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Short research communication

Babak Sayad[1] and Zohreh Rahimi[2,3]

[1]Infectious Diseases Research Center, Kermanshah University of Medical Sciences, Kermanshah, Islamic Republic of Iran. [2]Fertility and Infertility Research Center, Health Technology Institute, Kermanshah University of Medical Sciences, Kermanshah, Islamic Republic of Iran. [3]Department of Clinical Biochemistry, Kermanshah University of Medical Sciences, Kermanshah, Islamic Republic of Iran. (Correspondence to: Zohreh Rahimi: zrahimi@kums.ac.ir; rahimizus@yahoo.com).

Abstract

Background: Infection with coronavirus disease 2019 (COVID-19) could be complicated with coagulopathy and high risk of thromboembolic events.

Aims: The main aim of the present study was to find the coagulation profile of intensive care unit (ICU) admitted patients with COVID-19 from Kermanshah, Islamic Republic of Iran.

Methods: Coagulation parameters were analyzed using appropriate methods in 74 patients (24 patients aged

COVID-19) historically admitted to the ICU.

Results: Forty-two percent of patients had abnormal prothrombin time and international normalized ratio. The rates of mortality and comorbidity in patients aged ≥ 60 years were 73.7% and 78.4% compared to 26.3% and 21.6%, respectively, in patients aged

Conclusion: We found an abnormal pattern of coagulation parameters and association of advanced age and comorbidities with a high rate of mortality in severe COVID-19 patients, which should be taken into consideration in their hospital management.

Keywords: COVID-19, coagulation, prothrombin time, international normalized ratio, D-dimer, mortality

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Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that is responsible for coronavirus disease 2019 (COVID-19) resulted in systemic inflammatory response and imbalance between homeostatic mechanisms of procoagulant and anticoagulant. Moreover, it is complicated with thrombotic complications (1). In response to COVID-19 infection, activation of T cells along with massive production and release of cytokines occur with subsequent damage to internal organs, and primarily the lungs (2). Around 40% of hospitalized patients with COVID-19 are at a high risk of development of venous thromboembolism (VTE) (3). Among non-intensive care unit (ICU) COVID-19 French patients receiving thromboprophylaxis, the incidence of VTE and pulmonary embolism were 22.5% and 10%, respectively (4). Abnormal coagulation factors in Chinese patients with COVID-19 were associated with poor prognosis (5). In a number of studies (but not all) in-hospital death was associated with high level of D-dimer (> 1µg/ml) on admission (6).

There is an association between age and clinical severity of COVID-19 in patients aged ≥ 60

years, who demonstrate heavier clinical manifestations, higher severity and longer disease courses compared to patients aged

There is no available study related to the evaluation of coagulation parameters in COVID-19 patients from the Islamic Republic of Iran. Kermanshah Province in the west of the country borders Iraq and has extensive communication with the Iraqi Kurdistan region, which could be a challenge in disease control. More comparison of reports from various populations related to the clinical course, outcome of COVID-19 and blood coagulation profile in these patients are necessary to help the management and treatment of the disease.

Aims

The aims of the present study were to find the coagulation profile of 74 consecutive ICU-admitted patients with COVID-19 from Kermanshah Province, Islamic Republic of Iran, and to determine the influence of age and comorbidities on the level of these parameters. In addition, we aimed to compare coagulation parameters between survivors and non-survivors to detect their effects on the severity and outcome of the disease.

Methods

We studied 74 consecutive patients with confirmed COVID-19 admitted to the ICU of Farabi Hospital of Kermanshah University of Medical Sciences, being the second referral centre of COVID-19 in Kermanshah Province, from 7 March to 12 May 12, 2020. Patients consisted of 44 males and 30 females with a mean age of 65.1±17.1 years. There were 50 patients (67.6%) aged 60 years or older and 24 patients (32.4%) aged less than 60 years. Diagnosis of COVID-19 was made according to the chest CT scan and/or real time PCR. The samples for coagulation tests were collected at hospital admission. The prothrombin time (PT), aPTT, fibrinogen, and international normalized ratio (INR) were measured using Coatron M2 coagulation analyzer (TECO Medical Instruments, Germany). D-dimer was measured by a Siemens device (Germany) using chemiluminescence method. Although our research was an observational study, verbal consent was obtained from patients or from next-of-kin.

A two-tailed student’s t-test and ANOVA were used to compare quantitative data between groups. Using the $\chi 2$ test the categorical variables were compared between groups. The quantitative data were expressed as Mean±SD. P-value **Ethics approval**

The Ethics Committee of Kermanshah University of Medical Sciences approved the study (Ethics code: IR.KUMS.REC.1399.049) and the study was in accordance with the principles of the Declaration of Helsinki II.

Results

Twenty-six out of 74 patients (35.1%) required tracheal intubation (64.1% non-survivors and 2.9% survivors, P Table 1 indicates the levels of coagulation factors measured at admission in studied patients. Lower platelet (PLT) count was detected among non-survivors compared to survivors; in addition, patients with comorbidities had lower PLT count than patients without comorbidities (Table 1). Two (one male and one female, 70 and 68 years old, respectively) out of three patients with PLT count ≤36 ×103/μL died. Twenty-two patients (around 30%), had thrombocytopenia (PLT