



Research Article

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Electrolyte disturbances in PCR positive COVID-19 patients

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Abstract

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as coronavirus disease 2019 (COVID-19) pandemic agent has converted a worldwide key problem. This virus is extremely infectious between individuals and has expansion quickly. The most usual complaints related to electrolytes associated with COVID-19 are hypernatremia, hyponatremia, hypocalcemia and hypokalemia. The present study aimed to investigate electrolyte disorders in PCR positive COVID-19 patients in Yazd. This cross-sectional study was done from 2020 to 2021. All patients with COVID-19 that their PCR test was positive participated in this study. Age, gender, electrolytes levels and presence or absence of underlying disease were parameters used in this research. Finally, the data were entered into SPSS software version 22 and analyzed. Findings showed that no significant relationship was found between age and changes in sodium levels. No significant association was found between age and changes in potassium levels in individuals. There was a significant correlation between age and changes in calcium levels in patients. No significant relationship was found between age and random blood sugar levels in the studied patients. Changes in electrolyte levels can be a good indicator of the progression of COVID-19. Due to the importance of serum calcium levels, if there is an underlying disease or old age of the patient, calcium rates should be applied to detect the prognosis early and help treat the patient.

Keywords: COVID-19, PCR positive, Electrolyte disorders.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) as a universal health difficult first described in 2019 (December), in the Wuhan province, China [1-3].

Initial studies of COVID-19 have created several proofs that electrolyte instabilities may also be current in patients, such as potassium, sodium, and calcium disorders [4, 4]. No particular remedy is presently obtainable and present supervision comprises helpful medical maintenance [5, 6].

Electrolyte instabilities can have significant effects not only for controlling the patient condition [7, 8], but also for recognizing pathophysiological pathways related to COVID-19, which in turn can result in novel treatment prospects [9, 10].

The most important and common disorders related to electrolytes are hypernatremia, hypocalcemia, hyponatremia and hypokalemia which if rest as uncured, create numerous difficulties for patients and even enhance mortality rate. Electrolytes disorders are more usual

in the intensive care unit and hospitalized patients. Children are also at bigger hazard for these disturbances [11-13].

According to the importance of these disorders in the COVID-19 disease, in this study we evaluated electrolyte disorders in PCR positive COVID-19 patients in Yazd.

MATERIALS AND METHODS

This cross-sectional study was performed during July 2020 to July 2021. It was approved in the ethics committee of Shahid Sadoughi University of Medical Sciences of Yazd, Iran. Oral consent was obtained from patients. All patients with COVID-19 that their PCR test was positive participated in this study.

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RESULTS

In this study, 375 patients with COVID disease (positive PCR test) were evaluated. Among 375 patients, 22 (5.9%) were under 30 years old, 198 (52.8%) were between 60 and 90 years old and 155 (41.3%) were over 60 years old. Among 375 patients studied, 165 (44%) were female and 210 (56%) were male. Among 375 patients studied, 173 (46.1%) mentioned the presence of underlying disease but 202 (53.9%) did not have any underlying disease.

Electrolyte levels in the patients have been listed in Table 1.

Table 1: Electrolyte levels in the patients

Electrolytes	Frequency (%)		
	Low level	Normal level	High level
Sodium	144 (38.4%)	225 (60%)	6 (1.6%)
Potassium	42 (11.2%)	324 (86.4%)	9 (2.4%)
Magnesium	48 (12.8%)	310 (82.7%)	17 (4.5%)
Calcium	220 (58.7%)	151 (40.3%)	4 (1.1%)
Phosphorus	4 (1.1%)	368 (98.1%)	3 (0.8%)
Albumin	84 (22.4%)	287 (76.5%)	4 (1.1%)

Also, 307 patients (81.9%) had normal random blood sugar and 68 patients (18.1%) had abnormal random blood sugar. Among 375 patients, 22 (5.9%) were under 30 years old, of which 10 (45.5%) had hyponatremia and 12 (54.5%) had normal sodium levels. Hyponatremia was not observed in samples under 30 years of age.

198 patients (52.8%) were between 30 and 60 years old, of which 75 patients (37.9%) had hyponatremia and 123 patients (62.1%) had normal sodium levels. Hyponatremia was not observed in samples aged 30 to 60 years. 155 patients (41.3%) were over 60 years of age, of which 59 (38.1%) had hyponatremia, 90 (58.1%) had normal sodium levels, and 6 (3.9%) had hypernatremia. No significant relationship was found between age and changes in sodium levels.

Among 375 patients, 22 (5.9%) were under 30 years old, of which 2 (9.1%) had hypokalemia and 20 (90.9%) had normal potassium levels. No hyperkalemia was observed in samples under 30 years of age. 198 patients (52.8%) were between 30 and 60 years old, of which 20 patients (10.1%) had hypokalemia, 172 patients (86.9%) had normal potassium levels and 6 patients (3%) had hyperkalemia. 155 patients (41.3%) were over 60 years old, of which 20 patients (12.9%) had hypokalemia, 132 patients (85.2%) had normal sodium levels and 3 patients (1.9%) had hyperkalemia.

No significant relationship was found between age and changes in potassium levels in individuals. In this study, there was a significant relationship between age and changes in calcium levels in patients.

No significant relationship was found between age and random blood sugar levels in the studied patients. Also, no significant relationship was found between sex and electrolyte changes in the patients.

Among 173 patients (46.1%) who also had underlying disease, 62 patients (35.8%) had hyponatremia, 109 patients (63%) had normal sodium levels and 2 patients (1.2%) had hypernatremia.

Among 202 patients (53.9%) who had no history of underlying disease, 82 (40.6%) had hyponatremia, 116 (57.4%) had normal sodium levels and 4 (2%) had hypernatremia.

No significant relationship was found between the underlying disease and changes in sodium levels in individuals. There was a significant relationship between gender and changes in calcium levels in individuals.

DISCUSSION

In the current study, no significant relationship was found between age and changes in sodium levels. No significant correlation was found between age and changes in potassium levels in individuals. There was a significant correlation between age and changes in calcium levels in patients. No significant relationship was found between age and random blood sugar levels in the studied patients. Also, no significant correlation was found between sex and electrolyte changes in the patients.

A study in Kermanshah, Iran assessed electrolyte disorders and sugar levels of blood in patients with COVID-19 disease who had no underlying diseases types. There was a substantial difference between the ICU and outpatient patients in terms of Na⁺, FBS, and Mg²⁺ electrolytes [14]. In the present study, no significant connection was found between age with blood sugar and potassium levels.

One study approved the occurrence of hyponatremia in almost 20% of COVID-19 patients [15]. In the present study, 38.4% of patients had hyponatremia and 1.6% had hypernatremia.

In another study, hypokalemia was a usual outcome in patients with COVID-19 [8]. In the present study, hypokalemia was observed in only 11.2% of patients.

In another study, COVID-19 patients at the time of entrance had hypocalcemia and did not have a good prediction [7]. In the present study, hypocalcemia was also detected in more than half of the patients (58.7%).

CONCLUSION

Changes in fluid and electrolyte levels can be a good indicator of the progression of COVID-19 disease. Due to the importance of serum calcium levels and its role in determining the prognosis of patients with COVID-19, if there is an underlying disease or old age of the patient, calcium levels should be used to detect the prognosis early and help treat the patient.

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Conflict of Interest

We declare that we have no conflict of interest.

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