ORIGINAL ARTICLE

Serum Amylase Levels at Admission in Patients Hospitalized for COVID-19 Infection

Hastanede Yatan COVID-19 Hastalarının Serum Amilaz Düzeyleri

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Abstract

Introduction: We aimed to compare the amylase levels in hospitalized patients for COVID-19 infection, who were discharged or expired, to investigate the relationship between amylase levels and outcomes of COVID-19 infection.

Methods: In all patients having the symptoms of COVID-19, the diagnosis was established by reverse transcriptase-polymerase chain reaction. Demographic features, complete medical history, and laboratory findings of the study participants at admission are obtained from the medical records.

Results: A total of 145 patients (51 females and 94 males) were included in the study. Although liver function tests and kidney function tests were significantly different between discharged and expired patients, there was no significant difference regarding the serum amylase levels at admission. In our laboratory, the upper limit of amylase level is 100 U/L. Regarding this upper limit, 72 patients (67.3%) in the discharged group and 30 patients (78.9%) in the expired group had hyperamylasemia. There was not any significant difference between the two groups, regarding the hyperamylasemia prevalence (p=0.32).

Discussion and Conclusion: In patients hospitalized for COVID-19 infection, there was not any significant difference regarding the serum amylase levels between discharged and expired patients. We believe that serum amylase levels at admission cannot be regarded as a prognostic factor in COVID-19 patients.

Keywords: Amylase; COVID-19; COVID prognosis

Coronavirus disease 2019 (COVID-19) is an acute respiratory infectious disease caused by a novel coronavirus 2019 (SARS-CoV-2). This virus enters the human body cells through spike protein to combine with the angiotensin-converting enzyme-2 (ACE2) receptor.[1] Due to the wide distribution of ACE2 receptors all over the body, this virus potentially affects almost all systems. These receptors are also commonly present in the gastrointestinal system such as in hepatic, pancreatic, and colonic cells.[2,3] Although ACE2 receptors are highly expressed in the pancreatic tissue, the data about the pancreatic involvement in COVID-19 patients are conflicting.[4–6]

In this study, we aimed to compare the amylase levels in hospitalized patients for COVID-19 infection, who were discharged or expired, to investigate the relationship between amylase levels and outcomes of COVID-19 infection.

Materials and Methods

In this retrospective study, a total of 145 adult patients (≥18 years of age) admitted to the University Hospital and diagnosed with COVID-19 infection and hospitalized for the treatment between November 2019 and February 2020 were enrolled. The research was carried out in accordance with the conditions of the declaration of Helsinki and approved by the local ethics committee (Decision number: 2021/065).

In all patients having the symptoms of COVID-19, the diagnosis was established by reverse transcriptase-polymerase chain reaction. Demographic features, complete medical history, and laboratory findings of the study participants at admission were obtained from the medical records. Patients drinking alcohol, diagnosed with acute or chronic pancreatitis before, or having any known malignancy were excluded from the study.

The patients were grouped into two groups according to the outcome as discharged or expired during the course of the disease. The age, gender, comorbid diseases, and smoking habits of the patients were recorded with the outcomes of the disease. Patients with missing data were not included in the study.

Statistical Analyses

All statistical analyses were performed using SPSS version 22.0 software (Chicago, IL, USA). Descriptive statistics are presented as numbers and percentages for categorical variables and mean±standard deviation for continuous variables. The distribution of continuous variables was assessed with the Kolmogorov–Smirnov test. Chi-squared tests were used for the comparison of categorical variables in independent groups. The Mann–Whitney U test was used for comparative analysis between the two independent groups. P<0.05 was considered statistically significant.

Table 1. Demographic features of the study participants

	Discharged (n=107)	Expired (n=38)	p
Gender (F/M)	37/70	14/24	0.78
Age (years)	55.51±19.18	57.26±12.53	0.09
Smoking	32 (29.9%)	20 (52.6%)	**0.02**

F: Female; M: Male.

Table 2. Laboratory data of study participants at admission

	Discharged (n=107)	Expired (n=38)	p
AST (U/L)	26.81±18.17	125.82±36.33	**0.001**
ALT (U/L)	32.65±23.61	73.87±25.26	**0.001**
GGT (U/L)	30.14±14.27	64.46±24.69	**0.001**
Amylase	137.18±50.13	147.30±47.80	0.26
Creatinine (mg/dL)	0.94±0.23	1.31±0.75	**0.001**
D-dimer (ng/mL)	821.85±269.43	2806.71±743.30	**0.001**

AST: Aspartate aminotransferase; ALT: Alanine aminotransferase; GGT: Gamma-glutamyl transferase.

Results

A total of 145 patients (51 females and 94 males) were included in the study. Demographic features of the study participants are summarized in Table 1.

Laboratory data evaluated at admission of patients are summarized in Table 2. Although liver function tests and kidney function tests were significantly different between discharged and expired patients, there was no significant difference regarding the serum amylase levels at admission.

In our laboratory, the upper limit of amylase level is 100 U/L. Regarding this upper limit, 72 patients (67.3%) in the discharged group and 30 patients (78.9%) in the expired group had hyperamylasemia. There was not any significant difference between the two groups, regarding the hyperamylasemia prevalence (p=0.32).

Discussion

In this study, we analyzed the serum amylase levels at admission in patients hospitalized for COVID-19 infection, and we did not determine any significant difference between discharged and expired patients in serum amylase levels.

In the previous literature, there are some data regarding the importance of serum amylase levels in COVID-19 patients. In a recent study, peripancreatic fat stranding or

fluid collection and elevated amylase levels were reported to be more common in patients with COVID-19 infection.[7] Moreover, in a retrospective cohort study, the ratio of hyperamylasemia was reported as 12.9% and elevated serum amylase level was independently associated with adverse clinical outcomes in COVID-19 patients.[8] Ding et al.[3] reported that 29 of 55 COVID-19 patients hospitalized in the intensive care unit were having elevated pancreatic enzymes, and increased pancreatic enzymes levels were associated with poor prognosis. Bansal et al.[9] reported that, although hyperamylasemia was determined in 33% of the patients, serum amylase or lipase did not correlate with the severity of COVID-19 or its mortality. Liu et al.[10] reported that increased serum amylase and lipase levels were determined more commonly in severe cases compared with the mild COVID-19 patients. In contrast, we did not determine any significant difference between discharged and expired patients hospitalized for COVID-19 infection.

It is clearly known that elevated serum amylase levels are not directly associated with pancreatic injury. Both pancreas and salivary glands secrete amylase, and hyperamylasemia is the end result of the balance between its synthesis and clearance from the blood.[11,12] In this study, we did not determine any significant difference between discharged and expired groups, regarding the hyperamylasemia prevalence. However, it should be emphasized that, in both groups in our study, hyperamylasemia prevalence was high.

In this study, we determined that liver and renal function tests were significantly higher in the expired group compared with the discharged group. Previously, liver function tests were defined as the prognostic factor in COVID-19 infections.[13–15] Similarly, elevated renal function tests were also determined as the worse prognostic factor in COVID-19 patients.[16,17]

There are some limitations of this study. First, this is a single-center study, and the number of patients included in the study is low. Second, we did not analyze the pancreatic amylase levels, which is more specific for the pancreatic gland. And finally, we did not evaluate the pancreatic gland involvement in these patients with any radiological method such as computerized tomography.

In conclusion, in patients hospitalized for COVID-19 infection, there was not any significant difference regarding the serum amylase levels between discharged and expired patients. We believe that serum amylase levels at admission cannot be regarded as a prognostic factor in COVID-19 patients. Larger, multicentric studies are warranted, to determine the pancreatic gland involvement in COVID-19 infection.

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