



Medical care of patients in the emergency department of the Military Medical Academy in Belgrade during the epidemic of COVID-19

Zbrinjavanje pacijenata u Centru hitne pomoći Vojnomedicinske akademije u Beogradu tokom epidemije COVID-19

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Introduction

A coronavirus is a group of single-stranded RNA viruses that cause respiratory tract infections ^{1, 2}. The first case of the coronavirus disease 2019 (COVID-19), caused by a severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was recognized in December 2019 in Wuhan (Hubei Province, China) ^{3, 4}.

The first case of the infection caused by SARS-CoV-2 recorded in Serbia was on March 6, 2020 ⁵. Therefore, the COVID-19 Infection Disease Crisis Response Team was formed on March 13. The team was formed in order to ensure timely and coordinated treatment and undertaking of activities of the competent authorities, services, and organizations, as well as other entities related to the control of COVID-19. All activities at the Military Medical Academy (MMA) in Belgrade were in accordance with it since then.

After that, the number of infected and sick patients began to grow rapidly. Hence, on March 15, the Government of the Republic of Serbia imposed a state of emergency in the entire country ⁶. Most hospitals were dedicated to treating patients with COVID-19, while certain hospitals were

oriented to taking care of the remaining patients with other acute and chronic diseases.

After introducing the state of emergency, due to the central ventilation system, the MMA was assigned to provide all specialist healthcare services during the COVID-19 outbreak, except for infectious diseases patients ^{7, 8}.

This work organization also required an urgent transfer of the work regime to the daily twenty-four-hour duty. In order to protect our patients admitted to the hospital from the danger of potential entry of COVID-19 patients, the field hospital (admission-triage tent) has been set up in front of the entrance of the MMA Emergency Center. The field hospital is like a triage center where all patients must first pass through this center before entering the MMA (Figures 1 and 2). The medical triage is performed by the on-duty medical staff headed by a doctor based on information obtained from the patients' initial interview and examination. If they suspect a possible COVID-19 case patient, based on the clinical picture (fever, shortness of breath, chest pain, dry cough, changes in senses of taste and smell, stomach problems), a rapid serological test for COVID-19 is required, as well as an X-ray of the lungs and heart and laboratory



Fig. 1 – Admission-triage tent in front of the entrance to the Military Medical Academy Emergency Center during the fight against the coronavirus disease 2019 (COVID-19).



Fig. 2 – Inside the admission-triage tent in front of the entrance to the Military Medical Academy Emergency Center during the fight against the coronavirus disease 2019 (COVID-19).

analysis [complete blood count, sedimentation, lactate dehydrogenase (LDH), C-reactive protein (CRP), ferritin, D-dimer]^{9–11}. After that, based on the results, these patients were referred further to the Emergency Center of the MMA for examination, or if the patients were febrile and had at least one of the other signs in favor of COVID-19, then they were further referred to the Infectious Diseases Clinic of the MMA where they were treated until the polymerase chain reaction (PCR) test for SARS CoV-2 result arrived. In the case of a positive PCR test, a COVID-19 patient was transferred to the Clinical Center of Serbia, the main triage

clinic designated exclusively for managing COVID-19 patients. A negative test did not rule out a subsequent development of COVID-19, and, therefore, infection control precautions were continued during the incubation period, despite the negative result.

This current topic presented the provision of healthcare at the MMA in Belgrade starting from the introduction of the state of emergency onwards.

From March 16 to July 31, 2020, a total number of 39,249 patients passed through the admission-triage tent, set up at the entrance to the Emergency Center of the MMA, i.e.

Table 1

Number of patients treated at the Military Medical Academy Emergency Center during the period of the coronavirus disease 2019 (COVID-19) spread (16/03/2020–31/07/2020) and during the same period in previous year (16/03/2019–31/07/2019)

Parameter	From 16th March to 31th July	
	2019	2020
Number of patients in the admission – triage tent	–	39,249
Number of patients treated		
civil insured	13,275	24,158
military insured	6,497	4,411
Total number of patients treated	19,772	28,569
Number of hospital admissions		
civil insured	1,952	3,429
military insured	1,081	853
Total number of hospital admissions	3,033	4,282

285 patients on average per day (Table 1). On the other hand, a total number of 28,569 patients was treated at the Emergency Center of the MMA in the same period (from March 16 to July 31, 2020). Compared with the same period in 2019, during which a total of 19,772 patients were treated in the Emergency Center of the MMA, an increase of 44.49% was seen. Prior to the period of the state of emergency, the MMA was open for emergencies on the territory of Belgrade only on Wednesdays, while on other days, only first aid was provided to military insured persons. Since the introduction of the state of emergency, military insured persons have come to the MMA Emergency Center less often compared to the same period in 2019 (decrease by 32.11%) because they were mostly taken care of at the military medical centers. In contrast, the number of civilians who got first aid increased significantly. Table 1 shows that the number of civilians, who got first aid, almost doubled in that period (an increase of 81.98%). These data covered a period of 138 days, therefore, during this period an average of 207 patients per day were taken care of, while during the same period last year, 143 patients per day were taken care of. Otherwise, the MMA Emergency Center is designed to receive and examine about 100–130 patients per day. On the other hand, out of the total number of examined patients in the Emergency Center of the MMA during the analyzed period in 2019, 15.34%

of patients were hospitalized, while that percentage was 14.99% in 2020. However, the number of hospitalized patients among civilian insured persons increased by 75.66%, while among the military insured persons, the number decreased by 21.09%.

According to the testing recommendations of the COVID-19 Infection Disease Crisis Response Team, we used a COVID-19 rapid serology antibody test SARS-CoV-2 coupled with a reverse transcription PCR (RT-PCR) swab test to provide a more complete picture of the COVID-19 in our patients. In these circumstances, with the growing of COVID-19 pandemic and shortages of laboratory-based molecular testing capacity and reagents, the rapid point-of-care serological assay, cheap and simple enough to be afforded by the MMA, if used correctly (with the knowledge on their limited sensitivity at an early stage, when the host has not yet developed specific antibodies), was allowed, thus enlarging the spectrum of the tested population. We also took into consideration that the World Health Organization (WHO) did not recommend the use of antibody-detecting rapid diagnostic tests for patient care purposes but encourages their continuous usage in order to establish their usefulness in disease surveillance and epidemiologic research¹².

During the observed period, we took specimens (whole blood) for rapid serologic tests from 5,202 patients treated at the Emergency Center of the MMA (Figure 3). IgM was detected in

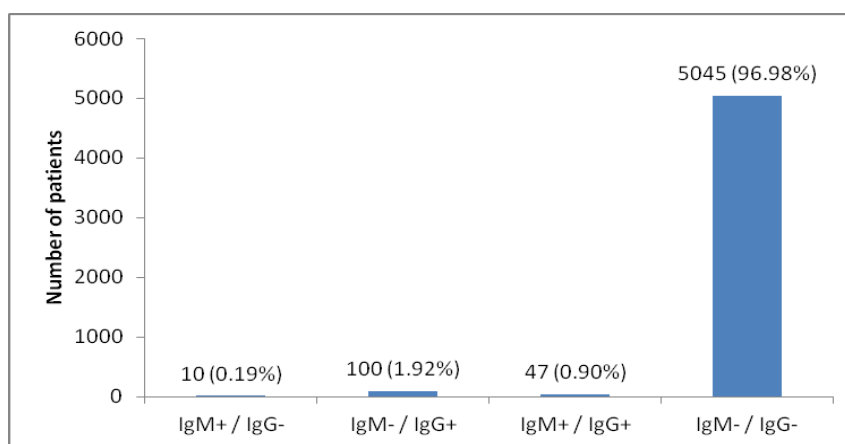


Fig. 3 – Number of patients tested with rapid serology antibody test for severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) at the Military Medical Academy during the period from 16/03/2020 to 31/07/2020.

10 (0.2%) patients and IgG was detected in 100 (1.9%) patients. IgM and IgG were positive in 47 (0.9%) patients.

The presence of SARS-CoV-2 using the RT-PCR method was confirmed in 95 of 1,096 hospitalized patients at the National Referent Laboratory “Torlak Institute of Virology, Vaccines, and Serums” in Belgrade. The largest number of tested and confirmed COVID patients, 32 (16.0%) PCR positive patients of 200 tested, were hospitalized at the Clinic for Infectious and Tropical Diseases of the MMA.

The coronavirus infection is a great challenge for the whole society and every health institution. The care of such patients requires large financial allocations for institutions that deal with COVID-19 patients. However, the facilities that treat all other patients are under great pressure, as they have to take care of all other patients, treated on all levels of healthcare with a wide variety of comorbidities. One of the additional pressures that the healthcare workers had was the constant wearing of protective equipment (goggles, masks, gloves, hats, tights, face shields, hazmat suits, coveralls), increased disinfection, and maintaining social distance during the rest period^{13–15}. All this further complicates the work of the medical staff, because the patient's health condition, protection from COVID-19 infection, economical but correct use of the protective equipment, and the possibility of making omissions must be considered the entire time.

Considering COVID-19 and the previous knowledge about the modes of transmission of SARS-CoV-2, healthcare facilities need to provide care for all patients and healthcare personnel in the safest way possible and at the appropriate level, regardless of the fact whether the patients need outpatient care, emergency center care, inpatient care, or intensive care. At the MMA, preparations for preventing and controlling COVID-19 began immediately after the WHO Director-General declared that the outbreak constitutes a Public Health Emergency of International Concern, in early February 2020. In the preparations, we used the recommendations of the WHO¹⁶, European Center for Disease Control and Prevention (ECDC)¹⁷, and Centers for Disease and Control Prevention (CDC)¹⁸. The experiences of the expert team from China were also implemented¹⁹. At all times, we followed the additions and the new announcements of the aforementioned bodies. A massive load was on the trainee specialist physicians who worked all the time on the triage of patients. Five basic principles were used in the prevention and control of COVID-19 at the MMA:

1. Screening and triage for early recognition of patients with suspected COVID-19 and rapid implementation of source control measures were done in all departments of the MMA.
2. Applying standard precautions in the care of all patients treated at the MMA. These measures were used when providing care to all patients, whether or not they appear infectious or symptomatic: hand hygiene before and after all patient contacts; consistent use of personal protective equipment, which included gloves, gowns, masks (medical or FFP2 depending on the type of activities), face shields or eye protection, respiratory hygiene/cough etiquette, needlestick and sharps injury prevention, cleaning and disinfection, reprocessing of instruments and equipment, regular waste disposal and safe injection practices.
3. Implementing additional precautions (Contact Precautions, Droplet Precautions, and Airborne Precautions) which were used in addition to the standard precautions. Special prevention measures were applied during the performance of aerosol generating procedures.
4. Implementing administrative measures which were included: the education of healthcare workers upon early recognition and diagnosis of COVID-19, education on the proper use of personal protective equipment (PPE), providing sufficient quantities of quality PPE, ensuring access to laboratory testing for COVID-19 detection, prevention of overcrowding, especially in the emergency center, etc.
5. Implementing environmental and engineering measures which were included: adequate ventilation according to specific areas at the MMA, spatial separation, adapted structural design, as well as adequate environmental cleaning and disinfection.

Conclusion

Data presented can serve as a good basis for further healthcare planning, considering that the number of patients infected with SARS-CoV 2 is again increasing, both in the world and in Serbia. Additionally, based on these data, new measures can be planned, which implies that the MMA, together with the Clinical Center of Serbia, are marked as hospitals that provide all specialist healthcare services, except for COVID-19 patients on the territory of Belgrade, while all other hospitals in Belgrade are dedicated to treating patients with COVID-19.

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