

## The significance of serum electrolyte levels as a prognostic marker in acute exacerbations of COPD – A hospital-based case control study

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### Abstract

**Background:** COPD is one of the leading causes of death in the world and has become a major issue of public health importance. With increasing in-hospital admission rates due to acute exacerbations, the emphasis is high on early diagnosis, prognostication and effective management of the primary disease and its complications. This study utilizes serum electrolytes as a prognostic marker to assess the severity of the illness and help reduce mortality rates.

**Objectives:** To assess the significance of serum electrolytes as a prognostic marker in acute exacerbations of COPD

**Methods:** 50 patients with acute exacerbations of COPD and 50 healthy COPD controls confirmed by spirometry were taken for the study and their serum sodium and potassium levels were obtained

**Results:** The electrolyte levels were analyzed and the results revealed significantly low sodium and potassium levels in patients with acute exacerbations. Also, prognosis is the form of prolonged ventilatory support and mortality was higher in the group with significant dyselectrolytemia.

**Conclusion:** This study enlightens the electrolyte abnormalities in COPD patients with acute exacerbations and their role as a prognostic marker.

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### I. Introduction:

Chronic obstructive pulmonary disease is defined as a disease state characterized by airflow limitation that is not completely reversible as confirmed by spirometry<sup>[1]</sup>. It is one of the leading causes of death in the world and has been touted to become the third leading cause of death by 2020. Overall, the prevalence of COPD in the general population is estimated to be about 1% across all ages, rising steeply to 8-10% in individuals aged 40 years or older<sup>[2]</sup>. COPD includes the clinical spectrum of chronic bronchitis, emphysema and small airway disease. An interplay of multiple risk factors, both genetic and environmental is important in the pathogenesis of COPD. In view of the high re-admission rates due to exacerbations, the social and economic burden created by COPD is extremely high<sup>[3]</sup>. Owing to the high mortality rates the need of the hour is for early diagnosis prognostication and effective treatment of the acute exacerbations of the disease.

### II. Objectives:

- To assess the significance of serum electrolyte levels as a prognostic marker in COPD patients with acute exacerbations
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### III. Methodology:

Duration of study: June 2016-December 2016

Place of study: SRM MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTRE

Sample size: 50 cases of COPD patients with acute exacerbations (confirmed by spirometry)

50 controls of healthy COPD patients (confirmed by spirometry)

Inclusion Criteria: Patients with acute exacerbations of COPD assessed clinically by history and examination and confirmed by spirometry

Exclusion Criteria:

1. COPD patients without acute exacerbations
2. Renal failure
3. Sepsis
4. Diabetic Ketoacidosis

5. Adrenocortical insufficiency
6. H/O vomiting/diarrhea/GI losses

#### IV. Methodology:

After satisfying inclusion and exclusion criteria, 50 cases and 50 controls were selected for the study and samples for serum electrolytes were obtained. Data obtained was analyzed and qualitative data analysis and significance of study parameters were done using Chi-square/Fisher Exact test.

#### V. Results:

Serum Sodium (mEq/L)	No. of Cases	% of Cases	No. of Controls	% of Controls
<130	16	32	3	6
130-135	14	28	14	28
>135	20	40	33	66
Total	50	100	50	100

P = 0.002, which implies significance

Serum Potassium (mEq/L)	No. of Cases	% of Cases	No. of Controls	% of Controls
<2.5	0	0	0	0
2.5-3.5	28	56	12	24
>3.5	22	44	38	76
Total	50	100	50	100

P = 0.002, which implies significance

Serum Sodium	No. of cases that improved with ventilation	% of cases that improved with ventilation
< 130	8	40
131-135	5	25
>135	7	35
Total	20	40

P < 0.001 indicates significance

Serum Potassium	No. of cases that improved with ventilation	% of cases that improved with ventilation
< 3	5	25
3-3.5	11	55
>3.5	4	20
Total	20	40

P < 0.001 indicates significance

In this study we aim to understand the prevalence of dyselectrolytemia with respect to sodium and potassium in cases with acute exacerbations of COPD. We found that there was significant reduction in sodium and potassium levels in cases when compared to controls. We also found that a significant number of cases with low sodium(40%) and potassium(80%) levels required the need for mechanical ventilation.

In a study by Mohan et al<sup>[4]</sup>, hyponatremia with sodium levels < 130mEq/L was found in 16.4% of the study population. In another study by Rabinovitz et al<sup>[5]</sup>, 10% of the study population had hyponatremia and was associated with high mortality rate.

#### VI. Conclusion

This study enlightens the various electrolyte abnormalities in acute COPD exacerbations and their significance as a prognostic marker in COPD. This could help in early assessment and appropriate management of exacerbations which would go a long way in reducing the high mortality rates associated with this disease.

#### References:

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