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Commentary

Phase 3 of COVID-19: Treat your patients and care for your radiographers. A designed projection for an aware and innovative radiology department

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Introduction

Since the COVID-19 outbreak, healthcare workers (HCWs) have faced an unprecedented and unpredictable situation on the frontlines. Clear instructions are crucial to manage COVID-19 patients and protect HCWs.

Operating in safe conditions is extremely important to minimize the risk of contracting the disease. The aim of this document is to provide useful operative recommendations to radiographers who perform imaging services, such

as chest X-ray (XR) and computed tomography (CT) scans, aimed at three kinds of patients: negative, suspected, or suffering from Severe Acute Respiratory Syndrome by Coronavirus (SARS-CoV-2).

The following information may undergo modifications and therefore can be adjusted according to individual department guidelines as the COVID-19 situation evolves.¹

Two different paths into a radiology department

Considering recent evidence, it is necessary to design two different paths for patients who enter a Radiology Department^{2-4,9}: one should be followed by confirmed and suspected SARS-CoV-2 patients, whereas the other should be used by patients who are confirmed negative (Fig. 1).¹⁵

This measure aims to keep COVID-19 patients as distant as possible from the non-COVID-19 patients. Every hospital or department dealing with this situation should arrange its layout accordingly. If the Radiology Department has one entrance, scheduling or postponing the confirmed or suspected COVID-19 patients at the end of day might be a suitable solution to perform the examinations safely.^{7,13} It is encouraged to designate a clean area, a buffer room, and a contaminated area before entering the imaging room.⁶

Finally, the implementation of proper signs to easily differentiate the two paths is strongly recommended.²

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The COVID-19 path

Several hospitals have chosen to avoid the term “COVID” on their signs in order not to scare patients. This might be a valuable option to obtain patient compliance. Wordings such as “respiratory” or “fever path” may be used instead.⁵

HCWs who manage COVID-19 patients should work in pairs^{8,13} when it comes to imaging in order to minimize the risk of contamination and the usage of PPE. A two-radiographer scenario is highly advised whenever possible.^{13,14} One radiographer should be fully equipped (three-level protection standard) with all the PPE and deal with the patient in the scanning or x-ray room, while the other one works on the console and wears only essential PPE in a clean zone. Although this operation might be time-consuming, wearing the proper PPE is mandatory.^{19,20}

If the two-radiographer scenario is not feasible, other options include having a team of one radiographer and one HCW, or having one radiographer only. This last option has a higher risk of contamination.

Overall, dedicated CT scanners, and standing and mobile radiographic units are strongly recommended to avoid disease spreading among patients.^{2,3} A period of at least 30 minutes for each patient should be considered for the exam administration.⁵

General radiography procedure for a chest X-ray (XR) with two radiographers

In these scenarios, the fully-PPE-equipped radiographer will be called “Radiographer 1” and the essential PPE-equipped radiographer will be called “Radiographer 2”.

In the radiology room

- Radiographer 1 sets up the room for the examination, takes care of the patient and wears three pairs of gloves,
- Radiographer 2 remains in the control room, performs the examination and wears two pairs of gloves (in case the colleague needs help)
- When the XR examination is finished, Radiographer 1 takes care of the room disinfection after removing one pair of gloves and practices hand hygiene with alcoholic gel.

Mobile radiographic unit scenarios

- Radiographer 1 takes care of the patient and wears three pairs of gloves,
- Radiographer 2 sets a double-bagged cassette and wears two pairs of gloves,
- Radiographer 1 places the double-bagged cassette beneath the patient’s chest while Radiographer 2 sets the mobile unit in proper position,
- Radiographer 1 removes a pair of gloves and practices hand hygiene with alcoholic gel,
- Radiographer 2 carries out the XR examination,

- Radiographer 1 wears a third pair of gloves, removes the double-bagged cassette from the patient’s chest and hands it over to his colleague while pulling down the outer plastic bag. Hence, he removes a pair of gloves and practices hand hygiene with alcohol-based gel,
- Radiographer 2 grabs the cassette, sets the mobile unit back, removes a pair of gloves and practices hand hygiene with alcohol-based gel,
- At the end of the procedure, Radiographer 1 disinfects the mobile radiographic unit.

Chest CT scan procedure with two radiographers

As mentioned above, the fully-PPE-equipped radiographer will be called “Radiographer 1” and the essential PPE-equipped radiographer will be called “Radiographer 2”.

- Radiographer 1 takes care of the patient and wears three pairs of gloves,
- Radiographer 2 remains in the control room and wears two pairs of gloves (in case the colleague needs help)
- Radiographer 1 places the patient on the CT couch, removes a pair of gloves and performs hand hygiene with alcohol-based gel,
- Radiographer 1 proceeds to patient centering and moves to an isolated protected area,
- Radiographer 2 performs the examination,
- Radiographer 1 wears a third pair of gloves, takes care of the patient on his way out, removes a pair of gloves and proceeds with disinfection of the CT scan unit.

A low-dose high resolution protocol is strongly advised for detecting COVID-19^{16,18,21} due to patient radiation protection concerns,¹⁷ mostly when it comes to patient screening.¹⁶

Disinfection methods

Surface wiping disinfection, floor disinfection, and air exchange must be performed daily. Every time a radiological exam is carried out, the equipment must be disinfected by wiping the surface with alcohol 75%. Floor disinfection is performed with 1000 mg/L of chlorine-containing disinfectant every 4 h at least, or when needed.²¹

Disinfection sprays must be used carefully because they might infiltrate into the equipment circuits. To facilitate disinfection, it may be useful to cover any electronic part (keyboards, push-button panels, touchscreen monitors) with plastic.

Using negative air pressure in the imaging room could be a suitable option to minimize the risk of disease spreading. Otherwise, the recommendation is to keep air temperature in a range between 19 and 21°.

Furthermore, to gather information about proper disinfectant products, contacting the application specialist in advance is suggested.

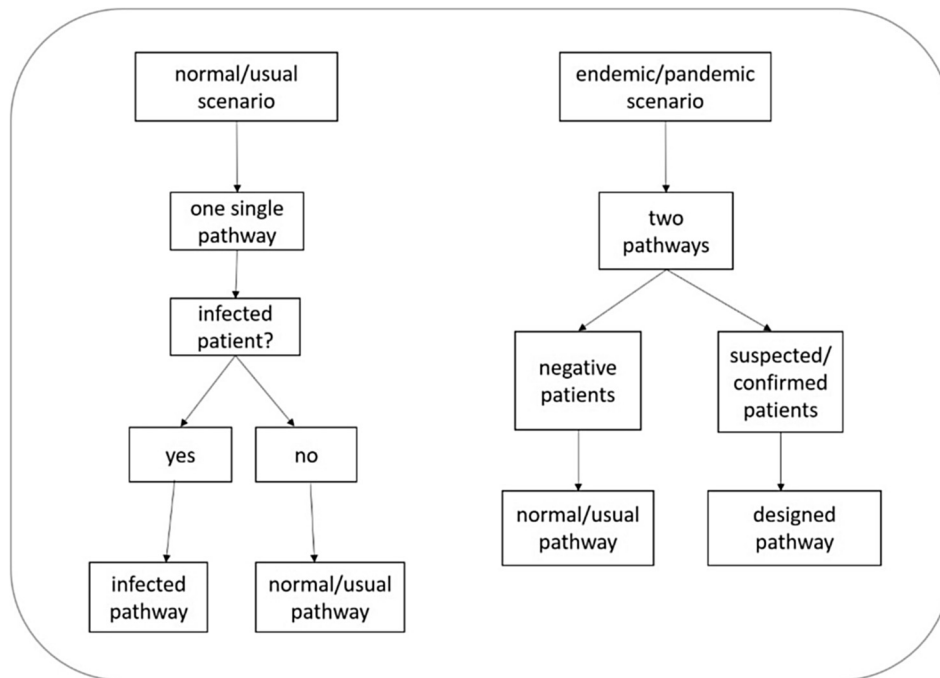


Fig. 1. Radiology department planning for the best practices. Before, during and after a pandemic or infection situation is important to implement standardized pathways to separate negative and suspected/positive patients.

Risk management & patient safety

A Hospital Readiness Checklist developed by WHO-Europe is supporting hospital managers and emergency planners in order to ensure a rapid and effective response to the COVID-19 outbreak.¹⁰

The step-by-step list is designed to help hospitals to review systems, resources, and protocols, and outline specific actions to strengthen responsiveness to COVID-19 spread.¹¹

Some of the elements in the checklist include:

- Surge capacity – the ability of a hospital to expand beyond its normal capacity and to meet an increased demand for clinical care;
- Adapted human resource management to guarantee adequate healthcare staff capacity;
- Accurate and timely communication to ensure informed decision-making, effective collaboration, public awareness and trust;
- An operational infection prevention and a control programme to minimize the risk of transmission of healthcare-associated infections to patients, hospital staff and visitors;
- An efficient and accurate triage system and a management strategy to ensure adequate treatment of COVID-19 patients;
- The ability of HCWs to recognize and immediately report suspected cases as the cornerstone of hospital-based COVID-19 surveillance.

A rapidly evolving outbreak requires all hospitals to be able to adapt to a swift increase in demand while continuing to ensure safe environments for HCWs. All hospitals need to

take precautions against potential interruptions of critical support services in case of shortage of equipment, supplies and/or healthcare personnel.

In Radiology Departments, radiographers performing CT scans and x-ray examinations are at a high risk of direct or indirect exposure to pathogens from infected patients.¹⁸ Hence it is critical to ensure personal safety and avoid cross-infection.

Overall, when working under pressure, clear messages need to be put into practice in order to guarantee and maintain patient safety¹²: Non-Technical Skills (NTS) as effective communication, good teamwork and clear leadership will give HCWs and patients a better chance of safety.

1. Brief the whole team, even if not in detail
2. Take deliberate action when under stress
3. Lead openly and inclusively on occasion of rapidly changing scenarios
4. Help staff who may be unfamiliar with some tasks
5. Use checklists and aid memory and support tasks
6. Encourage staff to express their opinion
7. Recognize performance-limiting factors
8. Debrief as a team to learn from experience
9. Think about the wider healthcare team and the hospital as a system.

Conclusions

Taking care of patients and HCWs, such as radiographers, is fundamental to minimize the risk of disease transmission. Within a Radiology Department, different path layouts should be designed to separate ordinary from epidemic/pandemic healthcare situations.

A two-radiographer scenario is highly recommended to deal with suspected or confirmed patients, alongside proper disinfection to prevent cross-infections. The first radiographer should be fully-equipped with proper PPE and deal with the patient in the scanning or x-ray room. The second wears essential PPE and remains in the console room. Therefore, having solid and clear protocols is key to reducing the risk of disease spreading.

Though the COVID-19 pandemic has been an unsettling experience for global health, healthcare systems, and also for patients and HCWs, we must not miss this chance to learn from firsthand experience to prevent failures and address their wider causes. This requires stretching beyond simple diagnostic activities and sharing lessons taken from incidents, to ensure that such lessons are embedded in practice. The distinction between passive learning and active learning is necessary in understanding why truly effective learning so often fails to take place.

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