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Rhabdomyolysis and Relative Inflammatory Markers in COVID-19 Patients

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ABSTRACT

Introduction: Rhabdomyolysis is a critical condition in which striated muscle cells break down and release their contents, such as potassium, calcium, sodium, phosphorus, and creatine phosphokinase (CPK), into the bloodstream. CPK is the most common indicator used to confirm the diagnosis of rhabdomyolysis. Previous studies have shown an association between rhabdomyolysis and certain viral infections, such as HIV, herpes, and influenza. Similarly, rhabdomyolysis has been reported in association with COVID-19 infection, as with other viral infections. While most COVID-19 patients present with mild symptoms, some severe cases have been observed, characterized by respiratory failure, shock, and multi-organ dysfunction, along with rhabdomyolysis. Rhabdomyolysis can prolong the duration of hospitalization and admission to the intensive care unit and lead to kidney involvement; therefore, it is necessary to investigate the prevalence of rhabdomyolysis in COVID-19 patients and its associated outcomes.

Methods and Materials: A cross-sectional analysis was conducted between June 23 and September 22, 2021, enrolling confirmed hospitalized COVID-19 patients with rhabdomyolysis at Al-Zahra Hospital in Isfahan. Demographic data, comorbidities, inflammatory markers, vital signs, and laboratory data were collected from patient profiles. Inclusion criteria were patients with positive COVID-19 PCR, and those with secondary causes of rhabdomyolysis were excluded. Patients with serum CPK above 1,500 U/L were diagnosed with rhabdomyolysis. Data were collected on demographic characteristics, comorbidities, health indicators, inflammatory markers, physical examination findings, and laboratory data. Patient outcomes such as mortality, intensive care unit (ICU) admission, length of hospital stay, and use of dialysis were also recorded. Quantitative data were described as mean ± standard deviation, and t-tests and Mann-Whitney U tests were used to compare means and medians between the groups.

Results: In our study of 1,954 hospitalized COVID-19 patients, 27 (1.38%) were diagnosed with rhabdomyolysis, predominantly males (70.4%), with a mean age of 52.67 years. Common comorbidities included hypertension (25.9%) and diabetes mellitus (11.1%). Laboratory findings showed that all patients had elevated initial lactate dehydrogenase (LDH) and D-dimer levels. However, only 37% had an elevated initial creatinine level, while 80% had an elevated initial C-reactive protein, which increased to 96% during hospitalization. Elevated erythrocyte sedimentation rate was observed in 85%, and 40% had decreased platelet counts. Also, 26.9% of patients were critically ill and did not survive, 70.4% were discharged home, 33.3% were admitted to the ICU, and 7.4% required dialysis during hospitalization. LDH levels in expired patients were significantly higher than in survivors ($p = 0.044$), and their first CPK levels were higher ($p = 0.026$). There was no significant difference between these two groups in other inflammatory markers.

Conclusion and Discussion: Rhabdomyolysis is a rare finding in hospitalized patients with COVID-19, with an incidence of 1.38% based on our findings. The identification of reliable biological markers could enhance diagnosis and treatment.

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