

## **Evaluation the frequency of liver enzymes abnormalities, CRP and Ferritin in patients with COVID-19**

### **Abstract**

**Background:** A number of reports have indicated that more than half of patients with COVID-19 showed varying levels of liver disease. Patients with abnormal liver tests were at higher risk of progressing to severe COVID-19 and are also more likely to have a poorer prognosis. The initial abnormal results of blood and biochemical tests can be used as a predictor of the severity of the disease in the following days of hospitalization.

**Aim:** This study aimed to evaluate the frequency of liver enzyme abnormalities in hospitalized patients with COVID-19, it is possible to understand the relationship between liver enzyme abnormalities and the severity of the disease in the following days of hospitalization, and can also be identify the liver enzyme abnormalities as an effective factor in the prognosis of COVID-19.

**Materials and methods:** This descriptive cross-sectional retrospective study was executed from March to August 2020 in all patients with COVID-19 admitted to Imam Khomeini Hospital, Ardabil. The inclusion criteria were all patients hospitalized in the corona wards whose real-time PCR test was positive for COVID-19 or diagnosed based on CT scan findings consistent with COVID-19 based on national guidelines. The checklist including demographic characteristics, primary tests, disease severity, and final disease outcome were collected from hospital information system (HIS) and documents and imported into SPSS version 21 software, results were analyzed using Chi-Square Test with  $P < 0.05$ .

**Results:** 2236 patients with COVID-19 with a mean age of  $60.15 \pm 17.20$  years, of which 1219 were men (54.5%) and 1017 were women (45.5%) were studied. The results of the current study revealed that 1794 patients (80.2%) recovered and 442 patients (19.8%) died. The most common comorbidities in patients with COVID-19 were hypertension (41.7%), diabetes (28.9%), and cardiovascular disease (22.0%), respectively. The most common clinical symptoms in patients with COVID-19 were dyspepsia (81.5%), fatigue (50.1%), and cough (48.4%), respectively. The levels of ALT, AST and Ferritin, and to a lesser extent ALP, increased in patients with COVID-19. ALT, AST and Ferritin levels in men was significantly higher than women ( $P=0.00$ ), but high level of ALP was not significantly related to gender. Also, high level of ALT in patients younger than 65 years were significantly more ( $P=0.00$ ), but ALP levels was higher in older age patients ( $P=0.020$ ). No significant relation was found between high level of AST and Ferritin with age of patients ( $P>0.05$ ). high level of ALT in patients without comorbidity ( $P=0.001$ ) and high level of ALP in patients with comorbidity ( $P=0.021$ ) were significantly more. No significant relation was found between AST and Ferritin with comorbidities ( $P>0.05$ ). ALT, AST, Ferritin and ALP levels were significantly higher in the fatal group ( $P<0.05$ ).

**Conclusion:** The results of the study suggested that most of the hospitalized patients with COVID-19 were men and younger than 65 years old. Also, comorbidities can be considered as an independent risk factor associated with increased risk of infection by SARS-CoV-2. Considering the slight increase in ALP level, despite the overexpression of ACE2 in cholangiocytes compared to hepatocytes, it can be concluded that the direct effect of SARS-CoV-2 on liver injury is insignificant and often related to multiple factors, including systemic inflammation, cytokine storm, and etc. high levels of ALT, AST, Ferritin and male gender can be identified as negative indicator of disease severity and

mortality in patients with COVID-19, and should be considered as determinants of poor prognosis.

**Keywords:** COVID-19 , Aspartate aminotransferase (AST) , Alanine transaminase (ALT) , Alkaline phosphatase (ALP) , C-reactive protein (CRP) , Ferritin