Role of Imaging patients with Suspected or Confirmed Covid-19 Infection in ED/In-patient and Ambulatory Settings

Situation:
No guidelines exist for enhancing the safety process for imaging patients with suspected or confirmed COVID-19 infection. There also remains lack of clarity on the role of chest imaging.

Background:
The goal of imaging in COVID-19 patients is to provide high level care while minimizing risks to healthcare staff and other patients. For in-patients and ED patients some radiology exams can be performed portably (US, radiographs, head CT, minor procedures), other exams require patient transport off the floor (MR, CT, Nuclear Medicine, Fluoroscopy, IR).

Assessment:
The transport of suspected/confirmed COVID-19 patients for imaging should be minimized. As such, ensuring appropriate imaging utilization is necessary. For ED and in-patients, portable alternatives to off floor imaging should also be used whenever possible. The use of chest imaging should follow best practice guidelines. Any non-critical imaging or procedure should be deferred until COVID-19 diagnosis is either confirmed (and patient recovers from their illness) or excluded.

Recommendation:
1. For in-patients and ED patients, all imaging requests (excluding radiographs) for patients with pending or confirmed COVID-19 will be approved by a radiologist whenever possible. For out-patients, medical necessity of any imaging test should be determined by the ordering provider and/or radiologist. COVID test results are not necessary to proceed with indicated ED imaging orders.
2. From 8am to 5pm approval will be sought by the relevant radiology technologist before performing the study (Appendix A, B, C for technologist work-flow).
3. After normal business hours, the technologist may need to discuss case with relevant working/on call radiology teams.
4. Best practice guidelines should be followed for a) chest imaging (Appendix D) and b) technologist use of PPE (Appendix E).
5. Radiology COVID Call Center has been established to assist in Radiology related questions for Yale New Haven Health. Call center number is 475-246-9660. Hours are currently 7am-7pm seven days a week.
Appendix A: Ultrasound and X-Ray ED and In-Patient Tech workflow for CONFIRMED or SUSPECTED COVID-19 cases. All studies should be PORTABLE whenever possible.

Order for radiology exam that can be performed portably

Ultrasound

Radiologist contacts clinical team

Not Necessary

Medical necessity review with a radiologist

Necessary

Arrive to the unit and prepare to put on your personal protective equipment before entering the patients room

Proper PPE currently includes:
- N95 Mask
- Gown
- Gloves
- Face shield (or any type of eye protection)

Enter room and perform exam

Properly take off all PPE before exiting the patient’s room. Reuse select PPE per most current hospital protocol

Exit the room and completely wipe down the entire portable machine

Radiographs

*Radiologist approval is not necessary unless the technologist feels order may not be needed

*Face mask may be used instead of N95 depending on supply availability

see video link for instructions
https://vimeo.com/397424618/5e50e2768d
Appendix B: CT/MRI/Nucs/Fluoro ED and In-Patient workflow for CONFIRMED or SUSPECTED COVID-19 cases
Appendix C: NON-“HOT-SITE” OUT-PATIENT work-flow for technologist/front-desk staff

Patients should wear their own face mask to ALL out-patient appointments. Mask should be given if patient does not have one.

Screening:
In the last month, have you been in contact with someone who was confirmed or suspected to have COVID-19, including outside the US.

OR
Do you have ANY of the following:
- Fever ≥ 100°F or 37.8 C
- New cough
- New shortness of breath
- New sore throat
- New chills
- New loss of smell or taste

OR
Have you been advised to stay home by a medical professional due to illness that might be COVID-19

If possible, obtain patient’s cell phone number or phone in the waiting room. Use phone communication whenever possible.

For the safety of patients and staff, the patient will not be permitted to proceed with the appointment, and should return to his or her car. They patient can contact the responsible clinician for further guidance. If patient does not have a responsible clinician or PCP, instruct to call contact Yale COVID-19 Call Center 203.688.1700.

Proper PPE includes:
- N95 (or face mask based on availability)
- Gown
- Gloves
- Face shield or Googles

Technologist performs imaging.

*If the patient wears the face mask properly throughout their entire stay in our imaging room, the room can be used again after proper disinfection of equipment and surfaces. If the patient has NOT worn the face mask throughout the procedure, the room will need to be left vacant for a specified time (1 hour for most rooms, shorter for CT suites).

Some sites can offer temp. check at front desk

SCREENER isolates patient per facility protocol. Emphasize to the patient that mask needs to stay on.

Tech confirms with referring provider or responsible radiologist when needed on medical necessity of exam

Route to designated "hot" site where staff will use appropriate PPE

Technologist notifies technologist

*If medical indication clearly necessary (acute DVT/PE, obvious fracture deformity, stroke/TIA, etc) additional confirmation will be unnecessary.

CHEST XRAY is not part of routine respiratory infection work-up currently. See next page

LINK for proper PPE USE.  https://vimeo.com/397424618/5e69e27680
Appendix D.1:

**Role of Chest Radiographs (CXR):**

CXR plays a role in the imaging management of pneumonia in immunocompetent patients, despite known low sensitivity.

*Any CXR of a suspected or confirmed COVID infection should be done portably for ED or In-Patient.*

- CXR should NOT be obtained to rule out COVID infection
  - A normal CXR does not rule out the possibility of COVID. CXR is reported to have 25-60% sensitivity in detecting pneumonia for these patients. Ground glass opacities commonly seen with COVID can be occult on CXR.
- CXR should only be obtained when absolutely necessary and xrays should be minimized when possible (e.g. for line placement, get one film after all lines placed).
- Examples of indications for CXR
  - Initial baseline imaging for a COVID Suspect or Known patient being admitted
  - To evaluate for complicated pneumonia (cavitation, effusions, etc)
  - To assess ETT placement after intubation or after line placement if concerned for malposition
  - When change in clinical status raises concern for possible superimposed pulmonary process

**Role of Chest CT:**

Chest CT plays a role in the imaging work-up of immunocompetent patients with pneumonia, mainly to detect complications such as cavitation, intra-parenchymal abscess and empyema. The role of CT in patients with suspected viral pneumonia is controversial.

Following recent statements by the American College of Radiology (ACR) and the Society of Thoracic Radiology (STR), CT is considered indicated in the following situations involving patients with suspected or confirmed COVID-19 infection:

1. CT should NOT be used to screen for or as a first-line test to diagnose COVID-19. It may play a role in helping triage and make management decisions in select cases where PCR test is negative, chest xray is negative and clinical suspicion for COVID remains high.
2. CT may be indicated in patients with positive COVID PCR testing AND suspicion for complications such as cavitation, intra-parenchymal abscess and empyema not adequately assessed via portable CXR.
Appendix D.2 - Current ADULT in-patient COVID treatment guide

[Flowchart of treatment algorithm]

- **Patient with confirmed SARS-CoV-2 by PCR**
  - If mechanically ventilated or on ECMO, proceed to severe algorithm

- **Supportive Care & EVERY 4 HOURS OXYGEN MONITORING**
  - Evaluate for Clinical Trials (YNNH unit)
  - If Oxygen saturation ≤ 93% on room air

- **START TREATMENT**
  - [Treatments listed]

- **TREATMENT**
  - [Detailed treatment steps]

- **COVID-SPECIFIC TESTS**
  - [Tests listed]

- **Cardiac**
  - [Monitor electrolytes, etc. for recommendations]

- **Hematologic**
  - [Blood work and treatment]

Algorithm reviewed by YNNH SAS and YNNH/PISM Ad-hoc COVID-19 Treatment Team.
Appendix D.3- Current adult URI work-up for out-patients

SIM COVID AMBULATORY GUIDELINE 3/25/20
* Aligned with CDC guidelines as of 3/25/20
Link for PPE use.  [https://vimeo.com/397424618/5e69e27680](https://vimeo.com/397424618/5e69e27680)

**CLICK HERE FOR FULL PPE GUIDANCE POLICY INCLUDING REUSE PROCEDURES**

References:


(4). YNHHS Covid Resource Website