Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Technical note

Organization of a radiotherapy service during the COVID-19 epidemic: Experience of Regional Center of Oncology of Agadir, Morocco

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ABSTRACT

This study proposes organization of the activity of a radiotherapy service during the pandemic COVID-19 period. Reliable circuits for staff as well as for patients are installed and treatment protocols are adapted to the current COVID-19 situation. Several scenarios are proposed to deal with any subsequent pandemic situation.

Introduction

The number of people infected by Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-COV-2) is dramatically increasing worldwide.[1] The first person declared Corona Virus Disease 19 (COVID-19) in Morocco was reported on March 2, 2020 at Casablanca city.[2] As of April 29, 2020, in Morocco, there are 4321 positive patients, 168 deaths, and 928 healed, with numbers varying from day to day. The incubation phase of COVID-19 varies from 5 to 14 days.[3] On March 11, 2020, the World Health Organization (WHO) qualified COVID-19 as a pandemic, and the Moroccan government declared a health emergency on March 20, 2020. As a result, all public and private hospitals have faced an unprecedented emergency, with drastic changes in all organizational processes.

Data specific to cancer patients is available based on recent Chinese experience.[4] In this study, the COVID-19 infection rate appeared to be higher in cancer patients than in the general population (1% vs. 0.29%). Specifically, among infected patients, the risk of developing severe respiratory complications requiring resuscitation was higher in patients with cancer than in patients without cancer (39% vs 8%, p = 0, 0003). In terms of prognosis, a history of chemotherapy or surgery in the months preceding infection was an important prognostic factor for developing severe respiratory complications (OR = 5.34, p = 0.0026). Similarly, cancer patients had a faster rate of respiratory deterioration of 13 versus 43 days (HR = 3.56, 95% CI [1.65–7.69]).[4]

The radiotherapy department of the Regional Center of Oncology at Agadir serves the population of Souss Massa region and also these of regions of Guelmim-Oued Noun, Laâyoune-Sakia El Hamra and Dakhla-Oued Ed Dahab.

Although the number of cases of COVID-19 contamination in the 4 regions remains relatively lower compared to the rest of the country, a set of measures must be taken. The principal problem was how to maintain the activity while protecting patients, families and health professionals from COVID-19. The authors have organized meetings by videoconference with other radiation oncologists to exchange their experiences and eventual solutions.

The current study proposes organization of the activity of the service during this pandemic period. Reliable circuits for staff as well as for patients are installed and treatment protocols are adapted to the current COVID-19 situation. Several scenarios are proposed to deal with any subsequent pandemic situation.

Zoning of the radiotherapy department

During this pandemic period we proposed to divide the radiotherapy department according to the risk of contamination into three zones:

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- **Clean area**: Represents the circuit where the risk of contamination is low. It includes the administrative offices, the dosimetry room and the staff rest room.
- **Semi-contaminated area**: This is the circuit where the probability of contamination is medium. It includes locker rooms, patient corridors, washrooms and waiting rooms.
- **Contaminated area**: This is the circuit where the risk of contamination is high. It includes the simulation room, the accelerator console, and the treatment room.

Disinfection of areas

For the purpose of good environmental hygiene, good ventilation must be maintained and a disinfection procedure for each area must be clearly defined. The disinfection by area will be carried out as follows:

- **For the clean area:** All surfaces must be cleaned daily with 75% ethanol.
- **For the semi-contaminated clean area:** A final disinfection at the end of the consultation and at the end of the treatment must be applied,
- **For the contaminated area:** Disinfection twice a day.

Access to the service

To access the service during this pandemic period, two entrances were installed. One door is reserved exclusively for staff and another for patients.

Staff circuit in the service

At the entrance to the staff door each team member who has suspicious symptoms must report them to the staff monitoring committee.

The nursing staffs are provided with surgical masks (to be changed every 4–6 h) and a hydro-alcoholic gels in Pocket format. The movement of personnel between units will be done in an internal circuit without any contact with the patients.

The organization of work adopted by profile is as follows:

- For the radiation oncologists a turnover system by activity is chosen (simulation, contouring, monitoring consultation and quality control at the post treatment).
- For Medical Physicists, the work is carried out with an alternating presence per post of activity (quality control of the accelerator, dosimetry etc.).
- For the radiation technicians (RTTs), teams of two technicians per time slot were used and overlapping between teams was avoided. For the simulation station, a single technician was adopted.

It should be noted that the direct inter-professional contact is reduced to the strict minimum. All technical and staff meetings have been cancelled. We opted for remote communication by phone and intranet. Only activities requiring the mandatory presence of more than one professional were maintained, such as 2D simulation, validation of the dosimetry and the portal imaging while respecting the distancing measures.

Patient circuit in the ward

At the entrance to the patient door a screening unit was installed. An interrogation on the symptoms of COVID-19 as well as the taking of temperature will be carried out for the patient. For suspicious cases the patient is referred to the COVID-19 specialized medical unit for further diagnosis. If a case is declared positive then treatment for the patient in question will be deferred until complete remission of the infection. Patients who do not have the symptoms of COVID-19 can access the ward with a surgical bib to complete their treatment.

For the simulation

During the pandemic Covid-19, the real time allocated to simulating of a location remains the same as before (60 min for breast location and 30 min for other locations). So, the total simulation time represents the real simulation time plus 15–20 min for disinfection of equipments and room between two consecutive simulations.

For the simulation CT scan

For the CT scan in consultation with the radiology department of Hassan II Hospital we have reserved a time slot of two half days per week for the non COVID-19 dedicated CT scan to pass our patients. We recommend disinfecting the scanner room and the equipment before starting the first patient. The table and restraints between consecutive patients should also be disinfected.

Waiting room

Access authorization will be given to one companion (wearing a surgical mask) per patient if his/her presence is required. We have separated the appointments to avoid crossing patients. We have taken care to separate fragile patients from other patients. We have also set a distance of two meters between patients. Potential material vectors such as cups, water dispensers etc. are removed from the room.

Treatment room

After the treatment of each patient we recommend the disinfection of the restraints and the treatment table. It is also important to leave a distance between the individual restraints and to avoid overlapping them.

Adjustment of treatment protocols with the pandemic

The strategy adopted favours hypo-fractionated protocols according to the recommendations of the Moroccan Society of Cancerology.[5] Patients treated curatively with tumours in place (cervix, H&N and lung) were prioritized. For lung cancer, we have adopted a protocol based on the concomitant radio–chemotherapy combination with carboplatin rather than cisplatin and hypo-fractionated radiotherapy of 55 Gy in 20 fractions instead of the usual standard protocol of 60–66 Gy in classic fractionation.

For locally advanced cervical cancer, we have kept the standard protocol i.e. radiotherapy of 46–50 Gy with normal fractionation followed by brachytherapy (HDR). For hormone-sensitive stage I and II breast cancer (RH+) we recommended postponing radiotherapy for 3 months and starting hormone therapy. For the other cases of breast cancer, we replaced the protocol of 50–66 Gy in normal fraction intended for young women by the hypo-fractionated protocol 42–53,2 in fraction of 2.8 Gy usually dedicated to elderly women.

For neo-adjuvant radiotherapy of operable tumours, priority has been established according to age and life expectancy. In fact, we made the decision to prioritize young patients with localized stages

over those with advanced stages. For elderly patients or those suffering from severe chronic diseases, we decided to postpone their radiotherapy for a few weeks depending on the evolution of the pandemic in the region. Indeed, these frail patients may develop severe forms if infected with COVID 19.

For symptomatic radiotherapy in emergency situations, we have proposed in the case of:

- Symptomatic brain metastases, a total dose of 20 Gy in 4 or 5 fractions.
- Very algic bone metastases refractory to analgesics, a dose of 8 Gy in 1 single fraction with re-evaluation at 10 days.

Management of a suspect or contaminated patient

A COVID-19 patient will only be managed in the radiotherapy department if he or she meets a number of conditions. Palliative radiotherapy will be done for a highly symptomatic patient with a life expectancy > 3–6 months and without any other therapeutic alternative. Curative radiotherapy will be given to a patient with a potentially curable cancer that is rapidly progressing.

Surveillance consultation

Weekly monitoring visits are only routine for patients undergoing concomitant chemotherapy. Symptomatic patients will be seen during their radiotherapy session. For the post-therapy consultations we have favoured teleconsultation to avoid the displacement of patients while maintaining patient-doctor contact.

Management of human resources in the event of a worsening of the epidemic state

We propose to divide the staff of the center into two teams. One team consists of three radiation oncologists, one medical physicist and three RTTs. Each team performs the work for two weeks and then alternates with the other team in order to reduce the risk of staff contamination. In case of human resources needs, we can call upon the Radiotherapists, Medical Physicists and Radiation technicians (RTTs) of the region.

Conflict of interest statement

None.

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