investigate the effect of expiratory time constant (RCEXP) on the course of treatment and duration of mechanical ventilation in patients with acute respiratory failure hospitalized In the intensive care unit of Imam Khomeini Hospital in Ardabil

Background: The coronavirus disease 2019 (COVID-19) has a high prevalence and mortality worldwide. Thousands of patients with acute respiratory failure caused by COVID-19 are daily hospitalized in intensive care units around the world. Many of these patients require full mechanical respiratory support and long-term ventilator use. Using different ventilators and calculating important variables can be helpful in meeting therapeutic needs of patients.

Aim: The aim of present study was to investigate the effect of expiratory time constant (RCEXP) on the course of treatment and duration of mechanical ventilation in patients with acute respiratory failure hospitalized in ICU.

Materials and Methods: The present cross-sectional study was conducted on 60 patients with acute respiratory failure who were hospitalized in the ICU and underwent mechanical ventilation due to COVID-19 in the first six months of 2020. The variables of RCEXP, lung compliance and lung resistance in all patients were recorded daily and analyzed. Then, based on clinical outcome, the patients were divided into two groups: the patients with wean outcome (N = 40) and those with death outcome (N = 20).

Results: The mean ± SD of lung compliance in patients who were separated from ventilator and patients with death outcome were 74.73 (18.58) mL/cm H_2O and 36.92 (10.56) mL/cm H_2O, respectively, which was statistically significant (P = 0.001). The mean ± SD of lung resistance in patients who were separated from ventilator and patients with death outcome were calculated at 9.25 (4.62) and 14 (6.5), respectively, which was statistically significant (P = 0.015). Also, there was a statistically significant difference between the two groups in terms of mean ± SD of RCEXP (0.67 (0.23) vs. 0.49 (0.19), P = 0.010).

Conclusions: According to the results of this study, there was a significant difference between high resistance, low compliance, RCEXP, and weaning success of intubation in patients hospitalized in the ICU.

Key words: **Compliance ,Resistance,** Ventilator