

Clinical Significance of Anemia in Chronic Obstructive Pulmonary Disease

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Abstract: *To assess the function of anemia on patient outcomes on COPD (Chronic Obstructive Pulmonary Disease) the contribution that lowers iron stores plays a important roles in this process. Some studies found that anemia is connected with the decrease in functional outcomes, increased healthcare utilizations increase mortality and costs in COPD. Relationships exists between decreased iron intake and the progression of COPD and decreased iron status with reduction of lung functions some iron supplementations models were used in various inflammatory diseases and were reviewed as starting point to evaluate the treatment regimen options in COPD. Some future research can be done and may direct to stabilize the best practice guidelines and standards for the utilization of iron supplementation in COPD.*

Keywords: Hepcidine, Anemia, COPD, erythropoietin, phosphor-diesterase-4 (PDE-4)

1. Introduction

COPD is a disease which is characterized severe and incurable airflow limitation and reduces functional capacity which is associated with multiple co-morbidities and markers of systemic inflammation. This disease is a cause of morbidity and mortality in the old age and contributes to the greatest proportion of mortality of all respiratory diseases. In the current situations it is the third leading cause of death in Europe and is also ranked as the fourth leading cause of death in the US. In some studies it has been seen an exponential rights in the healthcare utilization and financial burden along with the rising mortality rate among COPD patients.

More than 300 million peoples are affected by COPD (Chronic Obstructive Pulmonary Disease) all over the world and taking a toll of 2.9 million lives[1] and well increases to 4.4 million till 2040 and becomes 4th largest caused disease.

In United States commonly infectious disease which cause comprising emphysema or chronic bronchitis without or with associated bronco-spasm. Approximately more than 15 million people are suffering from COPD and 12.5 million peoples are suffering from chronic bronchitis component of this infection. More than 40% of people are incidentally diagnosed COPD till 1982 and it became fifth prime cause of death in United States. Therefore, COPD has been increased widely among the Geriatric populations across the world due to the increased contact with the indoor and outdoor pollution and unhealthy lifestyle choices including smoking tobacco even in western countries the rate of smoking drastically decreasing but still 175 million women and 942 million men in the world are still smoking.

As per the report of WHO (World Health Organization), deaths from air pollution includes 4.2 million death per year as compare to biomass exposure there are 3.8 million deaths per year from dirty stores and fuels. Around 91% of World's population lives in a area where the quality of air breathe the

lower limit of acceptability which was estimated by the World Health Organization. On condition of COPD, there is a small progress in the number of new therapies while there has been explosion in publications and scientific interest on COPD. Though there is number of new therapies was found but for past 30 years only one therapeutic class has been introduced successfully to treat COPD patients. That is phosphor-diesterase-4 (PDE-4) inhibitors bronchodilators which mostly targets beta-2 adrenergic or muscarinic receptors in airway and corticosteroids are found to be current pharmacologic therapies. Since the symptoms of COPD have been reduced through the average therapy and they can also modify the risk of exacerbations but still the impact on individual patient has not been improved.

Mostly the evidence of these types of therapeutic managements comes from the large clinical trials in which the common approach follows for most of the population. In this study, we will provide the therapeutic management for the medicines used in COPD and try to improve the therapeutic efficacy in COPD for the upcoming generation.

Anemia-

Most common causes of microcytic hypo-chromic anemia are Iron deficiency anemia (IDA) and beta thalassemia trait (beta-TT). Red blood cells indices are similar in both of the cases. Therefore, it is important to diagnose and differentiate between these conditions for improvement of therapy. Measures which may be helpful in differentiate between IDA and beta-TT is serum ferritin, total iron binding capacity (TIBC), transferrin receptor levels, and hemoglobin electrophoresis.

Generally, IDA is identified with low serum iron, low transferrin saturation and high TIBC. Beta-TT is interrupt by their irrespective of hemoglobin levels and there low mean cell volume (MCV) in erythrocytosis which is confirmed by normal iron profile, hemoglobin electrophoresis. 20-60% patients of hypothyroidism are suffering from anemia as well. According to the radio isotopic analysis the degree of

anemia was found to be lower volume of plasma in hypothyroidism causing falls high levels of hemoglobin in blood.

The mal-absorption of iron and the loss of iron are described as microcytic anemia; it is caused by mal-absorption of vitamin B12, folic acid, pernicious anemia and inadequate nutrition. Generally hypothyroidism patients are 20 times more prone to pernicious anemia. Around 55% old patients with hypothyroidism were found to be affected with microcytosis that results from insufficiency of thyroid hormones with nutritive deficit. Thus, the microcytic anemia also known as uncomplicated anemia. This type of anemia adaptation is due to decreased basal metabolism.

Correlation of COPD and Anemia-

COPD is a vigorous issue portrayed through wind stream deterrent. Initiative for chronic obstructive pulmonary disease. Specify with the condition as an ailment of critical extra aspiratory impacts that may add consequential in singular patients with preventable and treatable ailment. The aspiratory segments are irreversible which described under wind stream impediment.

In COPD patients, a database study has performed which indicator of endurance in populace before weight record which also related with more hospitalization. Less fortunate visualization have seen in low hemoglobin levels patient than the typical hemoglobin levels patients of COPD. Cobleakness of COPD is a noticeable iron deficiency with a pervasiveness extending from 12.3 to 23%. Intensifications will be higher in pervasiveness which were additionally demonstrate through past contemplates.

Association of Iron Indicators and Anemia with Outcomes of Disease-

In some studies it has been found that the increased mortality and decreased quality of life and the functional capacity in the patients with anemia and COPD when compare to COPD patients who were not anemic. Anemia is correlated with increased hospital administration, healthcare costs and utilizations. Moreover, patients who are anemic tend to be sick and require medical attention, treatment and they die soon then the non anemic patients. There are three studies which have shown association with anemia and quality of life measures in COPD. One study was conducted

and appose hoc analysis was done of 2704 randomized samples of adults to evaluate that how anemia has affected health related quality of life scores. It was concluded that 495 participants suffers COPD and 7.5% of the COPD participants suffered anemia. A study was conducted on 185 patients having chronic respiratory failure and it was found that the transferrin and hemoglobin saturation were independently related to improve health related quality of life scores in COPD patients. A study was conducted on 683 stables COPD patients and it demonstrated that the presence of anemia predicted dyspnea and lower 6 min walk distance. In a study researchers found that hemoglobin ANF transferrin saturation were associated with dyspnea.

A cross-sectional study was conducted and it evaluated serum iron and lung functions. Serum iron was associated with FEV1. One study evaluating iron intake was associated with an increased risk of COPD and with predicted FEV1.

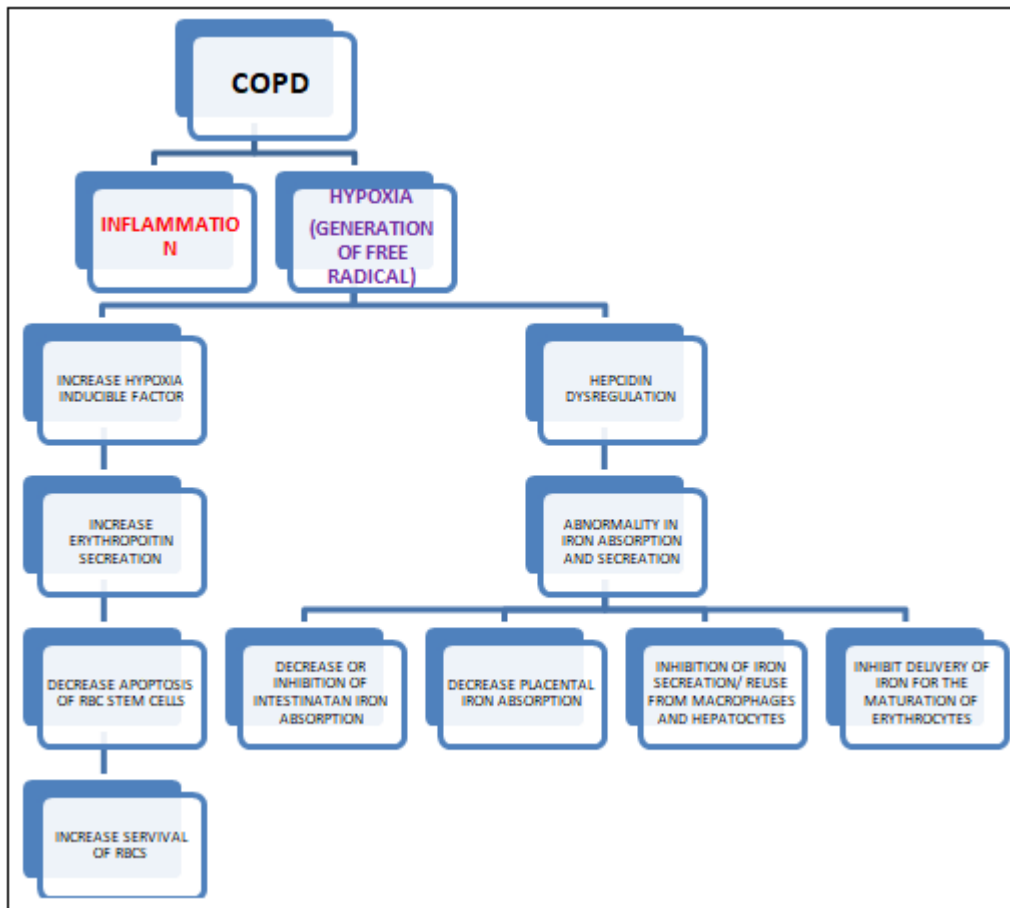
Anemia was considered as a marker for the end stage COPD cytokines was involved at different stage. The COPD patients have no specific hemoglobin conc. Levels as a cut off score to determine e which is clinically meaningful therefore the studies and the clinical surveys utilizes different anemia definitions.

Prevalence of Anemia in Chronic Obstructive Pulmonary Disease-

7.5 to 33% prevalence of anemia in COPD has been reported. Mostly these types of studies are retrospective in nature. Jhon et. al [8] notice that 13% of 101 COPD patients have anemia which are path genetically linked with the presence of inflammation. The nature of the anemia was normocytic and norm chronic on the basis of US Medicare claims database 21% of 1,32,424 patients of COPD diagnosed patients have anemia reported by Helpert et.al [9].

Shorr et.al [10] noticed in retrospective data analysis from USA that 33% of 2404 COPD patients have higher frequency of anemia. Hence, in COPD anemia is surely a common entity

An algorithmic approach for the understanding of the pathophysiology



Pathophysiology-

There are various factors or mechanisms involved in the pathophysiology of anemia in COPD like cancer drugs, kidney disease, autoimmune disorders, and other genetic disorders but the hepcidin and iron relationship is the major one. As we know COPD leads to further hypoxia and inflammation which cause dysregulation of hepcidin secretion. Hepcidin secretion dysregulation leads to inhibition of intestinal iron absorption, decreases iron delivery to maturing erythropoiesis, inhibits placental iron absorption, and inhibits the iron secretion of recycled iron from macrophages and hepatocytes.

Various studies and research strongly emphasized anemia due to the chronic disease in an immune system mediation processes like autoimmune disorders, CKD, oncological causes, etc.

2. Conclusion

Anemia and iron deficiency continue to be undervalued in most COPD clinical settings, despite affecting up to one-third of patients and having negative impact on prognosis. Prevalence of functional anemia increased during follow up-

The associations of anemia with reduced functional lung capacity and elevated inflammation may reflect a more severe COPD phenotype effects should be made to improve clinical management of anemia and iron deficiency in COPD patients as a means and achieving better patient care.

Conflict of Interest

There are no conflicts of interest regarding the publication of this paper.

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