



A CORRELATION BETWEEN SERUM MAGNESIUM LEVELS AND ACUTE EXACERBATIONS OF COPD

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ABSTRACT **BACKGROUND:** Chronic obstructive pulmonary disease (COPD) exacerbation was defined as an acute worsening of respiratory symptoms (increased dyspnea, increased cough or change in amount, and purulence of sputum) that was beyond normal day-to-day variations of symptoms. Magnesium is involved in many important functions as bronchodilation and contraction in respiratory tract smooth muscles, and others. Therefore a decrease in magnesium in level in COPD patients represents a factor which is detrimental to respiratory function as low magnesium level induces muscle fatigue. Magnesium deficiency contributes to exacerbations of COPD and asthma. **RESULTS:** Of the total 100 patients taken as a sample from King George Hospital and Government Chest Hospital, males were 79 and females were 21, of which many were smokers. Serum magnesium was considerably low in 59 patients the mean value being 1.6 and standard deviation is 0.54, and p value by independent t test was significant with $p < 0.001$. Number of exacerbations were also more in patients having hypomagnesemia with mean being 2.89 and standard deviation being 1.2. **CONCLUSIONS:** It is concluded that hypomagnesemia is associated with acute exacerbations of chronic obstructive pulmonary disease.

KEYWORDS : COPD, Exacerbations, Magnesium

INTRODUCTION:

Magnesium is involved in such important functions as bronchodilation and contraction in respiratory tract smooth muscles, mast cell stabilization, Neuro-humoral mediator release, and mucociliary clearance.

The potential mechanism for the direct relaxing effects of magnesium on bronchial smooth muscles include calcium channel blocking properties, inhibition of cholinergic neuro-Muscular Junction transmission with decreased sensibility to the depolarising action of acetylcholine, stabilization of mast cells and T lymphocytes and stimulation of nitric oxide and Prostacycline.

The prevalence of chronic bronchitis and emphysema (COPD) is high among smokers. When it affects elderly men, acute COPD exacerbations are commonly linked to several problems and hospital readmissions. This is a significant contributor to death and morbidity in elderly males.

‘There is ongoing research on the connection between recurrent COPD flare-ups and dietary magnesium shortage. Therefore, the foundation of this investigation is the correlation between serum magnesium levels and the incidence of readmissions to the hospital for acute COPD exacerbations.

MATERIALS AND METHODS:

SOURCE OF DATA

This is a study conducted in 100 patients admitted with acute exacerbation of Chronic obstructive Pulmonary Disease in King George hospital and government hospital if chest and communicable diseases, Andhra Medical College, Visakhapatnam.

STUDY DESIGN: Cross Sectional Study.

STUDY SETTING: King George hospital, Visakhapatnam.

STUDY POPULATION: Age group of more than 45.

STUDY PERIOD: July 2021 – June 2022 (1 year).

Sample size- 100

Inclusion Criteria:

1. COPD patients admitted in King George hospital and government hospital if chest and communicable diseases, Andhra Medical College, Visakhapatnam.

2. Patients who gave consent for study.
3. Patients of both genders more than 45 years.

Exclusion criteria:

1. Bronchial asthma
2. Coronary artery disease
3. COPD with Cor-pulmonale
4. COPD patients admitted for other conditions.
5. Patients who do not give consent for study.

Data collection:

Informed consent will be obtained from all patients and their attenders to be enrolled in the study. In all the patients relevant information will be collected in a pre-designed proforma. Patients with acute exacerbation should be satisfying the ANTHONISENS criteria, Progressive Dyspnea, Increased sputum purulence, Increased sputum volume. Any two of the above should be present for the patient to be classified as Acute exacerbation of COPD.

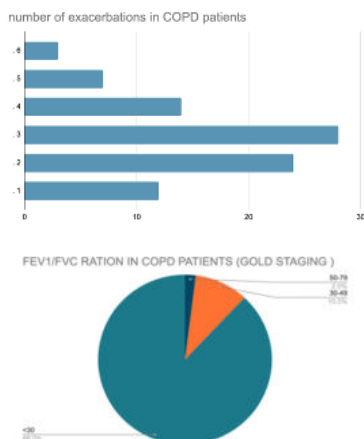
Serum Magnesium levels will be estimated in all patients at the time of Admission.

RESULTS:

- In the present study, 100 patients are included in the current study. The mean age of the patients 59.83 +/- 10.17, the mean age of males (62.34) is more than females (56.87).
- 89% of patients overall had a history of smoking.
- The proportion of the male (79%) patients was higher than the female (21%).
- Emphysema, which was detected in 41% of patients, was the most frequent finding on chest X-rays, followed by parenchymal infiltration (20%), hyperinflated lung (25%), lung consolidation (20%), and cardiomegaly (13%).
- In the current study, 59% of patients with an acute exacerbation of COPD reported having hypomagnesemia.
- In our study, hospital stays for patients with hypomagnesemia were noticeably longer than those for patients with normomagnesemia. The need for ventilator care may be one of the reasons for longer hospital stay in hypomagnesemia group.
- The overall mortality reported in the present study was 4%. The mortality rate was higher in the hypomagnesemia group (6.1%) than in the normomagnesemia group (3.5%), but the difference was not statistically significant (p-value 0.76).

S.NO	Serum Magnesium (mg/dl)	No. of patients	Percentage
1.	≤ 1.7	59	59%
2.	1.8-2.2	37	37%
3.	>2.2	4	4%

The above table describes serum magnesium levels and COPD exacerbations



SUMMARY

A total of 100 patients were taken into the study who attended out patient and got admitted in King George Hospital and Government Hospital for Chest and Communicable diseases, Andhra Medical College, Visakhapatnam. Of the total 100 patients males were 79 and females were 21, of which many were smokers.

FEV1/FVC ratio was also less in the patients with chronic obstructive lung disease of which 88% were in the category of 50-79 and 10 were in 30-49 and 2 patients were in less than 30.

Serum magnesium was considerably low in 59 patients the mean value being 1.6 and standard deviation is 0.54, and p value by independent t test was significant with $p < 0.001$.

Number of exacerbations were also more in patients having hypomagnesemia with mean being 21.89 and standard deviation being 1.2. Thus it is concluded that hypomagnesemia is associated with acute exacerbations of chronic obstructive pulmonary disease.

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