

COVID-19 IN INTERVENTIONAL RADIOLOGY: MANAGEMENT OF THE ANGIOGRAPHY ROOM

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ABSTRACT

One of the most significant challenges that the COVID-19 pandemic has created is the interventional radiology practice. In order to guarantee the best patient care and avoid contamination of the operators, it was necessary to carry out specific management of the complex angiographic rooms.

This work aims to guide healthcare professionals in the safe execution of interventional radiology procedures on COVID-19 patients using suitable management strategies, guidelines and recommendations available, creating an appropriate work environment.

Research and revision work, targeted at COVID-19 patients, made use of the main scientific literature databases of guidelines and scientific articles promoted or edited by international scientific societies.

After identifying and separating the pathways for infected patients and defining the dressing and undressing areas of the operators, a check-list was created to prepare the angiographic room and the surrounding spaces. The set-up includes removal of all non-essential mobile devices for the expected procedure and preparation of the sterile angiographic table with the necessary material and drugs. It is also necessary placement of containers for infected waste inside the room; cover of contrast injector, angiographic controls and patient monitoring devices; finally covering with clean sheets everything that cannot be moved. The standardization of operating procedures, staff training and the analysis of critical issues encountered lay the foundations for definition of best practices adaptable to different work environments.

INTRODUCTION

The World Health Organization (WHO) declared the Coronavirus disease 2019 (COVID-19) pandemic on 11 March 2020. Approximately 20% of COVID-19 patients may develop a severe form of disease, which fortunately in most cases it is a mild disease. The current estimated mortality rate of COVID-19 is 2%, compared to rates of 10% and 34% in Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) respectively.

One of the most significant challenges that COVID-19 pandemic has created is the practice of interventional radiology. In order to best ensure patient care and avoid contamination of operators, dedicated management of the complex environment of angiography rooms was necessary.

Angiography rooms are an extremely complex environment with specific characteristics that are unfortunately not always fully taken into account. The high degree of specialization of the professionals involved, the need to guarantee a 24/7 service, and the variety of devices and equipment present in the rooms are all factors that make it difficult to manage procedures on patients with COVID-19.

Careful hand hygiene, the correct use of protective equipment and strict adherence to sanitization procedures are essential measures to ensure continuity of infection control.

MATERIALS AND METHODS

This work aims to guide healthcare professionals in the safe performance of interventional radiology procedures on patients with COVID-19, using appropri-

ate management strategies, available guidelines and recommendations, creating a safe and appropriate working environment.

The research work made use of the main electronic databases of scientific literature, guidelines and scientific articles promoted or written by international scientific societies (CIRSE, ECDC, SERVEI).

From the research work and the analysis of the literature, it emerges that a rigorous training of the personnel involved in interventional radiology is necessary; that written protocols should be available in every department and easily accessible to all operators.

After identifying and separating the pathways for infected patients and defining the dressing and undressing areas for staff, a checklist was created for the preparation of the angiography room and surrounding areas.

Before a patient arrives in an interventional radiology department, it is mandatory that all preparations have been completed, using the checklist as a reference.

This will reduce the unnecessary amount of time patients spend on the ward and avoid contamination of surfaces and environments. These measures include both the dressing of the staff with the personal protective equipment (PPE), indicated and shared according to the dedicated guidelines, and the setting up of the angiography room.

PPE includes masks, gowns, gloves, eye protection (goggles or face shield) and shoe covers. Sterile equipment, such as gowns and gloves, should be worn by operators on top of other protective equipment. These devices will also be in addition to the usual anti-x PPE (lead-lined gown, parathyroid, and

lead-lined goggles).

With regard to the preparation of the angiography room, it is advisable to move all non-essential and mobile equipment out of the room to avoid possible contamination.

The fixed and essential contact surfaces inside the room should be covered with cloths, while plastic covers can be used to cover the angiograph controls, the injector, the ultrasound scanner and all the mobile equipment controls that will be needed during the procedure. The area in front of the angiography room, where the monitors for viewing and processing the images are located, should also be preserved with plastic covers.

It is also advisable to sanitize hands with a hydro-alcoholic solution (at least 70% alcohol) every time you leave the room to perform operations at the above-mentioned workstations and to replace the outermost pair of gloves.

Clean and contaminated work areas should be clearly separated.

The angiography table and sterile equipment suitable for the procedure should be prepared prior to patient arrival and drugs and medications should be stored in a plastic box to be opened if necessary. In addition, a sufficient number of waste disposal containers should be placed in the room, which in our experience is at least four.

Interventional radiology personnel and administrative staff, who are not directly involved in the procedures but are located within the department, will be removed during the arrival of the COVID-19 patient and the radiographer will be responsible for the acceptance of the patient.

At the end of the procedure, staff will leave the angiography room. Healthcare professionals (interventional radiologists, radiology technician and nurses) are required to remove PPE using the undressing area to avoid contamination of themselves or their colleagues.

Used PPE should be collected in bags for disposal. Access to workstations in the post-procedure reporting area by the interventional radiologist will only be permitted after removal of PPE and appropriate hand washing. Strict staff discipline is required.

Proper cleaning of the imaging equipment and proper disposal of instruments and consumables must

also be ensured. Non-disposable instruments should be placed in an antiseptic solution prior to sterilization. Personnel cleaning the room should use personal protective equipment such as FFP2 masks, non-sterile gowns, disposable gloves, goggles or face shields and over-shoes, in the same way as directly involved healthcare workers.

Exposed surfaces should be cleaned with 70% alcohol as sodium hypochlorite-based disinfectants may ruin surfaces. The use of such disinfectants is therefore preferably limited to the floor.

■ RESULTS AND CONCLUSIONS

The control measures described proved to be important in minimizing the risk of SARS-CoV-2 contamination and can be a valuable standardization tool during procedures on COVID patients.

The most critical issues encountered, especially during the first phase of the pandemic, were:

the correct and rigorous execution of the steps during room preparation, for which mutual control and the drawing up of a check-list were useful.

The long waiting times for transporting the patient from the inpatient ward to the interventional radiology service, which significantly increased the operators' exposure time, the difficult availability of protective plastic headphones, the optimization of time especially in case of urgency, and finally the management of emotions.

The psychological impact of the virus on the operators was in fact one of the most difficult elements to overcome and manage. The professional adaptation reaction to the emergency was as immediate as it was sometimes problematic.

Guidelines will evolve and have local variations. Strict adoption of safe practices may increase the cost of equipment and procedural time and inevitably create new technical difficulties during procedures. On the other hand, the daily catastrophic onslaught of the spread of COVID-19 on global health systems requires aggressive preventive measures from all medical disciplines to do our part to combat this dangerous pandemic. The standardization of operating procedures, staff training and analysis of the critical issues encountered lay the groundwork for the definition of best practices adaptable to different work environments.

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