Role and Challenges of Radiology in COVID-19: Our Experience at a Tertiary Care Center in India

Dear Editor,

The coronavirus (COVID-19) pandemic has propelled the health-care system into a state of emergency. With over 11.08 million cases globally and 648,315 cases and 18,655 deaths in India, the pandemic is currently showing no signs of slowing down.[1] The figures have shown steep spikes in the last few weeks in India despite the lockdown measures, with all hopes now hinged upon finding a vaccine.

In the backdrop of these changes, it is challenging to adequately operate a functional radiology department in a tertiary care center with limited resources and a huge patient burden.

Yu *et al*. drawing from their experience of fighting the pandemic at their institution have emphasized primarily on measures to minimize droplet, aerosol, and contact transmission in a radiology department while dealing with suspected or confirmed ambulatory patients of COVID-19.[2] The following simple measures have been suggested:

1. Specific examination rooms and corridors can be reserved for suspected patients. The examination room should be thoroughly sterilized and the next patient should be examined at an interval of at least half an hour. If special examination rooms are not available for suspected patients, as is the case in most hospitals in this country, one can try dividing the time period for ordinary and suspected patients with thorough disinfection in between
2. Portable X-ray machines and ultrasonography units reserved exclusively for isolation wards and COVID intensive care units (ICUs) should ideally be used
3. Because high-resolution computed tomography (HRCT) has an adjunctive role in the investigation and care of patients and because in most hospitals it is not feasible to exclusively allocate a CT machine for suspected/diagnosed COVID patients owing to logistical and infrastructure constraints, the method of time interval division for suspected and ordinary patients with disinfection of the unit after each patient should be ideally adopted[3]
4. Operators and first-line staff such as those operating the X-ray machine, Cath lab, or performing ultrasonography of suspected patients should be adequately protected with disposable medical caps, face masks (N95), protective goggles, double-layered gloves, shoes, and disposable medical gowns or clothing.[4]

Disinfection of the examination room may be done with either a chlorine-containing disinfectant or ultraviolet light. There is a need for a buffer zone between contaminated and noncontaminated areas within the radiology department. Such guidelines are bound to limit the patient-handling capacity of a heavy-duty department.[5]

Use of a picture archiving and communication system (PACS) considerably reduces the risk of exposure for the reporting radiologist and is hence desirable. However, in our setting, PACS is unavailable at many centers in the country.

Yu *et al*. have also outlined a postexposure protocol for medical staff exposed incidentally while caring for nonsuspected patients[5] [Figure 1].

At our institute, adequate safety measures as outlined above have been adopted while ensuring no patient approaching the department is refused care. Routine ultrasonography and other investigations are being carried out with adequate barrier protection comprising face mask, cap, shield, and gowns. Radiological examination in ICU and isolation wards has been carried out with adequate prescribed full personal protective equipment and using exclusively dedicated portable X-ray and ultrasonography machines for these units [Figure 2].

While this institution has been declared a COVID hospital, routine patients are still being catered to on a priority basis with additional safety measures pertaining to disinfection and time management to avoid contamination or overcrowding (social-distancing norms).

Residents and faculties of all departments at our institution have been given a brief orientation program regarding the clinical and microbiological aspects of COVID following which they have been posted in COVID screening, isolation ward, and ICU duties on a rotation basis of 1 week followed by 1-week quarantine.

A broad schematic layout of an ideal radiology department is shown in Figure 3. This has been adhered to while dealing with the examination of suspected/confirmed COVID cases in the isolation ward and ICU, as well as routine investigations in the casualty department to reduce nonessential exposure.

While patchy ground-glass opacities (GGOs) are the predominant imaging feature, distribution of these opacities in peripheral and basal segments has greater value in a positive diagnosis.[3] A variety of plain chest radiographic findings have been encountered in COVID patients, which include an apparently normal chest X-ray, patchy peripheral and basal GGO, patchy and ill-defined nodular opacities in bilateral lung fields, and diffuse air space opacities with architectural distortion of unilateral lung field [Figure 4a-d].

Our radiologists have been keeping a high degree of clinical suspicion while evaluating patchy GGOs, viral interstitial pneumonias, and severe acute respiratory illness on HRCT or

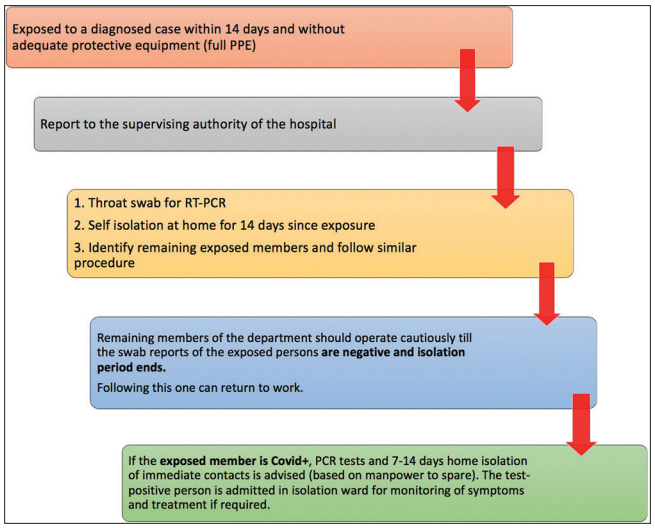

Figure 1: Postexposure protocol for medical staff exposed incidentally while caring for nonsuspected COVID patients

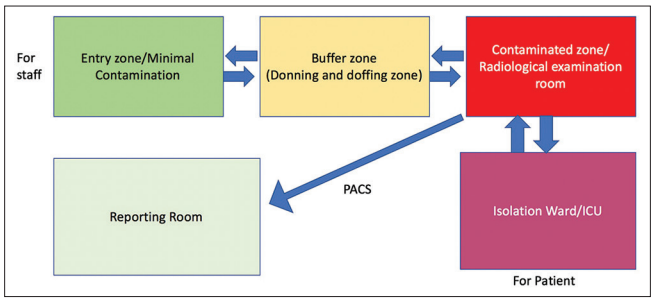

Figure 3: Broad schematic layout of an ideal radiology department

plain radiographs. The role of radiologists in this pandemic may be briefly summarized as follows:

i. Advising microbiological testing in cases with suspicious clinical and imaging features suggestive of COVID[3]
ii. Assessment of severity and progression/remission of disease in diagnosed cases to aid further management.

Following the above-mentioned safety guidelines and keeping oneself academically up to date with novel findings will hopefully help in operating a functional radiology department albeit in a restricted manner safeguarding both the staff and the patients while continuing to provide a high quality of service and care.

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Conflicts of interest

There are no conflicts of interest.

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Figure 2: Personal protective equipment offered at our institute; (a) protective N-95 mask, face shield, and apron worn by a radiologist while performing routine procedures; (b) full personal protective equipment worn by radiographers posted in exclusive COVID isolation wards and intensive care units consisting of full gown, double gloves, shoe covers, goggles, and N-95 mask

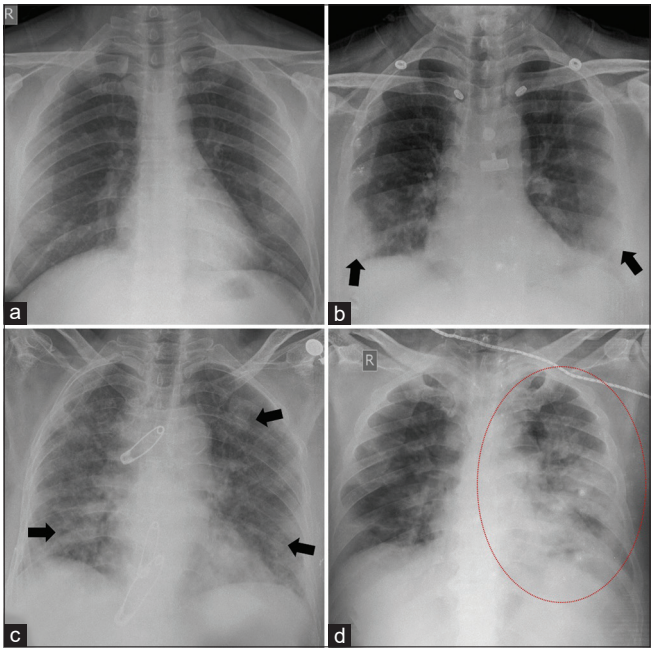

Figure 4: Plain chest radiographic findings different in COVID patients: (a) normal chest X-ray; (b) patchy peripheral and basal ground-glass opacity with increased reticular markings; (c) patchy and ill-defined nodular opacities in bilateral lung fields; (d) diffuse air space opacities with architectural distortion of left lung field

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