



Pandemic Process in the Department of Pediatrics

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Abstract

Very recently, a new coronavirus causing a serious, atypical pneumonia cluster that was life-threatening in humans was discovered in December 2019. The virus detected in China spread to 188 countries/regions all over the world in a short period of six months, and it was declared by the World Health Organization to cause pandemics. In Coronavirus Disease-2019 (COVID-19), the main route of transmission is directly from person-to-person transmission by droplets and contact. In the reported publications, the disease related to Severe Acute Respiratory Syndrome-coronavirus-2 is more common in adults and causes a serious life-threatening disease, especially in the elderly. It is observed that it causes milder clinical presentation in children than adults. Fever and cough are also the most common symptoms in children. In the pandemic course, the department of pediatrics started the training, planning and preparation process before the acceptance of positive patients under the leadership of the Ministry of Health's constantly updated guide and the established multidisciplinary science committee of our hospital. The treatment of COVID-19 positive pediatric patients has been carried out for most up-to-date and successful manner. The protection both of our healthcare personnel and other pediatric patients who had to use same health care facility during the pandemic course was provided within the framework of the taken infection control measures. While applying the current scientific data and the guide of the Ministry of Health, it was aimed to emphasize that it is important to make decisions in accordance with the dynamics of the process, organized with team spirit.

Keywords: Children, pandemic, COVID-19, single center

INTRODUCTION

Very recently, in December 2019, a new coronavirus (CoV) was discovered in the city of Hubei, Wuhan province, in the Republic of China, causing a severe, atypical pneumonia cluster in humans. Chinese scientists revealed the genome sequence of this virus, which they isolated from a patient, on January 7, 2020, in a short time. This new CoV was named 2019-new CoV by the World Health Organization (WHO) on January 12th, 2020 (1,2).

In order to determine the relationship of the new CoV with other CoVs, the genomic structure was first tried to be determined. In a study examining the 2019 new CoV genome obtained from a patient, nucleotide similarity was found with bat Severe Acute Respiratory Syndrome- (SARS)-like CoVZXC21 at a rate of 89% and with human SARS-CoV-2 BJ01 2003 at a rate of 82% (3). On February 11th, 2020, the name of the new CoV was changed to

SARS-CoV-2 by the International Virus Taxonomy Committee Coronavirus Working Group. The WHO announced the name of the new disease caused by this virus as Coronavirus Disease-2019 (COVID-19) on the same date (4). The disease spread all over the world in a short time. And ultimately, it was declared a pandemic by the WHO on March 11th, 2020 (5).

CoVs are enveloped, single-stranded RNA viruses belonging to the *Coronaviridae* family within the *Nidovirales* family. In humans, it usually causes a mild cold but sometimes severe acute lower respiratory tract infection. In the current taxonomy, CoVs have been classified into four genera; alpha, beta, gamma and delta CoVs, according to sequence and antigen-based studies. SARS-CoV-2, which was detected in 2002 and Middle East respiratory syndrome coronavirus (MERS-CoV-2), which was detected in 2002, which in the past crossed the species barrier and caused



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serious respiratory disease epidemics, are included in the beta CoV group. SARS-CoV-2 is also a beta CoV group member and is recorded as the seventh CoV that infects humans (causing mild disease; HKU1, NL63, OC43 and 229E, and severe disease-causing SARS-CoV-2, MERS-CoV-2 and currently detected SARS-CoV-2) (6-8).

At the beginning of the pandemic, the seafood market, where illegal livestock was sold, was shown as the place where the contamination took place. The fact that most of the people who got sick were people working in or visiting this market suggested that the virus was transmitted from animals to humans. However, as the pandemic progressed, person-to-person transmission became the main mode of transmission. It is still not clear what the source of the virus is (8,9).

In COVID-19 disease, where direct person-to-person transmission is the main route of transmission, transmission occurs mainly through droplets and contact. When an infected person coughs, sneezes, or even talks, the virus in the droplets are emitted. If these droplets come into contact with the respiratory tract and mucosal membranes (mouth, eyes and nose) directly with the hands, it may lead to the emergence of the disease. Droplets are typically thought to be spread no more than two meters away, thus it is necessary to maintain a social distance of at least two meters with sick people (8,10,11).

Under normal circumstances, whether SARS-CoV-2 is transmitted by air or not remains controversial. SARS-CoV-2 virus has also been detected in samples other than respiratory secretions, including feces, blood, tears and semen. However, the role of the virus detected in these regions in transmission is not certain. Although difficult to confirm, fecal-oral transmission has not been clinically defined. Likewise, although virus RNA is detected in the blood, it is thought that there is a very low probability of transmission through the blood. Transfusion transmission has not been reported with SARS-CoV-2 or previously with MERS-CoV-2 or SARS-CoV-2 (8,10-15).

The incubation period for COVID-19 disease is thought to be 2-14 days after the virus is taken, and most of the patients have been found to be symptomatic about 4 to 5 days after exposure. The contagious period of COVID-19 is not known exactly. It is thought that it starts 1-2 days before the symptomatic period and ends with the disappearance of symptoms. Although symptomatic infection is on a spectrum between mild and life-threatening disease, most infections are not severe (8,10,16). Disease spectrum of 44,415 confirmed patients in a report from the Chinese Center for Disease Prevention: 81% mild (no pneumonia and mild pneumonia), 14% severe (dyspnea, respiratory rate >30/

min, blood oxygen saturation <93%, more than 50% increase in lung infiltration within 24-48 hours) and 5% critical (respiratory failure, septic shock and/or multi-organ dysfunction or failure) (17). In another study reported, asymptomatic patients and patients with mild or moderate disease constituted 98% of the pediatric patients, while severe or critical disease was found in the remaining 2% (18).

The most common form of transmission in children is intra-familial transmission. Most patients are exposed to adult patients through household contact. The role of children in infecting others is not clear. Infected children can spread the SARS-CoV-2 virus around them. Infection by children is thought to be less common, due to their milder symptoms. However, the risk of transmission from infected children to adults cannot be neglected. Therefore, it is very important for those who provide care for infected children to take personal medical protection measures (10,16).

The presence of pneumonia characterized by fever, cough, shortness of breath, and bilateral infiltrates on chest X-ray is the most common severe presentation of COVID-19 disease. However, other clinical features are also common, including upper respiratory tract symptoms, myalgia, diarrhea, and smell or taste disturbances. Children have fewer symptoms than adults. Fever and cough are the most common symptoms in children. Although severe clinical course is less common in children compared to adults, the risk of severe disease is higher in children with underlying diseases. Younger age, underlying lung disease and conditions with immunodeficiency are associated with worse clinical outcomes in children (8,16,19).

Reported publications indicate that the disease caused by SARS-CoV-2 is more common in adults and causes a very severe disease that threatens life especially in the elderly. As of June 21st, the Johns Hopkins Coronavirus Research Center reports that 8,918,101 people worldwide were infected with COVID-19 disease and 467,611 deaths occurred due to this disease (20). In children, the disease is generally less common and is reported to be milder. Among 1,932,051 patients with COVID-19 whose age data were reached in the United States, [the data were updated by the Center for Disease Control (CDC) as of June 21st], the number of children between the ages of 0-17 was 99,618 (0.05%) (21). Intensive care requirement in children is less common compared to adults, and information is shared that especially infants have a more severe course (16,17).

The first patient with COVID-19 in Turkey was reported on March 11th 2020, and the first deaths were reported on March 17, 2020 (22). A total of 198,284 confirmed patients and 5,097 deaths have

been reported by the Turkish Ministry of Health as of June 28, 2020 (23). However, it has not been stated what percentage of these patients are pediatric patients. The reported mortality rate has been relatively low compared to most countries, and Turkey has been the 13th country in the world based on confirmed patients reported in the world as of June 21st (20).

Our hospital, located in a central location in Istanbul, is University of Health Sciences Turkey, Prof. Dr. Cemil Taşçıoğlu City Hospital, as a general pediatrics and infectious diseases clinic, has 61 beds, additionally 20-bed hematology-oncology service, 30-bed level 2 and three neonatal intensive care unit and 10-bed pediatric intensive care unit. In addition, the hospital has a children's emergency service with 16 conservation beds. For outpatients, four general pediatric outpatient clinics, as well as most of the sub-branches' outpatient clinics (infection, endocrinology, gastroenterology, cardiology, metabolism, nephrology, neurology, healthy child, newborn) provide services.

Before the first patient was detected in our country, a scientific committee consisting of a deputy head physician, family physicians, pediatric and adult infectious diseases, pediatric and adult intensive care, anesthesia, emergency, internal medicine and hematology-oncology specialists was established in our hospital under the leadership of the chief physician. In this scientific committee, decisions on various issues such as the protection and precautions to be taken of our healthcare workers working within our hospital, the use and provision of necessary personal protective equipment, in-hospital trainings regarding the pandemic, the management of patients with and without COVID-19 who will be admitted to our hospital, and making the physical conditions suitable, were made. While these decisions were made guidelines shared since the beginning of the pandemic and updated from time to time by the Turkish Ministry of Health, General Directorate of Public Health, were taken into consideration (8). The pandemic was managed in our hospital by reviewing many issues in the guide which were changed and developed as the data about the virus and disease increased, including possible case definitions and treatments, and the conditions of discharge and isolation in patients with COVID-19.

During the pandemic process, in-service theoretical and practical trainings were given to healthcare professionals in our pediatric clinic before the positive patients were accepted. The pediatric emergency outpatient clinic and service, where the patients would be admitted, were divided into two as dirty and clean areas. A separate triage outpatient clinic was established. It was ensured that the health worker working in the triage outpatient

clinic was provided with a full personal protective equipment including N95 mask. In line with the guide published by the Ministry of Health, possible patients were directed from the triage outpatient clinic to the dirty area. Surgical masks were provided for patients and their caregivers who were directed to the dirty area. Nasopharyngeal samples were taken from the patients who were evaluated in the dirty area in special cabinets. The nasopharyngeal sampling area was disinfected with ultraviolet (UV) light before being used for another patient. The UV light emitting device used is shown in Figure 1. Dirty and clean observation areas were created for patients who would be subject to observation for a certain period of time. Two COVID wards were created for patients who needed to be hospitalized. Patients with positive SARS-CoV-2 polymerase chain reaction (PCR) test were followed up and treated as much as possible in single isolated rooms with bathroom and toilet. Healthcare professionals working in the hematology-oncology service and neonatal intensive care units were assigned only in these departments. Health workers in these departments were not allowed to work in the dirty area. The work of the healthcare professionals was arranged in 24-hour shifts, separating the dirty and clean areas alternately. In this way, both the risk was shared and the exposure to risk was tried to be reduced. Until May 15th, more than 1,500 patients with possible COVID-19 were admitted



Figure 1. Device that emits UV light

UV: Ultraviolet

to our pediatric emergency outpatient clinic, and SARS-CoV-2 PCR positivity was detected in 160 of nasopharyngeal samples taken from these patients. In our hospitalized and treated patients, the number of positive patients was thirty. The number of positive patients followed in the pediatric intensive care unit was five, and no patient died. None of our pediatric patients required the use of hydroxychloroquine, favipiravir or lopinavir/ritonavir treatments specified in the guideline.

As the pandemic progresses, information on how the virus affects children's health is constantly reported, and new features are learned to emerge. In April, patients resembling incomplete Kawasaki disease or toxic shock syndrome, thought to be associated with COVID-19 disease have begun to be observed in children from the UK. Then, an increase has been observed in the reporting of similar patients from various countries around the world, especially in New York (USA). In mid-May, a new form of presentation of COVID-19 has been announced for the first time by the US CDC and Prevention. This condition has been called multiple systemic inflammatory syndrome (MIS-C) possibly associated with COVID-19 in children (24-27).

CONCLUSION

As a result, the COVID-19 pandemic emerges as a dynamic process that is constantly evolving and changing. Here, the role of mankind's first confrontation with a CoV pandemic is great. In the process, as the information about SARS-CoV-2 and the disease it causes increases, changes in our approach may occur. It is very important to take adequate and appropriate infection control measures to prevent possible transmission from children with COVID-19 to other people, especially healthcare workers. It is obvious that it will contribute to preventing the spread of the disease in the community and in the hospital. Although the disease has a mild course in children, it is vital to follow up patients closely in terms of clinical features that may emerge and may be life-threatening (such as MIS-C).

Ethics

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: A.K., D.K.İ., E.T., M.T.P., Concept: A.K., Design: A.K., Data Collection or Processing: A.K., D.K.İ., E.T., M.T.P., Analysis or Interpretation: A.K., Literature Search: A.K., Writing: A.K.

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