Burn Care Strategies and Precautions in the Care of 698 Burn Patients During the 15-Month COVID-19 Period in Our Burn Center

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ABSTRACT

OBJECTIVES: The novel 2019 coronavirus disease (COVID-19) was detected for the first time in China and quickly spread globally. Because of its high contagiousness, disruptions occurred in the activities of many health care providers. However, a delay of care for patients with burn injuries is unacceptable. Here, we assessed our burn care strategies and precautions during the COVID-19 pandemic.

MATERIALS AND METHODS: Since the start of the pandemic in our country and up to now (March 2020 to August 2021), we have successfully treated 698 patients with burn injuries. We created a 3-degree protection protocol. We also isolated patients who were diagnosed or suspected of having COVID-19 by reducing the number of beds.

RESULTS: Of 698 burn patients, 411 were male and 287 were female patients. There were 452 adult and 246 pediatric patients, with 591 of total patients treated as outpatients and 107 who were hospitalized. The patients were mostly injured by scalding burns. Mean total burn surface area of hospitalized patients was 26.2% in adult patients and 9.8% in pediatric patients. We diagnosed only 2 patients with COVID-19. Both patients were successfully treated and discharged.

CONCLUSIONS: If burn centers create protection protocols, disruptions can be minimized so that necessary and successfully care to burn patients is provided, even during pandemic periods.

KEY WORDS: *Isolation, Pandemic, SARS-CoV-2*

INTRODUCTION

The 2019 coronavirus disease (COVID-19), which was first detected in Wuhan, China in December 2019 and caused by SARS-CoV-2, continues to have devastating effects in the world.[1] According to data from the World Health Organization (WHO), so far, more than 250 million people worldwide have been affected by this disease and more than 5 million people have died due to COVID-19.[2] For this reason, it has become necessary to take precautions in the fields of health as well as in social and economic fields.

To prevent the spread of this disease, it is recommended that people be isolated at home as much as possible and not be in crowded areas. In addition, some procedures, such as elective examinations and surgeries, should be postponed in order to avoid overcrowding in hospitals.[3] However, burn injuries are an emergency that should be treated as soon as possible.[4] According to WHO data, an average of 11 million people worldwide present with burns annually requiring medical treatment, and an average of 180 000 people die from burns.[5] With these considerations, it is both necessary to prevent the spread of COVID-19 and to treat burn injuries promptly and completely. In this study, we described our experience and the precautions we took during a 15-month pandemic period in our burn center.

MATERIALS AND METHODS

The first burn center in our country was established in July 1975 by our team at Hacettepe University, and the Başkent University Burn Center was established in 1993 by the same team. Our burn center consists of an outpatient clinic, 4 rooms in a semi-sterile area with 2 beds in each,

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an operating room in a sterile area, and an intensive care unit with a total of 5 beds, 1 of which is completely isolated. During the 15-month pandemic period to date in our country (March 2020 to August 2021), 698 patients were successfully treated at our burn center. During this period, 2 of our patients were diagnosed with COVID-19 and were discharged after completion of treatment without any spread.

For patients seen at our burn center, patient placement is first decided in the treatment areas. Before entering the burn center, patients undergo measurement of temperatures and are questioned on COVID-19 symptoms. If hospitalization is necessary for the patient, a COVID-19 polymerase chain reaction (PCR) test and, if possible, a thorax computed tomography scan are performed before hospitalization. In addition, a second PCR test is performed 24 hours after hospitalization. Entry of visitors is strictly not permitted, except for mandatory cases. Outpatient clinics are ventilated with fresh air for 10 minutes after each examination, and all equipment is disinfected with 5.25% sodium hypochlorite at a 1/100 concentration. During the pandemic period, the bed capacity of all patient rooms in the semi-sterile area was halved, ensuring that the patient in each room was completely isolated during treatment. The number of beds in the sterile area was also reduced by half, thus ensuring a safe distance between patients. We limited the number of team members entering the patient room for examination and for examination and in multidisciplinary rounds to 2 people.

We have developed a specific 3-degree protection protocol for our staff members. We used first-degree protection in patients with burn injuries less than 25% total burn surface area (TBSA) and not suspected of having COVID-19. In patients with burn injuries greater than 25% TBSA and not suspected of having COVID-19, we used second-degree protection. We used third-degree protection for treatment and surgical procedures in patients who were suspected of COVID-19 or diagnosed with COVID-19 (Figure 1, Table 1).

TABLE 1. Equipment Used in Protection Protocols

	First-Degree Protection	Second-Degree Protection	Third-Degree Protection
Hand hygiene	+	+	+
Surgeon cap	+	+	+
Operation mask	+	-	-
Medical rubber gloves	+	+	-
Scrubs	+	+	-
Isolation clothes	+*	+	-
N-95 face mask	-	+	+
Protective goggles	-	+	+
Special protective coverall	-	-	+
Double medical rubber gloves	-	-	+

*Bedside procedures (wound dressing, central line catheter placement, etc.)

FIGURE 1. Third-Degree Protection of Health Care Givers

Statistical analyses

The chi-square or Fisher exact test was used for data analysis. Qualitative variables are presented as frequencies, and quantitative variables are expressed as means ± SD. $P < .05$ was considered statistically significant.

RESULTS

We have successfully treated a total of 698 burn injury patients in our burn center during a 15-month period since the start of the pandemic period in our country. Of these patients, 452 (64.7%) were adults and 246 (35.3%) were pediatric patients.

Mean age of adult patients was 41.77 ± 1.08 years. Of the adult patients, 268 were male and 184 were female patient. In addition, 371 of the adult patients were treated as outpatients, whereas 81 of them were hospitalized. For adults, mean length of hospital stay was 16.1 days. Average age of pediatric patients was 4.35 years. Of these patients, 143 were male and 103 were female patients. Among pediatric patients, 220 were treated as outpatients and 26 were hospitalized; length of hospital stay of the hospitalized patients was 5.7 days (Table 2).

The mean TBSA of adult patients was 4.33% in outpatients and 26.2% in hospitalized patients. When we evaluated the causes of burn injuries, we found that the most common cause in adults was scalding burn (51.7%). In pediatric patients, the mean TBSA was 1.87% in outpatients and 9.82% in hospitalized patients. The most common cause of burn injury in pediatric patients was scalding (78.8%; Table 3).

During the 15-month pandemic period, 2 patients were diagnosed with COVID-19. Both patients were men (ages of 57 and 30 years, respectively). Causes of burn injuries in these 2 patients were flame and explosion, and their TBSA results were 35% and 53%, respectively. As soon as both patients were diagnosed with COVID-19, favipiravir treatment was started in addition to burn treatment. In addition, a third-degree protection protocol was applied throughout the treatment period. The patients were successfully discharged without any spread on day 47 and day 30, respectively.

TABLE 2. Demographic Characteristics of Patients Seen During the 15-Month Pandemic Period at Our Burn Center

	Adult Patients (n = 452)	Pediatric Patients (n = 246)
Age, years	41.77 ± 1.08	4.35 ± 0.34
Sex, No.		
Male	268	143
Female	184	103
Outpatient, No.	371	220
Hospitalized, No.	81	26
Length of hospital stay, days	16.1 ± 2.86	5.7 ± 1.4

DISCUSSION

In this study, we described the precautions that we took and our treatment experiences during the 15-month pandemic period in our burn center. We have shown that successful burn injury treatment can be continued when necessary precautions are taken.

With the declaration of COVID-19 by the WHO, it has become necessary to take some urgent precautions in the field of health all over the world. One of the first precautions taken was to reduce hospital admissions and postpone elective surgical procedures, since COVID-19 is transmitted through the respiratory tract and is easy to transmit.[6] However, burn injuries, especially those with a TBSA of more than 20%, are severe traumas that need to be treated as quickly as possible.[7] It frequently occurs with systemic problems, such as inhalation injury and cardiac arrhythmias, as well as tissue traumas, especially in patients who have severe burns.[8]

Social isolation is one of the most common precautions practiced globally during the pandemic period. Social isolation aims to reduce transmission by minimizing contact among people.[9] At our burn center, we ensured that our patients were isolated from each other. In our center, we treated only 1 patient per room. We also used separate sterile materials for each patient. After each patient's treatment, all team members who had contact with the patient replaced their personal protective equipment with new ones.

TABLE 3. Total Body Surface Area and Burn Injury Causes in Study Patients

	Adult Patients	Pediatric Patients
TBSA (outpatient), %	4.33 ± 1.15	1.87 ± 0.38
TBSA (hospitalized), %	26.23 ± 3.37	9.82 ± 2.54
Cause of burn injury, No. (%)		
Scald	234 (51.7%)	194 (78.8%)
Flame	86 (19%)	15 (6%)
Contact	44 (9.7%)	26 (10.5%)
Chemical	34 (7.5%)	0 (0%)
Steam	18 (3.9%)	0 (0%)
Electric	14 (3%)	0 (0%)
Explosion	5 (1.1%)	1 (0.4%)
Cold-frozen	2 (0.2%)	0 (0%)
Other	15 (3.3%)	11 (4.4%)

Abbreviations: TBSA, total body surface area

Because of the high risk of transmission of COVID-19, health care providers also need to protect themselves. These especially include procedures that require close contact, such as vascular access, patient examinations, wound dressing, and surgical procedures. For these, it is absolutely necessary to prevent transmission with personal protective equipment.[10] A possible contagion that will occur in health care providers may cause other patients treated in the burn center to be infected with COVID-19 and may cause that burn center to become unable to provide health care. We developed a 3-degree prevention protocol in our burn center and informed all of our staff about this protocol and implemented it as soon as possible. Thanks to this protection protocol, although 2 of our patients were diagnosed with COVID-19, we successfully completed their treatment without any transmission.

In conclusion, COVID-19 is a disease with high contagiousness and a high mortality rate that is widely seen all over the world. Despite this situation, it is vital that the treatment of patients with burn injuries is conducted completely and as quickly as possible. For this reason, all burn centers should develop their own prevention protocols as soon as possible to minimize the risk of transmission and to continue patient treatment. If the necessary precautions are taken and the developed prevention protocols are fully implemented, the treatment of patients with burn injuries can be completed safely and successfully.

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