

# **Maimonides Emergency Department COVID-19 Chest Point-of-Care-Ultrasound (POCUS) Protocol**

## **BACKGROUND**

Identifying COVID-19 patients is important to controlling this pandemic and continues to challenge our current health care system. The PCR testing for the novel SARS-CoV-2 can take many days to result and has unknown sensitivities or specificities. Early data shows that it may be less than reliable. We know that CXR is clearly an unreliable test. Preliminarily, CT has been shown to have good test characteristics for COVID-19, but CT scanning every patient to rule-out COVID-19 is not practical. Chest POCUS has the potential to be an important tool in the evaluation of COVID-19 patients because it is cheap, quick, and repeatable. Though chest POCUS has unknown specificities or sensitivities for COVID-19 (due to a paucity of data), there have been descriptive studies showing potential for chest POCUS to help guide the provider in the evaluation and treatment of COVID-19 patients.

COVID-19 generally begins in the terminal alveoli, and the disease is described on CT as bilateral, multi-focal, basilar, peripheral opacities. The characteristic lesions are close to the pleura and therefore amenable to chest POCUS. Anecdotally, groups in China and Italy have reported using chest POCUS with good success<sup>1,2</sup>. Based on the limited reports, we suspect that chest POCUS will have much higher sensitivities for COVID-19 than CXR. These groups report that lung findings may be present prior to clinical deterioration, and therefore may assist in the triage of patients and in identifying those patients who are currently stable, but are at risk of clinical deterioration.

## **CHEST POCUS FINDINGS**

The chest POCUS findings with COVID-19 seem to be similar to the ultrasonographic findings of other viral illnesses involving the lower respiratory tract. Therefore, these findings described are not specific to COVID-19 and should be used in conjunction with history, clinical presentation, lab testing, and other imaging to risk stratify patients. Findings in COVID-19 are commonly bilateral, and most commonly in posterior and inferior quadrants. When the following findings are present, there is already significant pulmonary involvement and the patient may have the potential to deteriorate clinically:

- Patchy, multi-focal areas showing “B-lines”
  - Most common finding
- Thickened, irregular, “shredded” pleural line
- Sub-pleural consolidations that abut the pleura and appear hypoechoic with irregular borders
- Air bronchograms (pneumonia)

In comparison, patients with cardiogenic pulmonary edema typically have crisp pleural lines with B-lines less numerous in the anterior-superior lungs that progress to more

numerous in the posterior-inferior lung fields. Also, there is commonly pleural effusions with CHF, but not commonly with COVID-19.

Interestingly, there have been reports of COVID-19 induced myocarditis. If you perform a POCUS echo and see globally depressed cardiac function in a person without cardiac history, questionable history, or even with known cardiac history, it would be prudent to include a cardiac workup.

## **PROPOSED SCANNING PROTOCOL**

The chest POCUS scanning protocol is no different than the typical eight zone scan that we perform on our other undifferentiated dyspneic ED patients. Four zones per side with views of the superior and inferior anterolateral lung fields, as well as superior and inferior posterior lung fields. Most Emergency Physicians are well versed in this standard protocol.

We encourage both the use of phased array probe (best for B-line identification) as well as linear array probe (best for pleural/subpleural findings).

## **INFECTION CONTROL**

We recommend that after scanning a presumed COVID-19 patient, the probe, the probe cord, the machine user interface, the keyboard, and the power button all be cleaned thoroughly with disinfectant wipes. This is no different than after any other patient scanned with our machines in the ED. Hopefully this potentially lethal pathogen will increase adherence to our standard cleaning regimen. In our ED the purple top wipes are currently available and effective.

If patients are having a procedure performed with high aerosolization risk (intubation), the ultrasound machine should not be in the room.

For now, the machines on the North Side of the ED should remain in the “Hot” zone. There should be no movement of the ultrasound machines into or out of this zone without permission by an Ultrasound Division Member who will perform a terminal cleaning of the machine.

## **THE FUTURE**

The tsunami of patients with respiratory complaints is predicted to swell in the coming weeks and months. As our resources become increasingly limited with the increased demand, lung POCUS may be an important tool in triaging sicker patients as well as in identifying those patients with higher risk of clinical deterioration and return visits who require close follow-up. The data supporting chest POCUS is limited now, but future studies may demonstrate that it is a crucial tool in this resource consuming pandemic. More to come...

Lawrence Haines MD, MPH, RDMS, FACEP  
Director, Emergency Ultrasound Division  
Attending Physician, Emergency Medicine  
Maimonides Medical Center

1. [10.21203/rs.2.24369/v1](#)
2. [10.1007/s00134-020-05996-6](#)