

## COVID-19 National Pakistan Guidelines: Radiological Society of Pakistan (RSP) Recommendations Regarding Utilisation of Chest Imaging

Aman Nawaz Khan,<sup>1</sup> Najam Ud Din,<sup>2</sup> Ummara Siddique Umer<sup>3</sup>

Coronavirus disease (COVID-19) is a WHO-declared pandemic, since the first case was reported in China and has challenged all fields of medicine. At the time of this writing, the total number of diagnosed cases globally is above 2 million with 128, 000 deaths.

The role of radiology in COVID-19 is three-fold: diagnosis, progression and severity.<sup>1,2</sup> Progression and severity can be assessed in moderate to severe clinical scenarios. For mild symptoms in a patient with COVID-19, there is no role of imaging and isolation with observation is being suggested routinely. Although the progression and severity of disease can be assessed with arterial blood gases (ABGs), imaging like chest X-ray or CT scan, depending upon availability, can be used for assessment of the extent of pneumonic infiltrates.<sup>1-5</sup> Till now the role of imaging in Pakistan is limited mostly for progression and severity, and that too in selected cases.<sup>6</sup> Internationally, publications in different journals and online forums highlight the importance of CT scan as diagnostic tool. Some centres in China have experimented with ultrasound as well, but we as radiologists know that doing ultrasound for a pneumonic picture of lung, no matter how peripherally located, would still end up in having chest X-ray or CT scan being performed. The role of radiology has been well established in Chinese clinical pathways during the pandemic which have been advocating the use of CT scan particularly in recent publications in peer-reviewed high-impact factor journals. In comparison, its role in the West, both in USA and Europe, has been evolving that can be judged by the changing statements from the European, British and American radiological societies.<sup>7-9</sup>

In Pakistan till date (21 April 2020), there have been 9771 diagnosed cases of COVID-19 with a mortality figure of 209, with 118,000 reverse transcriptase polymerase chain reaction (RT-PCR) tests performed. We in Pakistan, from the Radiological Society of Pakistan (RSP) forum, are critically reviewing the evolving clinical evidence with a .....  
<sup>1-3</sup>Radiological Society of Pakistan, <sup>1,3</sup>Radiology Department, Rehman Medical Institute, Peshawar, <sup>2</sup>Aznostics - The Diagnostic Centre.

**Correspondence:** Ummara Siddique Umer.

Email: ummara\_81@hotmail.com

**DOI:** <https://doi.org/10.5455/JPMA.03>

dedicated subcommittee of executive council, have been discussing it at executive council and member levels, since the first reported case in Pakistan. RSP took initiative to create guidelines for radiology departments all over the country, and proposed pathways for the clinical community to define the role of radiology in managing symptomatic patients during the COVID-19 pandemic. Due to the evolving situation of the disease, day-night changes being observed in international forums and at our society level, we also come up with regular updates/versions weekly. The evidence-based discussions on the RSP forum led to a consensus for version 3 of guidelines, which was disseminated along with clinical guidance for management pathway. It has been uploaded on RSP official website on 8th April 2020. It emphasises the role of radiology in diagnosis, prognostication, assessment of severity and progression of disease. We from the RSP forum have also been advocating appropriate use of CT scan in select group of patients as a tool to triage, in the background of increased incidence of COVID-19 symptomatic patients (Figures 1 and 2). In such clinical scenario, the availability of RT-PCR and turnaround times can lead to delays in clinical decision-making, which has the potential of adverse clinical outcomes. The facilities and capacity of the designated COVID-19 centres by the government is also variable. The National Institute of Health (NIH) Pakistan published the national guidelines and management pathway on 2nd April 2020, according to which the role of radiology is in the form of chest X-ray in COVID-19 suspected patients with disease ranging from mild to critical.<sup>6</sup>

We are dealing with different set of patients, COVID-known or COVID-suspected, which are grouped according to the epidemiology, clinical findings and laboratory results:

1. The group of asymptomatic patients with high or low risk COVID-19 exposure necessitates RT-PCR testing. These cases, with normal chest X-ray, no evidence of hypoxia (oxygen saturation >94%) and no haemodynamic compromise would fall in the category of mild disease. Chest X-ray is not a very sensitive test to pick

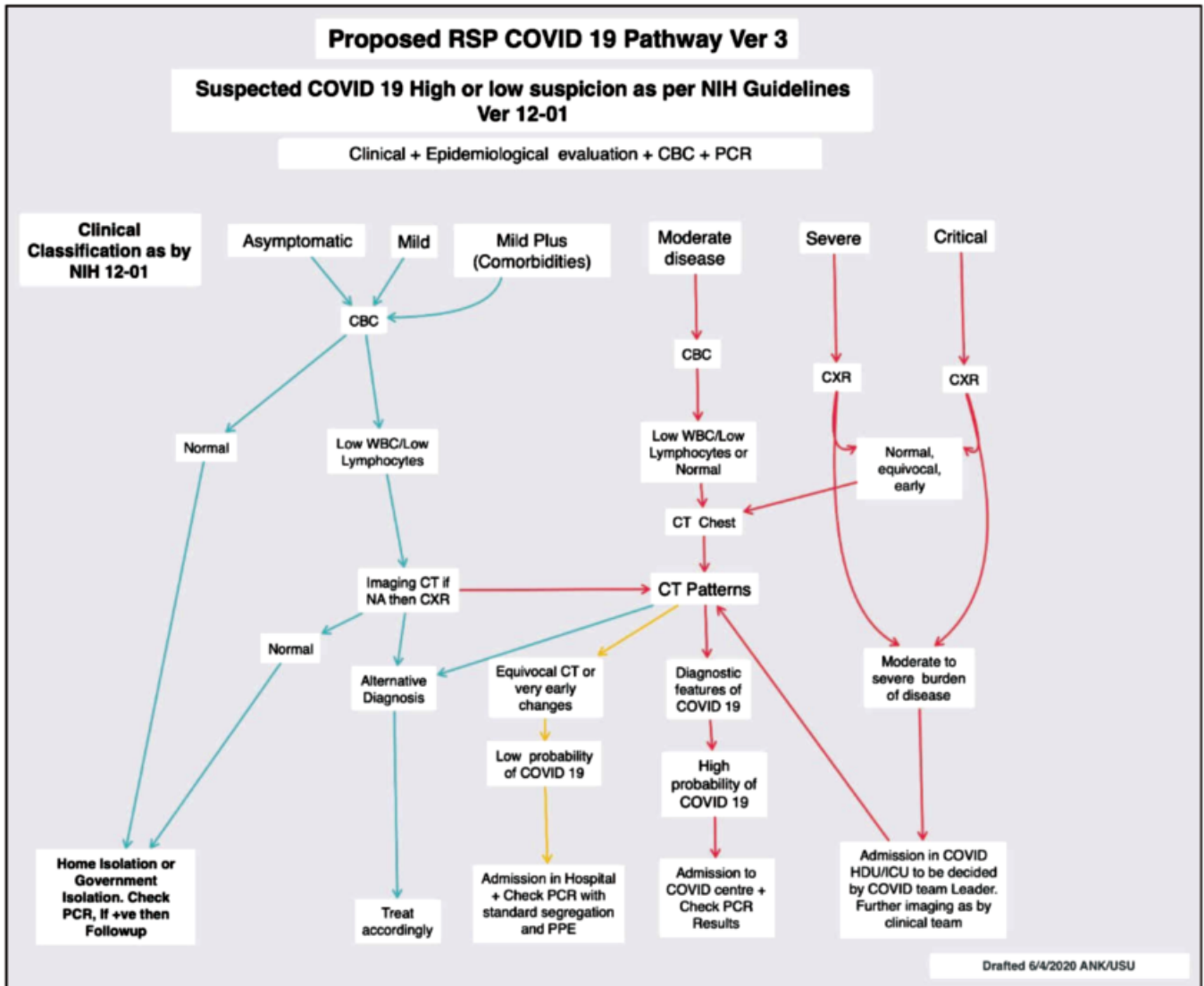


Figure-1: Radiological Society of Pakistan (RSP) proposed COVID-19 pathway as per NIH guidelines.

up early signs of COVID-19. In this group of patients when no risk factors are present, no imaging is required, as it will not add to the management. This cohort can be managed at home or at designated dedicated isolation facility. However, if they are in the high risk group (age greater than or equal to 65 years, with co-morbidities or are immunosuppressed), they would be candidates for hospital admission. This is a potentially large group and the high-risk cohort particularly could strain the acute COVID centres' beds. However, those who are in high risk group might benefit from imaging by CT scan which can exclude the evidence of any lung changes in which case they could be candidates for home or dedicated facility isolation. Those with CT scan evidence of lung infection

would be candidates for admission in COVID centres. Patients with alternative diagnosis on CT scan can be routed to the appropriate clinicians. The presence of CT scan facility in the designated centres makes it a viable option that can benefit patients and better direct the resources for those who are at high risk of progressing further.

2. In patients with moderate disease, the presence of "mild infiltrates" on chest X-ray is a subjective radiological criterion. These patients may have hypoxia. CT scan can prove useful in defining the disease burden and severity, and diagnosis and better clinical management can be quickly obtained, rather than relying on clinical and

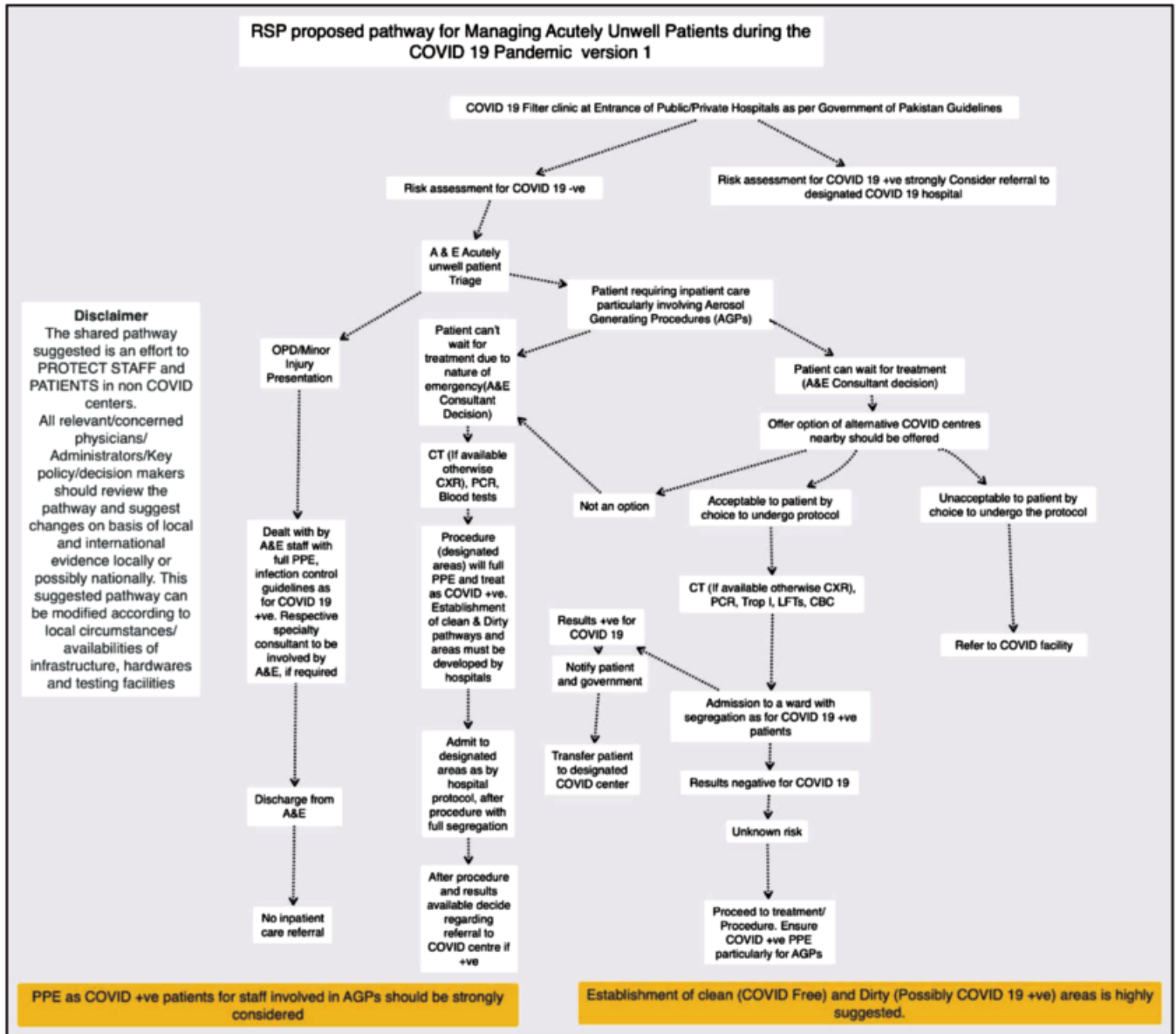


Figure-2: Radiological Society of Pakistan (RSP) proposed pathway for managing acutely unwell patients during the COVID-19 pandemic.

epidemiological basis alone. It can identify patients who are likely to progress to severe disease early. It has the potential to identify patients who might be COVID-negative due to alternate diagnosis suggested on CT scan, leading to a change in the management plan. Utilisation of CT scan facility, which is available in most of the designated COVID centres in Pakistan, makes it an invaluable resource. The fact that many centres have used it across the globe effectively, with adequate PPE and infection control measures, motivates us to recommend using this resource effectively.

3. In patients with severe and critical illness, the likelihood of x-ray abnormalities is high. In most cases, X-ray as a preliminary investigation will be useful. However, if diagnostic uncertainty exists or if the X- Ray images are not typical for COVID-19 and/or PCR is negative, then CT scan may have a role.

4. A special cohort in this pandemic includes patients presenting with other acute illnesses or emergencies who will need medical care. This group may have COVID-19 carriers who can act as vectors to transmit the infection to healthcare workers (HCWs). Global morbidities and

mortalities amongst HCWs involved in care of non-COVID-19 or suspected cases is evidence to the statement. This poses a unique challenge for non-COVID-19 centres regarding isolation and allocation of a clinical area. This also poses a serious hazard to HCWs, particularly if they are performing aerosol generating procedures (AGPs). In this group, different subspecialties have come up with national and international guidelines that recommend using HRCT imaging before performing AGPs. In such situations, proving PCR-negative status might not be possible due to urgency. The role of RT-PCR and chest imaging in this clinical scenario needs to be defined in national guidelines to protect both HCWs and patients.

RSP has shared its proposed clinical management pathway defining the role of radiology in our clinical guidelines on 8th April 2020 on our website (<https://www.radiologypakistan.org.pk/>). We have also proposed pathways for role of imaging in management (Figures 1 and 2). Our website and social media has been used to disseminate continuous guidance on use of personal protective equipment (PPE) in radiology and methods of infection control. We have communicated our recommendations to different national clinical societies and the decision-making forums.

Lately, RSP has endorsed the recently published multinational consensus statement from the Fleischner Society regarding the role of chest imaging in patient management during the COVID-19 pandemic.<sup>7</sup> We are aware that high-resolution computed tomography (HRCT) and ultrasound chest are being used in NIH-designated COVID centres. We therefore recommend multidisciplinary interaction leading to changes based on available evidence to the NIH COVID-19 pathway, RSP will be keen to collaborate with NIH to standardize the role of imaging in designated COVID 19 centers. This is a challenging task due to the variability of resources, infrastructure and incidence of COVID 19 cases in the

country. However, using all available resources including CT scan of the chest appropriately has the potential to improve clinical outcomes and efficiently utilize limited hospital beds. Our proposed pathways, Fleischner guidelines and newly emerging clinical evidence can be used to draft a multivariable national model that can be adopted by different centers across the country, depending on available resources and incidence of COVID 19.

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