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Management of a radiation oncology clinic in a clean oncology hospital during the COVID-19 outbreak

COVID-19 salgını sırasında temiz bir onkoloji hastanesinde radyasyon onkolojisi kliniği yönetimi

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Abstract

Aim: COVID-19 is a disease that was declared a pandemic by the World Health Organization (WHO) in 2020. The first case in Turkey was confirmed on 11 March 2020. Since patients with cancer were reported to have a higher risk for COVID-19 infection, as an oncology hospital, we created a mini science board within our hospital. By following the advice of this science board and the permissions of the local administrators our hospital, which is the only training and research hospital that specialized in oncology in Turkey, undertook the clean hospital mission to continue cancer treatments uninterruptedly. Radiotherapy has an essential role in cancer treatment and our radiotherapy department is the biggest one in Turkey. This retrospective study aimed to constitute ideas for special issues such as pandemics by examining the workflow of our hospital's radiation oncology clinic.

Methods: The workflow of the clinic, the precautions taken, the number of treated patients and the COVID-19 positive cases were evaluated. The records of the radiation oncology clinic were used for evaluation.

Results: Two-hundred forty-seven patients in March 2020 and 164 patients in April 2020 were treated in our department. None of our staff and only 3 of our patients were COVID-19 positive.

Conclusion: For emergent situations like this pandemic that may occur in the future, the existence of clean hospitals is essential to continue cancer treatments uninterruptedly.

Keywords: COVID-19, Pandemics, Radiation oncology

Öz

Amaç: COVID-19 2020 yılında DSÖ tarafından pandemi olarak ilan edilmiş bir hastalıktır. Türkiye'de ilk vaka 11 Mart 2020'de tespit edilmiştir. Kanser tanısı olan hastaların COVID-19 enfeksiyonu açısından daha riskli olduğu bildirildiğinden onkoloji hastanesi olarak hastanemizde mini bilim kurulu oluşturuldu. Bu bilim kurulunun tavsiyeleri ve yerel yöneticilerin izinleri ile Türkiye'de kanser konusunda uzmanlaşmış tek eğitim ve araştırma hastanesi olan hastanemiz, kanser tedavilerine kesintisiz devam edebilmek için temiz hastane görevini üstlenmiştir. Radyoterapi kanser tedavisinde önemli bir role sahiptir ve hastanemizin radyoterapi kliniği Türkiye'nin en büyük radyoterapi kliniklerinden birisidir. Bu çalışmada, Türkiye'deki temiz bir onkoloji hastanesindeki radyasyon onkolojisi kliniğinin iş akışı incelenerek pandemi gibi özel durumlar için fikir oluşturulması amaçlanmıştır.

Yöntemler: Kliniğin iş akışı, alınan önlemler, radyoterapi uygulanan ve radyoterapi sürecinde COVID-19 pozitif tespit edilen hasta sayısı değerlendirilmiştir. Değerlendirme için radyasyon onkolojisi kliniği verileri kullanılmıştır.

Bulgular: Bölümümüzde Mart 2020'de 287 hasta, Nisan 2020'de 164 hastaya radyoterapi uygulanmış; bu hastalardan sadece 3 tanesinde COVID-19 pozitifliği tespit edilmiştir. Hiçbir personelimizde COVID-19 pozitifliği saptanmamıştır.

Sonuç: Gelecekte ortaya çıkabilecek bu pandemi gibi acil durumlarda kanser tedavilerinin kesintisiz devam edebilmesi için temiz hastanelerin varlığı önemlidir.

Anahtar kelimeler: COVID-19, Pandemi, Radyasyon onkolojisi

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Introduction

In December 2019, many patients were admitted to hospitals with pneumonia in Wuhan, China. The etiology was unknown at the beginning. A coronavirus named 2019-nCoV was isolated by Chinese scientists on 7 January 2020 [1].

In January 2020, 7734 cases of COVID-19 were reported from China and 90 other cases were reported in various countries. The mortality rate was reported as 2.2% and the World Health Organization (WHO) declared COVID-19 as an international health emergency. On March 2020, COVID-19 was announced as a pandemic by the WHO [2].

As reported recently, COVID-19 is transmitted through close contact and respiratory droplets. The incubation period has been estimated as 3-7 days but extend up to 14 days. Asymptomatic cases within the incubation period and mildly infected children were declared as the main transmission routes. The illness was severe and more fatal in the elderly and those with underlying chronic disease [3]. So, precautions were taken in Turkey based on these observations. Firstly, in January 2020, the COVID-19 science board was established within the Ministry of Health. In line with the science board's recommendations, travel restrictions were introduced, primarily to China and Italy. Quarantine application was brought to citizens coming from abroad for fourteen days. The first COVID-19 case in Turkey was confirmed on 10 March 2020 by the Ministry of Health. Two days after the detection of the first case, education was interrupted in all schools and universities across the country. In the following days, the centers, such as theatre, cinema, show centres, shopping malls, cafes, restaurants and gym centers where people can be found collectively were all closed. A curfew was imposed to citizens who were over 65 and under 20 years of age.

During this process, all hospitals, including private ones, were declared as pandemic hospitals. An in-hospital science board was established at our hospital. It was reported to the Provincial Health Directorate with the suggestions of our science board that our hospital was a cancer hospital, the majority of the patients we serve were cancer patients and that these patients were in the group where COVID-19 infection may be severe. With the recommendation of the Provincial Directorate of Health, our hospital started to serve as a clean oncology hospital as of 16 March 2020. Clean hospital term means that the hospital where COVID-19 positive cases were not accepted and treated.

It was an important issue to stay as a clean hospital to continue the treatments of cancer patients without any interruptions. As the clean hospital, COVID-19 (+) cases were not allowed in our hospital. However, a pandemic polyclinic was opened for the cancer patients treated in our hospital. Suspicious cases were referred to this polyclinic and when these cases were confirmed as COVID-19 (+) they were transported to other pandemic hospitals.

As recently reported by Liang et al., cancer patients had a higher risk of contracting COVID-19 than otherwise healthy people. Besides, cancer patients with COVID-19 had poorer prognosis [4]. Our hospital is the only hospital in Ankara that specializes in oncology. Therefore, it was important to stay as a clean hospital for the protection of our patients from COVID-19. Radiotherapy has an essential role in cancer treatment. Over 50-60% of all cancer patients are treated with RT at some point in their treatment [5].

The COVID-19 outbreak is a health emergency, but cancer treatments are also important and cannot be omitted or interrupted because of this outbreak. This study aimed to evaluate the management and working flow of the radiation oncology clinic of a clean oncology hospital in this pandemic period.

Materials and methods

In this study, it was aimed to evaluate the personnel working order, the number of patients, management of patient treatments and treatment devices working time and order, as well as the regulations of radiotherapy indications and doses within the scope of the pandemic along with the precautions taken in the radiation oncology clinic of our hospital, which has served as a clean oncology hospital after the detection of first the COVID-19 positive case in Turkey.

As the biggest radiation oncology clinic in Turkey, many patients have been treated in our clinic. The number of patients treated during and before the pandemic period was compared to evaluate the effect of this emergent period to the number of treated patients. Treatment interruptions due to COVID-19 positivity were also evaluated.

1. General precautions in hospital

The training started throughout our hospital before the pandemic was announced. The first training was given on 11 February 2020. A training program was prepared in accordance with the pandemic action plan. The training was provided and continues to be delivered. All staff was trained about the use of PPE (personal protective equipment) and written documents were sent to the clinics. The PPE request of all personnel with the possibility of contact with COVID-19 (+) patients was met. Surgical masks were distributed to all staff in connection with the patients 5 days after the detection of the first case. Starting from the second week, protective eyewear, long-sleeved disposable gowns, shoe covers, gloves and surgical caps were distributed to those who had direct contact with the patient. Transparent protective barriers were placed in front of the data processing and patient registry units. Workflow charts and guidelines for patients suspected of COVID-19 were created in clinics. These guides have been added to the training documents on the desktop of the hospital computers and the remote education system.

To prevent the disruption of follow-up and treatment of cancer patients, the internal medicine intensive care unit and radiotherapy services were evacuated. Cancer patients suspected of COVID-19 were hospitalized and followed-up in these evacuated services, within the scope of the clean hospital, the positive results of PCR were sent to pandemic hospitals by ambulances. A polyclinic was opened for personnel screening. Until the 20 May 2020, 1565 personnel were scanned for COVID-19 by PCR and of these, 480 also by rapid antibody tests. Personnel screening is still on- going. All staff was questioned daily for COVID-19. In case of suspicious contact

with COVID-19 patients in his family or in his environment, he/she was asked to report to his/her administrators.

A flexible working schedule was set up for the staff. The hospital information management system was fully opened to remote access to doctors. In this way, remote consultations were possible if necessary. Council meetings were held online whenever possible; and with minimum participation, if not possible. Online patient information line was made more active to prevent patients from coming to the hospital except in very urgent and necessary situations. Attention was paid to ensure that the working areas were large and adequately ventilated by windows.

Triage was established in all clinical entrances. By the opening of local triages, the in-hospital entries were reduced to just one. The other two entrances to the radiation oncology clinic were closed, and the only access was provided from the main entrance. One security guard and one nurse commissioned in the triages. All PPE was given to these security guards and nurses. Importance was given to maintaining social distance at the entrances. The fever of every person, including personnel, who entered the clinic, was measured and queries suggested in the COVID-19 guidelines of the ministry of health were made. Suspicious cases were referred to the pandemic polyclinic, and the polyclinic was informed by phone about the patient. The department where the patients were treated, and their doctors were also informed. Patients were taken to the clinic alone, if possible, with one accompanying person if needed. Hand sanitizers were provided at the entrances. Patients who came with gloves were asked to remove their gloves; their hands were disinfected. Beginning from the third week, all patients were given a surgical mask in triage. With the recommendation of the radiation oncology clinic, since the valve mask has a high risk of spreading viruses to the environment, patients with a valve mask were asked to remove these masks and wear a surgical mask or use them together with the surgical mask.

2. Special precautions in the radiation oncology clinic

2-a) Devices

Necessary precautions were taken for 6 treatment devices and 3 planning CTs available in our clinic. While 8-10 patients were taken into treatment per hour before the pandemic, this number was reduced to 4-6 patients during the pandemic period. Due to the reduction of the number of patients by the hour, additional shifts were worked until all daily treatment patients were treated. After each patient, the cleaning staff dressed in appropriate PPE cleaned the devices with medical device disinfectants. Seats in the waiting rooms were removed. The patients were taken to the waiting areas one by one.

2-b) Staff

All radiation oncology clinic staff switched to flexible working hours. The work plans of the staff were made following patient flow. Thirty-five doctors working in our clinic came to work alternately. Every day, 10 doctors were arranged to be in the clinic. Attention was paid to only to have one doctor in each doctor's room.

Eighteen radiotherapy physicists were divided into 6 groups of 3 people. Arrangements were made so that one person from each of these 6 groups was brought to the clinic every day.

Forty-eight radiotherapy technicians were divided into groups of 4 people and these groups worked in shifts for a week. Each team was given one week off, they were asked to stay at home and follow social distancing rules when they were on leave.

Daily PPEs were given to the staff by the department officers. After the announcement of the first case, it was observed that all staff started wearing uniforms and surgical caps voluntarily.

Patients on treatment were questioned every day according to the Turkish Ministry of Health's pandemic guide. If any of these questions were answered 'yes', the patient was referred to the pandemic polyclinic.

2-c) Radiotherapy indications and treatment schedules

Radiation oncology communities published guidelines for both indications and radiotherapy schedules to be used during this outbreak. These guidelines and recommendations were shared online with our doctors [6-8].The decisions about the indications and treatment schedules were left to doctors 'interpretations.

Results

During the pandemic process, our hospital continued to serve oncology patients with the role of a clean hospital.

In January, February, and March 2020, the numbers of treated patients were 259, 257 and 247, respectively. When these numbers were compared to October, November, and December 2019 (n=286, 255, and 257, respectively), no difference was observed. The number 247 in March 2020 decreased to 164 in April 2020.

Although there was no decrease in the number of oncology patients compared to the same months of 2019, a severe decline was observed in our other polyclinics other than oncology due to the refusal of the elective cases and the shutdown of the central patient appointment system to maintain the role of the clean hospital. After the pandemic announcement, our outpatient clinic occupancy rates were 10% in the second half of March and 25% in April. Although there was a partial increase in the number of outpatients in April upon hearing that we are a clean hospital, these figures were lower than those in April 2019.

When 16 of the patients who were being treated in our clinic, answered 'yes' to the questions asked in the Ministry's guide, they were referred to the pandemic polyclinic with the suspicion of COVID-19. Three of these patients were COVID-19 positive. Radiotherapy was interrupted for these patients. One of the patients who underwent COVID-19 treatment continued radiotherapy after the PCR test was negative after the treatments. The COVID-19 treatments of the other 2 patients were ongoing during the writing process of this article. Radiotherapy technicians who treated these 3 patients were also referred to the staff pandemic clinic and recommended to stay at home until the test results came. After the test results were negative, they continued to work in accordance with the algorithm, using the necessary PPE.

All our staff was referred to personnel pandemic clinic and the test results of COVID-19 were negative for all of them.

Discussion

The COVID-19 outbreak is an international health emergency. As a result of our scientific board's attempts and the approval of the provincial health directorate, our hospital served as a clean oncology hospital in the pandemic process. If these attempts were not made, our hospital would have served as a pandemic hospital and cancer patients who were being treated in our hospital would have been at greater risk of being infected with COVID 19.

Our patient population had a higher risk in terms of contracting COVID-19 and having poorer outcomes because of their cancer[4]. Naturally, cancer was not the only risk factor for our patients. There were of course elderly patients and patients with other chronic diseases besides cancer. So, we had to take special precautions to protect both our patients and our staff.

The protection of the personnel was essential both in terms of infecting patients and continuing their treatment. Radiotherapy is a very specialized area and cannot be performed by uneducated and unqualified staff. With this in mind, our Ministry of Health published an instruction on 14 April 2020 in order not to hire oncology staff at pandemic clinics. As a clean hospital, our directors did not employ any oncology staff at our pandemic polyclinic even before this instruction.

In a recently published paper from the radiation oncology department of Istanbul Dr. Lutfi Kırdar Training and Research Hospital, 13 radiation oncologists of 18, one technician and one nurse were reported as COVID-19 positive because of small sized polyclinic rooms and not giving importance to social distance. So they reported that their hospital management committee decided not to accept new cancer patients and refer them to nearby centers [9]. In our clinic, strict precautions were taken from the announcement of the first case in Turkey. Social distancing was the most important issue for us. All the tumor boards and education programs were canceled in our clinic. Both tumor boards and education programs were made online as much as possible. No COVID-19 positivity was reported in the staff of our radiation oncology clinic so all new cancer cases were accepted and treated at our center. This supports both the importance of the early precautions and the clean oncology hospital concept. As a clean oncology hospital COVID-19 positive cases were not accepted to our hospital.

In German and Italian studies, institute sanitation, triage implantations and dividing staff into groups are reported as important precautions for radiation oncology departments [5, 10]. Institute disinfection, and triage implantation were the first precautions of our department. We also agreed on confidential working hours and the staff was divided into groups to prevent potential contamination. The division of radiotherapy technicians was nearly ideal. They were divided into groups as one week on and one week off. The off group did not come to hospital for 7 days, which is the average incubation period of COVID-19. They also did not contact each other. But a study of Shen et al. reported that the incubation period of COVID 19 may extend up to 14 days [3]. For this reason, it would have been more appropriate to set the working interval of the teams as 14-day-on-off periods instead of one-week, but this could not have been provided in the first periods. Our studies were continuing to increase this period to 14 days in the writing stage of this article. The doctors, radiotherapy physicists, nurses and cleaning staff were also divided into groups but this one week on one week off system could not have been provided for these groups due to the workload. In this process, the staff, who could not be interrupted for 7 days, could cause infection in our clinic. Nevertheless; none of our staff was COVID-19 positive. We think that is due to our other strict precautions like triage, sanitization, staff education, respecting social distancing.

PPE is another important issue in this outbreak. In Italy, for example, where the COVID-19 mortality rate was one of the highest in the World (about 9.8%), shortage of PPE was reported as one of the most critical problems. Because of this shortage, 10 % of the people infected by COVID-19 were health professionals [11]. In our clinic, surgical masks were provided for our staff from the date that the first case was announced in our country. All other necessary PPE (protective eye wear, long-sleeved disposable gowns, shoe covers, gloves, and surgical caps) were provided one week later. Moreover, our staff started to wear uniforms and surgical caps voluntarily. This was considered as an indication that the awareness of the staff in our clinic is high.

In recent studies, adapting the radiation therapy indications and durations were suggested in this pandemic period [6-8]. In our clinic these suggestions were shared with our doctors but the decision about this was left to the doctor. When the number of patients treated in March and April 2020 was compared, we observed that the patient number in April 2020 is nearly half the number of patients treated in March. This supports that our doctors have limited the indications of radiotherapy in line with the recommendations.

Radiotherapy should be administrated in a planned time. Interruptions in the treatment time may cause tumor cell repopulation. For head and neck cancers a 1-day interruption resulted of a 1.4% decrease in local control rates.so it is recommended to finish radiotherapy in planned time [12]. Only three of our patients were reported as COVID-19 positive in this period and radiotherapy was interrupted for only these three patients because of the COVID-19 outbreak. This emphasizes the importance of working as a clean oncology hospital in this pandemic period.

Conclusions

The establishment of a cancer science board in our hospital and our clean hospital status with the recommendation of the science board have been one of the most important steps in the protection of the hospital staff and cancer patients from infection during this period. In this process, we believe that the general measures are taken in our hospital, and the special precautions taken in our clinic have set an example for other hospitals and radiation oncology clinics in possible future emergencies.

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