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AFOMP GUIDELINES ON RADIATION ONCOLOGY

OPERATION DURING COVID-19

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The Disease caused by severe acute respiratory syndrome coronavirus 2, SARS-CoV-2, has been named as Coronavirus Disease 2019 (COVID-19) by the World Health Organization (WHO). It was declared a Public Health Emergency of International Concern on 30th January 2020, and elevated to a pandemic on 11th March 2020. People with cancer appear to be at increased risk of COVID-19, and their outcomes are worse than those of individuals without cancer. This is especially valid for those cancer patients with another associated disease like cardiovascular disease, diabetes, chronic lung disease, liver disease, kidney disease etc.

Experience in China suggests that oncological patients are quite vulnerable to infection due to their compromised immune system, as a result of both cancer and active cancer therapy. Many cancer patients are elderly and more susceptible to aggressive coronavirus infection. Classification of people in radiotherapy departments is relatively complex and includes cancer patients, family members, doctors, nurses, radiation therapists, medical physicists, maintenance engineers, logistics support personnel (e.g. IT) and so on. When patients receive radiotherapy, there will be different degrees of exposure to these groups, with the possibility of cross-infection in different areas. In order to reduce the impact of this, and to ensure that cancer patients receive radiotherapy in a safe and orderly way during the pandemic, the Education and Training Committee (ETC) of Asia-Oceania Federation of Organizations for Medical Physics (AFOMP) has developed this guideline for use in radiation oncology with a particular perspective of medical physics.

General management

1. Establish a coordination unit with representatives from all professional groups within a Radiation Oncology Department (doctors, nurses, medical physicists, radiation therapists, maintenance

- engineers, IT specialists) and/or other relevant parts of a hospital (administration, transport)
2. Establish excellent links and reporting lines to the hospital executive and local Department of Health (where appropriate).
 3. Develop general rules for prevention and personal behavior with detailed information to all professionals from the very beginning (e.g. procedures for disinfection of rooms and apparatus, optimization of pathways and waiting rooms for patient use only; allocation of precise consultation time avoiding unnecessary waiting times, rules on frequent hand washing and surgical mask wearing by operators and by patients/ accompanying persons);
 4. Consider, where possible (e.g. in larger centers with adequate staffing), splitting staff into different teams to keep them physically segregated. Working from home is also an option for some staff groups. For example, medical physicists can perform some tasks from home provided that remote access to computing resources (such as treatment planning) can be facilitated.
 5. Review department procedures: postpone treatments for low-priority cases (prostate with hormone, benign diseases, etc.), favor short-term treatments (hypofractionation), skip or restrict follow-up visits (use phone consultations and telehealth); Define a priori policy for coronavirus suspected or positive cases at the beginning of and during treatment (it is recommended not to start treatment and recommended to interrupt treatment);
 6. Establish a triage process at the entrance of the department for all patients and accompanying persons:
 - a) first visit: questionnaire, temperature measurement, check of symptoms;
 - b) daily treatment: temperature measurement, check of symptoms;

Staff and patient management

1. Ask the patient to wear a mask before entering the department for simulation or treatment, minimize conversation with the patient, and keep the patient as far away from you as possible. Small capacity waiting rooms and accelerator/treatment waiting areas may need to be limited to patients only, aiming for social distancing where possible (1 to 3 meters).
2. Set up a separate clearly demarcated waiting area (e.g. floor marks and barriers) for febrile patients and set up guidelines to avoid repeated inquiries and walks by patients.
3. Provide information and education of staffs, patients and their families on ventilation, washing hands and wearing masks. Hand washing for 20 seconds with soap and water or use of alcohol gel/sanitizer with greater than 62% alcohol content on a regular basis is recommended.
4. Radiation therapists who are in close contact with patients should apply good protection principles

and wear protective clothing, gloves and other protective equipment prior to treating patients. Education about the appropriate use of personal protective equipment (PPE) must be provided.

5. Strictly implement hospital's fever and infection emergency protocol. A temperature measurement office/post must be set up. Everyone who enters the radiotherapy center, including employees, patients and family members, shall undergo body temperature measurement. If there is anything abnormal, hospital protocol must be followed strictly.

Division of infection control areas

1. Divide the radiation therapy center into areas of different contamination levels (Clean Area; Potentially Contaminated Area, Semi-soiled/semi-contaminated Area; and Soiled/Contaminated Area),
2. Periodically disinfect areas following corresponding protocols. A typical division is shown in figure 1. The protection level needed for each area must clearly defined.
3. For each zone, personnel should adhere to specific environment infection control protocols and strict routine disinfection of the workspace and equipment. Individuals are prohibited from crossing between different zones and channels to reduce contamination and cross-infection. Keeping meticulous records of disinfection is necessary to also ensure a clean and safe environment.

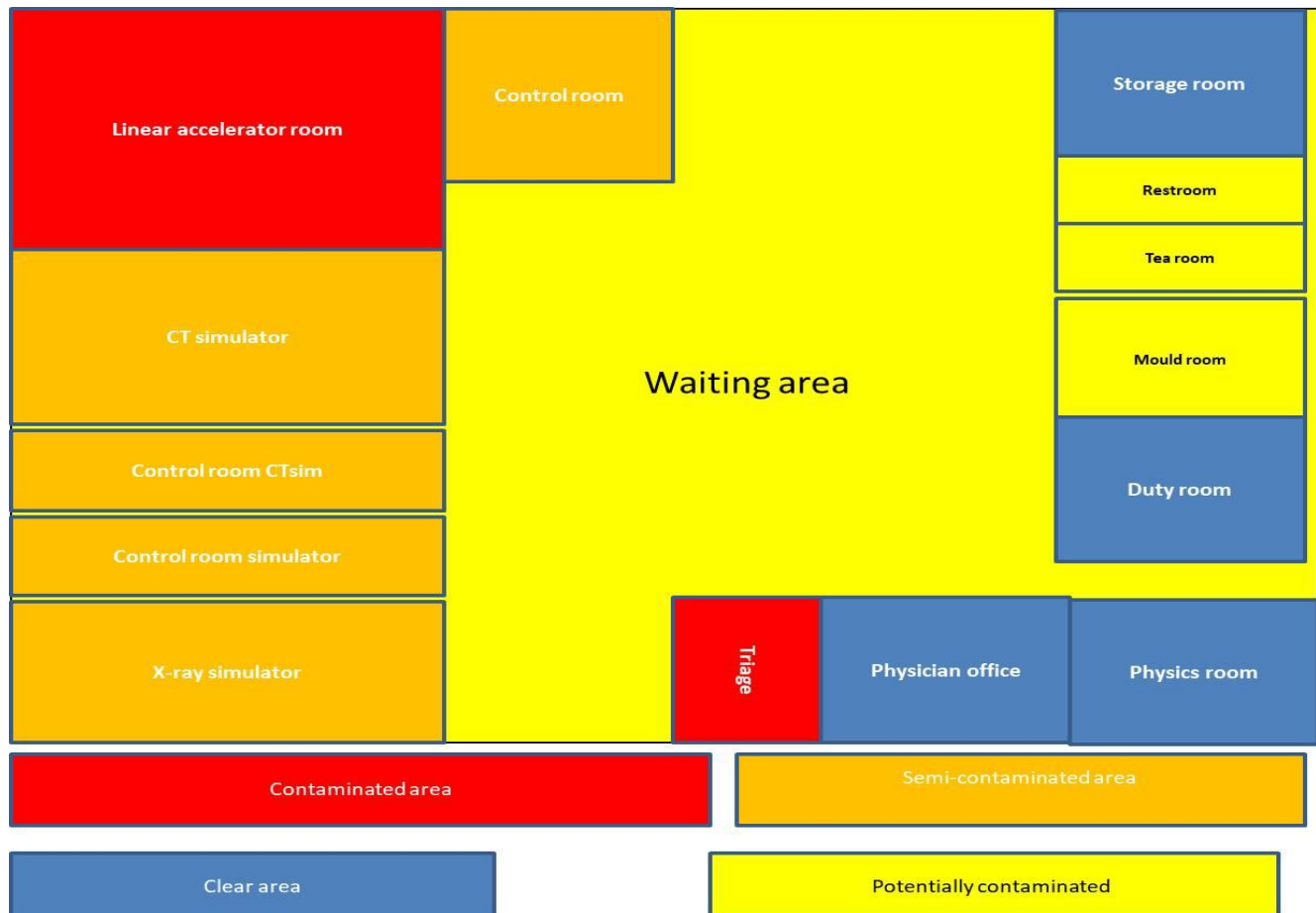


Figure 1 A typical division of different control areas for Department of Radiation Oncology.

Protective equipment and level of protection for staff

Detailed protection levels are described in Appendix A.

1. Radiation therapists: therapists work in close contact with patients and need secondary or tertiary protection, double gloves should be worn.
2. Radiation oncologists: A disposable surgical mask and a work coat in daily work should be worn; secondary level protection and double gloves should be worn during general examination;
3. Triage and other staffs (such a medical physicists): first-level protection is required.

Disinfection measures

1. Treatment equipment and operating console

2000 mg/L chlorine-containing disinfectant is preferred for cleaning of treatment equipment. 75% ethanol should be used for any equipment that is not corrosion resistant (disinfection is performed after each treatment). Equipment in the simulation room can be wiped and disinfected with 250~500mg/L chlorine-containing disinfectant, or with alcohol-containing disposable disinfection wipes. Cleaning and disinfection can be completed in one step, at least twice a day. Disinfection must be performed any time contamination occurs. If there are pollutants visible to the naked eye, disposable water-absorbing materials are used first to remove pollutants, followed by routine disinfection.

2. Ground disinfection

Floors of doctor's office, physics room, accelerator room, simulation room should be disinfected with 2000 mg/L chlorine-containing disinfectant. Ordinary treatment rooms can be disinfected with 250~500 mg/L chlorine-containing disinfectant. If there are pollutants visible to the naked eye, use disposable water-absorbing materials to completely remove the pollutants first and then disinfect the floor at least twice a day. Floors should be disinfected any time pollution occurs.

3. Air disinfection

Treatment rooms, where suspected or confirmed COVID-19 patients are treated, must be disinfected at the end of the day. During the operation, circulating air disinfectant can be used for continuous disinfection. Use hydrogen peroxide air disinfectant spray disinfection at the end of day. Alternatively, ultraviolet radiation for 60 minutes at a time, 3 times a day, can be used for air disinfection. Use of negative pressure in the room should be considered.

4. Management of medical waste

All patient waste of shall be regarded as infectious medical waste and shall be managed strictly in accordance with the regulations/protocols on the Management of Medical waste in a given Medical and Health institution. Protective equipment for staff who examined suspected or confirmed COVID-19 patients should be directly discarded in medical waste buckets after examination. Double-layer sealing, clear marking and airtight transportation are required for waste management.

Brachytherapy

This guideline does not specifically include brachytherapy but the general considerations provided here still apply in addition to any guidelines and protocols applicable to the operating theatre. In general, the number of procedures should be reduced, including consideration of reduced fractionation.

In a large institution a split into different teams may be possible which can help to avoid infection of all team members. An additional consideration for centers using 192-Ir HDR is the availability of exchange sources, which may be restricted due to restrictions in source production or transportation. In general it is possible to use the source for not more than two half-lives and the total number of allowable source transfers may restrict activities. Close collaboration with the vendor is required.

In conclusion, the novel coronavirus pandemic is a battle between people and viruses. In the face of the pandemic, in order to protect the safety of all people, all health professionals are dedicated to move forward with courage. Radiation oncology departments also play an important part on the frontline of this pandemic, with all radiotherapy staff ready to face the challenge.

Acknowledgement

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Related Articles and links

1. <https://www.nccn.org/covid-19/>
2. <https://www.astro.org/Daily-Practice/COVID-19-Recommendations-and-Information/Summary>
3. <https://www.cityofhope.org/breakthroughs/covid-19-advice-for-cancer-patients-survivors-and-caregivers>
4. <https://www.sciencedaily.com/releases/2020/03/200318143632.htm>

Appendix A

Protection levels

First level: It is suitable for medical staff in pre-examination triage, fever clinic and infectious diseases department; wear disposable work cap, disposable surgical mask (N95 protective mask for epidemiological contact), work clothes, isolation clothing (disposable isolation clothing if necessary), wear disposable latex gloves when necessary, strictly carry out hand hygiene;

Secondary protection: It is suitable for medical staff engaging in diagnosis and treatment activities in close contact with suspected or confirmed COVID19 patients ; wear disposable work hats, protective glasses or masks (anti-fog type), medical protective masks, protective clothing or isolation clothing, disposable latex gloves and disposable shoe covers, strictly enforce hand hygiene.

Tertiary protection: It is suitable for staffs performing aerosol measurement for suspected or diagnosed COVID19 patients, such as sputum suction, respiratory tract sampling, endotracheal intubation and tracheotomy, which may cause respiratory secretions, body substance spray or spatter. Wear disposable work cap, medical protective mask, protective mask (or comprehensive respiratory protector or positive pressure head cover), medical protective mask, protective clothing, disposable latex gloves, disposable shoe covers, and strictly enforce hand hygiene.

Appendix B

Procedure for medical personnel to enter the isolation ward, wearing protective equipment

1. Medical staff enters the clean area through the special channel for employees, and after carefully washing their hands, they wear medical protective masks, disposable hats or cloth hats, change work shoes and socks, and can change hand-brushing clothes if possible.
2. Wear work clothes before entering the potentially contaminated area, and staff with damaged or suspected damaged hand skin should wear gloves before enter the potentially contaminated area.
3. Before entering the contaminated area, take off your work clothes and change to protective clothing or isolation clothes, and wear disposable hats and disposable medical surgical masks (a total of two layers of hats and masks), protective glasses, gloves and shoe covers.



Figure 2. Order in which personal protective equipment is put on.

Procedure for medical personnel to take off protective equipment when they leave the contaminated area

1. Before leaving the contaminated area, medical personnel shall first disinfect their hands, remove protective glasses, outer disposable surgical masks and outer disposable hats, protective clothing or isolation clothes, shoe covers, gloves and other items in turn, and put them in special containers, disinfect hands again, enter the potentially contaminated area and change into work clothes.
2. Wash hands and disinfect hands, take off overalls, wash hands and disinfect hands before leaving the potentially contaminated area and entering the clean area.
3. Before leaving the clean area, wash and disinfect hands, remove disposable hats or cloth caps, medical masks, ice bath clothes, and clean the oral cavity, nasal cavity and external auditory canal.
4. Wash and disinfect hands immediately after each contact with patient.
5. Disposable medical surgical masks, medical protective masks, protective clothing or isolation clothing should be replaced immediately when they are contaminated by the patient's blood, body fluids, secretions, etc.
6. Personal hygiene should be carried out before leaving work, and attention should be paid to the protection of respiratory tract and mucous membranes.



Figure 3. Order in which personal protective equipment is removed.