

# Electrolyte Imbalance in COVID-19 Patients

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**Abstract:** *Electrolyte disturbances in COVID-19 patients lead to severe disease condition. Coronavirus disease 2019 can be fatal in severe cases.*

**Keywords:** COVID-19, SARS-COV2, Sodium, Potassium, Calcium,

## 1. Introduction

In December 2019, a new pandemic emerged from the severe acute respiratory syndrome coronavirus2 (SARS-COV-2) which the WHO named coronavirus disease (COVID-19). Corona virus enters the host cells via angiotensin-converting enzyme 2 (ACE2) receptors, present in several organs such as the heart, liver, kidneys and lungs. ACE2 is one of the key enzymes in the Renin-Angiotensin system which has significant role in regulating fluid and electrolyte balance. Virus infection causes acute kidney injury and digestive problems. One of the most important complications of kidneys and GI involvement in COVID-19 is fluid and electrolyte disturbances. The most common disorders are hyponatremia, hypokalemia, hypocalcemia, hypochloremia, hypervolemia, and hypovolemia, untreated cases will increase the rate of mortality. Change in electrolyte levels can be a good indicator of progression of disease. The electrolyte disturbances are caused by the direct effect of the virus on infected host cells. Malfunction of the organs during the disease can cause electrolyte imbalance. The conditions such as fever, hyperventilation, sweating, drug related side effects and dietary changes may cause electrolyte imbalances in patients with COVID-19

## 2. Materials and methods

This study is aimed at investigating the electrolyte imbalance in COVID-19 patients. Internet -based literature search was done for this article. PubMed, biomed, Scopus and Google scholar databases were used to collect information. Pooled analysis was performed to estimate the levels of electrolytes such as sodium, potassium, calcium and chloride.

## 3. Results and Discussion

Due to COVID infection, impaired renal and gastrointestinal tract functions leads to fluid and electrolyte imbalances. Studies on COVID patient confirm the electrolyte disturbances including sodium, potassium, chlorine and calcium imbalances. One of the most common electrolyte disorders is hyponatremia which leads to increased mortality rate in COVID patient. Hyponatremia is a term indicating the level of sodium which is less than 135 mmol/L (reference range 135-145 mmol/L). Sodium was significantly lower in COVID patients. Drugs such as chloroquin and hydroxychloroquin, which is used for treatment of COVID patients can cause electrolyte disturbances. Potassium was also significantly lower in

COVID-19 patients. Hypokalemia is a condition in which potassium level is less than 3.5 mmol /l (Reference range 3.5-5.0 mmol/L). In COVID patients hypokalemia leads to acute respiratory distress syndrome (ARDS) and increase the risk of heart injuries in patients. Hypocalcemia is also one of the electrolyte disorders in COVID patients which increase the mortality rate. Hypocalcemia leads to neuromuscular irritability, characterized by muscle spasms, tingling in the limbs and perioral numbness. Hypochloremia is a condition in which level of chloride is less than 95 mmol/l, can increase the risk of acute kidney injury, morbidity and mortality.

## 4. Conclusion

In COVID 19, involvement of kidney and GI tract can lead to fluid and electrolyte disturbance. Abnormal serum electrolytes are correlated with COVID-19 severity and serve as good indicator of the condition and disease prognosis.

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Volume 12 Issue 4, April 2023

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