of presence of anemia in COPD patients.

The finding of our study is also supported by Matthias John, Soeren Hoernig et al, who in their study concluded that there is no direct correlation between anemia presence and disease severity, Anemia and Inflammation in COPD. [20]

The finding of our study is also supported by Matthias John, Soeren Hoering et al, who in their study concluded that there is no direct correlation between anemia presence and disease severity. [20]

Limitations of the study: We have taken both genders but the ratio of male and female was not equal because of which we cannot firmly support the results obtained on females and cannot generalize on population.

Limitations of the study: We have not specified which stage of COPD patients we have taken along with that there is vast difference between both gender ratios.

CONCLUSION

This study shows that anemia is being more prevalent in most of the sufferers of COPD but it is not correlated with the disease severity. It should be included in the screening and as well as management of patients of COPD to reduce its ill health effects and thereby reducing the disease burdens on the patient's health.

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