



Review Article

Adapting to the COVID-19 Pandemic: Recommendations for Cancer Centers

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Abstract

Starting in December 2019, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) causing coronavirus disease 2019 (COVID-19) began a pandemic that has rapidly swept across the globe claiming many victims and forcibly changing the way of life for many. Healthcare systems around the world have been put under immense pressure and obliged to evolve in order not only to handle the abrupt and extreme rise in COVID-19 infections but also to continue to treat other patients while minimizing the risk of infection and outbreaks. The diagnosis and management of cancer has similarly been impacted. As the pandemic continued, oncological departments and centers adapted new regulations and oncological societies attempted to publish recommendations and guidelines to ensure optimal management while also accommodating for the ongoing pandemic. In this article, we investigate the measures that should be taken by cancer patients in general and attempt to construct guidelines for how oncology departments should be organized and operated during the pandemic.

Keywords: COVID-19 and cancer; SARS-CoV-2 and cancer; Pandemic Guidelines; COVID-19 precautions

Introduction

In late 2019, a cluster of pneumonia of unknown cause began to emerge in Wuhan, China [1]. Soon, a novel Coronavirus, now termed Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), was identified as the culprit. The virus was initially believed to be transmitted primarily via respiratory droplets in close contact that is through droplets released when an infected person talks, coughs, or sneezes [2]. Recent studies however have pointed to the possibility of airborne transmission over longer distances [3]. The significance of this finding is not yet fully known however the virus proved to be infectious enough to spread beyond Wuhan into other parts of China and then the world. On March 11th, 2020, as it rapidly spread between countries, the WHO declared COVID-19 a pandemic.

With the emergence of this new pandemic of unprecedented proportions, medicine throughout the world has shifted. Its structures have been forcibly altered to minimize and handle the effects of the SARS-CoV-2 virus. This has held true especially so for the field of oncology.

Immunocompromised patients have been shown to be more susceptible to the virus and are at a greater risk of facing the adverse effects. Cancer patients, being immunocompromised, are no exception and are thus considered at higher risk, facing a mortality rate of 7.6%, over five times greater than the mortality rate of 1.4% for COVID patients with no comorbid conditions [4]. The threat to cancer patients comes not only from infection with the virus itself but also from the fact that many of these patients are having their treatments discontinued or placed on hold which puts them at risk from their own pre-existing disease. In fact, it was found that in Turkey, there was a statistically significant increase of 4% in the postponement of chemotherapy appointments after

the pandemic started [5]. With many hospitals around the world at capacity, it is also becoming increasingly difficult for surgery to be conducted on cancer patients, which poses a problem as surgery remains the first line treatment in many types of cancers—thereby worsening both morbidity and mortality. Another issue that has risen with the pandemic is the postponement and/or cancelling of screening and the delay in investigation even when symptoms are present. Alkatout et al. wrote that there has been a marked decline in cancer screening, diagnostic imaging, as well as histopathological and cytological biopsies during the COVID-19 pandemic and have raised concerns that short-term and more importantly, long-term interruption of cancer screening will delay the diagnosis of cancers and therefore cause a shift in favour of more advanced cancers [6]. Camille Maringe et al. demonstrated that an estimated 3291–3621 additional preventable deaths would occur within 5 years in the UK as a result of diagnostic delay [7].

In this review, we will be looking at the measures that should be taken in general by any cancer patient to ensure their safety. Then, we will go into details about and attempt to construct guidelines for how oncology departments should be organized and operated for the most beneficial outcomes for cancer patients during the pandemic. Measures for treating cancer patients that have contracted COVID-19 will be looked at, followed by a discussion on the different treatment options for oncology patients during these times. Finally, we will dive into the vaccination protocol and recommendations for these patients.

General Measures for Cancer Patients

As is the case in most diseases, prevention before treatment is paramount to ensure favourable outcomes. This holds doubly true for patients with malignancies who are defined as high-risk patients and who have a much higher risk for adverse effects and mortality than the general population. During outbreaks, we suggest that all cancer patients remain at home and minimize contact with the outside world. If outside contact is unavoidable, these patients should take all COVID-19 precautions which include social distancing, avoiding indoor gatherings, maintaining proper hand hygiene, wearing face masks, avoiding touching of their faces, etc. All items brought from the outside world should be well sanitized before use. We also suggest that their environment be cleaned and routinely disinfected. In addition, these patients should be informed and educated about symptoms to be watchful for and instructed to isolate and contact their healthcare provider if any symptoms arise. Moreover, they should be asked to keep up with WHO guidelines and recommendations about the pandemic, especially if and when the environment is exposed to the outside world. Guidance on types of disinfectants, strengths, and how to use them can be found on the WHO COVID-19 guidance website [8]. Lifestyle measures not specifically directed against COVID-19 may be helpful in boosting immunity and preventing “pandemic

fatigue” such as having proper sleep hygiene, establishing stress relieving practices and a proper routine, exercising, and maintaining virtual contact with family and friends for good social support. Nutrition in particular has been shown time and again to be an important factor in immunity to infection. As was discussed by Schaible et al., malnutrition not only leaves people susceptible to infection but also decreases their ability to mount a proper immune response and puts them at risk for more severe infections [9]. Therefore, a well-rounded and nutritious diet with good caloric balance is essential for everyone during such pandemics. Dietary guidance can be found on the WHO healthy diet website [10]. In addition, these patients should be informed and educated about symptoms to be watchful for and instructed to isolate and contact their healthcare provider if any symptoms arise. Moreover, they should be asked to keep up with WHO guidelines and recommendations about the pandemic.

Recommendations for Oncology Centres and Departments

Outpatients

In general, specialized oncology departments and cancer centres should follow all COVID guidelines set out by their national ministry of health or by trusted official international committees such as the WHO. These include obligatory masking, implementation of social distancing especially in tight spaces like elevators, providing and advising visitors on the importance of hand hygiene, implementing touch-free technology, educating visitors on how to limit COVID spread via billboards, posters, and announcements, limiting patient and visitor capacities, adding glass barriers at reception areas and similar places, providing adequate Personal Protective Equipment (PPE) for healthcare workers, and others.

Temperature checks at the door are not recommended as a study of 15 million screenings identified an efficiency of only 1 identified case of COVID-19 infection per 40 cases missed [11]. The floor plan and layout of each floor should be reconsidered and possibly redesigned to attempt to ensure the appropriate flow of people and proper distancing between visitors. The facility’s ventilation system should be assessed, and managed, expert opinion should be consulted considering important parameters that may propagate the spread of the virus. When possible, we recommend designating one elevator for special use by cancer patients, one patient at a time. Aerosol generating procedures should be conducted in a controlled setting with appropriate PPE and preferably in a negative pressure room.

Recommended standard PPE should usually include gloves, a gown, a respirator (or at least a medical mask), and eye/face protection. HCWs should always don isolation gowns and gloves when entering patients’ rooms. It is important that hand hygiene be

routinely performed before entering or exiting the room. In general, there is no need to change gowns between patients unless it is stained or for some other unrelated additional contact precautions. However, they should be limited to COVID-19 infected areas and should never be worn in common spaces. Respirators (for example N-95) should be worn during aerosol-generating procedures. In case of no aerosol-generation, a regular medical mask can suffice if respirators are in short supply as there is no evidence that a respirator provides additional benefits in such cases. Goggles or a face covering that shields the front and sides of the face should be worn for eye and face protection.

Employees and healthcare workers should also be screened and be obliged to follow the set out COVID measures to ensure patient safety. It is important for every cancer centre or oncology department to take into consideration the current state of endemicity of COVID in its particular region. This should guide the current procedures and guidelines that these centres should follow.

In areas with moderate to high community spread, high risk of COVID outbreaks, or with a current COVID outbreak occurring, restrictions must be tightened. Firstly, patients should be classified by oncological state and priorities should be assigned based on their respective malignancy. The number of patients must be decreased. Taking into consideration assigned priority, current malignancy, its status, and the kind of treatment patients are on, centres must identify patients that can be assessed remotely via e-medicine and telemedicine and who do not need to present in person. Examples of such patients are followed ups with paramedical examinations like lab tests and imaging ordered. Other patients that can be assessed remotely are some patients on oral chemotherapy, some patients on hormone therapy, and patients in remission presenting for follow-up with no new alarm symptoms. We recommend video calls for these assessments. For other patients who must be seen in person, we recommend screening them for COVID exposure and symptoms via phone call before each visit. Screening should include questions about possible COVID-19 exposure within 2 weeks, travel history, and symptoms of COVID-19 which include fever, chills, fatigue, cough, rhinorrhoea, sore throat, anosmia, ageusia, myalgia, dyspnoea, and gastrointestinal symptoms (diarrhoea, pain, etc). Number of visits, length of each visit, accompanying visitors, and the amount of time spent in contact with other patients and healthcare workers during each visit should also be minimized. For patients screened to have a possible upper respiratory tract infection or COVID exposure, we recommend a negative COVID RT-PCR result before presenting, regardless of vaccination status. Patients receiving treatment in the hospital like chemotherapy or radiotherapy can be assessed during their treatment to hasten their stay.

In areas of low endemicity and low risk of COVID outbreaks, restrictions may be curbed, and more patients can be

seen and assessed in person. General COVID measures should remain in place. The threshold for in-person evaluation, however, can be lowered. Screening of patients before their appointments should still be implemented. For vaccinated patients who screen positive for possible COVID infection, they may still be seen in person however we recommend special measures be taken for these patients similar to those taken for patients in high community spread. For unvaccinated patients who screen positive for possible COVID infection, we recommend a negative COVID RT-PCR result before presentation.

Healthcare Workers

Special care must be taken with healthcare workers as some of them are the most exposed members of society. Healthcare workers are not only exposed in the hospital/healthcare setting but also in their private lives. The most at risk healthcare workers are those that have direct contact with patients [12]. Studies have identified nurses to be at greatest risk [13]. To begin with, we recommend, as per the WHO, that all healthcare workers receive recommended COVID-19 vaccines as well as the seasonal influenza vaccine [14]. The influenza vaccine is necessary because it noticeably decreases the occurrence of viral-like symptoms. This spares more HCWs from undergoing COVID-19 testing and/or quarantine which could prove crucial, especially with the current burdens on the healthcare system. We also suggest screening workers by asking about symptoms before granting access to the facility. Screening should include the questions mentioned before.

The decision on when to test and quarantine HCWs is controversial and can be complicated sometimes. We must first consider the vaccination status, exposure, and presence of symptoms of each case. Any HCW that has COVID-19 symptoms should quarantine and be tested twice. For HCWs that are fully vaccinated and asymptomatic with a high- risk exposure, we recommend testing but no quarantine. These HCWs should adhere to social distancing and always have facial masks on. For HCWs that are unvaccinated and have a high-risk exposure, we recommend immediate quarantine and testing. The only HCWs that can be exempted from these measures are those that have had a SARS-CoV-2 infection within 3 months, unless symptomatic. Testing should be done twice, once immediately and then again between 5 and 7 days later.

If there isn't one, a special COVID-19 committee should be established to follow and monitor healthcare workers' COVID status. This committee would also be responsible for following up, tracing, and testing in any possible cases of COVID-19 infection among staff.

Healthcare workers should follow and remain up to date on the aforementioned national and international COVID guidelines that include obligatory masking and social distancing. These

measures should be stressed not only in the healthcare setting but also in their communal and private lives. Other measures should be considered depending, as discussed before, on the current state of COVID-19 community spread.

In areas with moderate to high community spread, high risk of COVID outbreaks, or with a current COVID outbreak occurring, restrictions on healthcare workers should be tightened to ensure a safe space for patients and healthcare workers alike. The number of healthcare workers present should be limited to the minimum required. As patient number is already limited, workload can be managed even with less workers. During the pandemic, healthcare worker burnout and chronic fatigue is a relevant concern especially as the number of workers is being limited to avoid spread. This can lead to adverse effects on workers such as emotional and psychological disturbances, inattentiveness, discoordination, slowness, and inefficiency, which would not only cause distress but also reflect negatively on quality of care [14]. To counteract this, we recommend strategic planning while providing support and listening to feedback. Appropriate scheduling and work allocation with proper management of rest time is crucial. Since less workers are needed at any given time, centres can make use of excess workers to decrease working hours and increase rest time. Kluger et al. proposed a technique to allocate the workforce in order to preserve it while also minimizing HCW exposure during the pandemic. Importantly, they concluded that having all HCWs work at least 3 consecutive days reduces the chance of team failure, longer nursing shifts (12 versus 8 hours) decreases the rate of HCW infection, and avoiding staggering of rotations of attendings, house staff, and nurses reduces the number of infected HCWs [15]. If necessary, additional workers can be recruited. Importantly, these workers should be well trained in protection and have good knowledge on disease control and prevention. They should know what type of PPE to use for each situation or procedure, how to use it, and how to dispose of it. Moreover, these healthcare workers should be assigned strictly to the oncology department. It is highly recommended to restrict oncology healthcare workers to one division and prevent concurrent rotation in other departments, especially departments with high potential for COVID-19 transmission, as they will be working with mostly immunocompromised cancer patients. We also recommend encouraging self-reporting of any symptoms, immediate self-quarantine and isolation, and testing and tracing. A good incentive to ensure these essential practices is implementing paid leave and making sure these workers would not lose their income. Other forms of incentives can be considered such as an honesty appreciation system where workers can receive public or private praise for self-reporting and being honest. The aforementioned COVID-19 committee would be responsible for ensuring the implementation of these measures.

In areas of low endemicity and low risk of COVID outbreaks,

constraints may be slightly loosened to increase efficiency while remaining safe. The number of healthcare workers may be increased in proportion to the number of patients being allowed access to the facility. Workers should still be knowledgeable in safety and security, as well as disease control and prevention and PPE should still be used appropriately. We also recommend preventing oncology healthcare workers from visiting or rotating on COVID-19 floors. It is still important for workers to self-report any symptoms or contact with COVID-19 positive individuals. A case-by-case decision can then be made about testing and isolation depending on the circumstances.

Inpatients

It is again important to make a distinction on inpatient services on the status of the containment of COVID-19 in the surrounding community. In areas where there is a high risk of community spread of the virus, it is recommended that only emergency patients, as well as patients who cannot go without their inpatient treatment, be admitted. Patients who are deemed necessary for admission into inpatient wards include the following: those with suspected cancer that require inpatient diagnostics, those who have been diagnosed with cancer and are found to have a high or intermediate grade cancer, surgical candidates, those with locally advanced cancer, those diagnosed with a high risk early stage disease, patients with painful metastatic diseases, and patients presenting with oncological emergencies [12]. While this is not a fully comprehensive list, it can be used to make a judgement on whether a patient needs to be admitted, and therefore will allow for a decrease in the number of patients that are in the hospital, helping to minimize the spread of the virus.

All potential inpatients should be screened virtually for any viral symptoms of infection before presenting to the hospital or care centre [16]. All patients, even if vaccinated, that are suspected of having COVID related symptoms should be sent directly to COVID treatment centres, especially if presenting with fever [16]. For the non-suspicious patients, they must be tested for COVID, and present negative results, before being admitted into the hospital [17]. This should be done through rt-PCR testing. One exemption is if a case arises where a symptomatic patient refuses testing, the next best option is to consider the patient infected, and treat them in a separate unit, apart from cancer patients [18]. It is recommended that all patients in a high risk community be contained in single rooms, where they will also receive most aspects of their basic care, including food and medication [17]. In addition, it is recommended that any inpatient who has been admitted into the hospital and is now waiting for PCR test results, or is suspected to have contracted COVID-19 while in the hospital, be removed from these single rooms and be held in rooms with modified droplet precautions [19]. During every shift, patients should be screened for any symptoms related to COVID-19. The symptoms that need to be

screened for include cough, fatigue, anorexia, shortness of breath, myalgias and even some broader symptoms such as sore throat, nasal congestion, diarrhoea, loss of smell, and loss of taste [20]. A particular distinction must be made for immunocompromised cancer patients, who may typically present with a greater sense of fatigue, reduced alertness and mobility, diarrhoea, loss of appetite, and confusion without having contracted COVID-19. Therefore, for such patients, it is important that their comorbid ailments be taken into consideration as a possible cause of such symptoms that overlap with those of COVID-19 during daily screenings. Clinical judgement is, as always, important. Visitors in the inpatient setting should be prohibited. However, certain exceptions can be made when a visitor is absolutely necessary to patient welfare, a new diagnosis of cancer is being made, when bad news must be announced, and for terminally ill patients [21]. In these cases, the decision to allow visitors should be made by the team of healthcare professionals. Lastly, it is important to focus on limiting the spread of COVID-19 between patients and physicians by implementing telehealth services for inpatient care. Telehealth is the use of technology that allows for physicians to diagnose and treat patients remotely, allowing for very close communication between patients and physicians, as well as other healthcare providers, without face-to-face contact [22]. Telehealth can be done through a variety of means, with the three main proponents being video calls, telephone text messages, emails. There also may be other ways to deliver telehealth services, such as through mobile applications and even home laboratory testing kits. These means of telehealth fall into one of two main categories, which are either synchronous or asynchronous. Synchronous telehealth gives a live sense of care, where the physician and patient are communicating in the moment, such as through video calls, whereas asynchronous telehealth gives a gap or postponement in the communication between the patient and physician, where data is typically being transferred between both parties. Before the emergence of COVID-19, telehealth services were administered mainly for long-distance care or patient education; now, however, telehealth has the potential to sustain, or even improve, the link between the physician and patient during the pandemic, without the risk of spreading COVID-19 between the two, and thus decreasing transmission. Therefore, in a community that may be at a very high risk for spreading the virus, many inpatient services can be conducted through telehealth. Firstly, telehealth services can be used for the triaging of inpatients [23]. Here, it is essential that in high-risk communities, hospitals maintain a strict structure and order for prioritizing emergency care to the sickest patients. Patients can be sorted into different priority levels such as that we have suggested using the telehealth triage system before hospital admittance, avoiding unnecessary admissions. By triaging through telehealth systems, not only would the spread of the virus be further contained, hospital costs and resource use would be cut down, and the proper prioritization for admission can occur.

Secondly, telehealth can be used to care for inpatients. It allows for physicians to communicate and monitor patients without contact. By checking the vital status and well-being of a patient, physicians can maintain appropriate care for non-emergent cases. Physicians should focus in-person care on emergent cases that need physical examinations. With this, a higher priority is given to patients that need to be seen, while all other patients can still be cared for in the hospital without having in-person contact with their provider, thus limiting the spread of COVID-19. When a physical exam is necessary, we recommend that only one physician conduct such an exam, and then communicate the findings to the rest of the team of providers that are part of delivering care for that patient. It is important that if telehealth is implemented, the software being used for telehealth conforms to the guidelines and rules of the hospital's national agency on patient privacy and protection, and that both healthcare providers and patients be educated on the use and benefits of such a system [22].

Different protocols can be made for inpatient services in communities where there is a low risk of spread of the virus. Here, we recommend that the usual inpatients that need to be admitted to the hospital can be admitted if they are screened negatively for COVID-19. This screening protocol need not be as intense in these low risk communities and should go as follows. First, all potential inpatients that should be screened virtually, in the same manner as previously described for high spread communities [16]. If the patient is not suspected of having the virus from this virtual screening, then they may be admitted into the medical floor without PCR testing [17]. If they are suspected of having the virus as an outcome of the screening, then they must be tested for COVID-19 and only admitted if they present a negative test. If screened positive for symptoms, vaccinated patients would only need to be tested if they have had a positive contact. After screening, the protocol for handling patients in the hospital is the same as the one previously mentioned for high-risk communities. Within the hospital, it is still recommended that patients be held in single rooms in low spread community settings, so long as the hospital contains the resources and capacity to do so [17]. Unlike in high risk communities, visitors should be allowed, albeit after appropriate screening, for inpatient treatment in low risk communities; this is because visitors act as the main support branch for inpatients, and are an essential piece to delivering the highest quality of patient-centred care [19]. To find a good balance between patient safety and patient support, hospitals manipulate visitation hours and duration, as well as symptom screening for COVID-19 in visitors to ensure all inpatients are still in a safe environment. Due to the low risk of the spread of COVID-19, there is no need for telehealth services in these communities, and all patient care can be conducted in-person with proper distancing and infection control measures.

Pre-Operative Care

Surgery is the mainstay of treatment in the management of many oncology cases. In order to avoid the inadequacy in cancer treatment that was seen at the beginning of the pandemic, surgery should still be an available option for treatment. The best way to combat the spread of COVID-19 to cancer patients that are elected to go into surgery is through adequate preoperational etiquette. There have been multiple proposed methods used to conduct preoperative protocols in hospitals around the world. Most of them make use of blood tests, PCR testing, and sometimes radio imaging. In summary, first, tele-screening is conducted to detect the presence of any COVID related symptoms. If a patient does not show symptoms, they then undergo blood testing upon admission to the hospital. This blood test should focus on lymphocyte count, LDH, fibrinogen, D-dimer, and CRP. Along with this blood test, PCR testing is given to all patients in high community spread. After taking the PCR test, the patient must observe a strict quarantine while waiting for the results. If the tests are negative, then the patient has passed the preoperational protocol, while a positive test leads to the patient being directed to healthcare clinics or a general practitioner that primarily cares for COVID-19. It should be noted that some variations of this method ask for a chest CT scan before PCR testing, with the belief that CT scans should be conducted to avoid potential mistakes that can come about from false negatives in the PCR tests [24, 25]. This was seen being used in Milan in Italy at a peak of the Italian outbreak [26]. Admission is encouraged to be done 48 hours before the surgery is scheduled. However, we recommend against the use of CT scans for preoperational protocols, due to their high cost and the effects of harmful unnecessary radiation on the patient, we believe it is impractical and unnecessarily excessive.

In a community that contains a lower risk of spread, the variation transitions to one where PCR testing is the main foundation for preoperative protocol [26]. This shall be done within a week of the date of the surgery after screening. Patients must be able to stay at home in between the time of the PCR testing and the surgery, as well as quarantine and maintain separation from all individuals that pose a threat of having COVID-19. Patients that are presenting symptoms of COVID-19, such as fever, loss of smell, or dry cough, must be looked at from the standpoint of their comorbidity with cancer. If these symptoms are known by the patient's healthcare provider to have been caused by their cancer, then the result of the PCR test would dictate if the surgery would be postponed; a positive test would postpone the surgery, while a negative test would dictate that a patient is ready for the procedure. If the symptoms are not known to have been caused by cancer, then the patient would be directed to healthcare clinics or a general practitioner that primarily cares for COVID-19, and their surgery postponed.

Conclusion

After a thorough search through the literature, it is noticeable that there are many gaps in our knowledge of the viral pandemic. Bridging these gaps will not only help healthcare systems cope with the ongoing pandemic but will also prepare and enable them to handle future pandemics. Most recommendations made at the beginning of the pandemic were based on logical assumptions and comparisons with other viral outbreaks. In reality, there is a significant lack of real-world data especially when it comes to COVID oncological data. Therefore, emerging oncological and logistical recommendations should rely on up-to-date pandemic data in order to help oncological centers and departments around the world in providing the optimal care and management for cancer patients.

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