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
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 C.2 & 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*

Discuss the exam to determine medical necessity with a radiologist

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

**Necessary**

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

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

*Depending on supplies surgical mask may need to be used and many supplies may need to be re-used

Enter room and perform exam

Properly take off all PPE before exiting the patient’s room (see video link for instructions)

Exit the room and completely wipe down the entire portable machine

https://vimeo.com/397424618/5e69e27680
Appendix B: CT/MRI/Nucs/Fluoro ED and In-Patient workflow for CONFIRMED or SUSPECTED COVID-19 cases

Order for radiology exam that CANNOT be performed portable

For MRI, CT, Nuc Med, Fluoroscopy, and invasive procedures on inpatients/ED

*Note* Expected that radiographs and ultrasounds will rarely have to be performed in diagnostic radiology department

Radiologist contacts clinical team

Discuss the exam to determine medical necessity with a radiologist

Equipment in the pavilion closest to the patient unit should be used to limit travel time

Discuss transport with nurse. Precautions need to be taken during transport to minimize spread.

*Depending on supplies surgical mask may need to be used and many supplies may need to be re-used

Before entering the imaging room, proper PPE must be put on. Proper PPE currently includes:
- N95 Mask
- Gown
- Gloves
- Face shield (or any type of eye protection)

Enter room and perform exam

For select studies, technologists may need to remain in the room for the exam in order to conserve PPE

Properly take off all PPE before exiting the imaging room (see video link for instructions)

If the patient wears their surgical mask properly throughout their entire stay in our imaging room, the room can be used again after proper disinfection of all imaging equipment and surfaces

If a patient mask has not utilized, or has been deemed compromised during any part of the exam, the room must be cleaned and left vacant for 1 hour

https://vimeo.com/397424618/5e69e27680
Appendix C.1: OUT-PATIENT work-flow for technologist/front-desk staff

Patient presents as an outpatient for ANY Radiology Appt

FRONT DESK SCREENER ASKS

> 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 ≥ 100F or 37.8 C
  - New cough
  - New shortness of breath
  - New sore throat
  - New chills

OR

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

YES

SCREENER puts a surgical mask on patient and isolates patient per facility protocol

Is test medically necessary? Tech should confirm with referring provider (or responsible radiologist when needed)

NO

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

YES

Technologist puts on the appropriate PPE and brings the patient into the imaging room

Technologist performs imaging.

*If medical indication clearly necessary (acute DVT/PE, obvious fracture deformity, stroke/tia, etc) proceed with exam without additional confirmation.

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

Proper PPE includes:
- N95 (or surgical mask based on availability)
- Gown
- Gloves
- Face shield (or any type of eye protection)

LINK for proper PPE USE. https://vimeo.com/397424618/5e69e27680
Appendix C.2- Current adult URI work-up for out-patients

**ADULT OFFICE TRIAGE for Patient Calls w/ Respiratory Symptoms — DO NOT BRING PT INTO OFFICE**

### START: Telephone Triage

- **If Pt has Moderate/Severe Symptoms**
  - Minor respiratory symptoms
    - Sore throat
    - Hoarse voice
    - Cough
  - Call Center if no clinician available
  - **Moderate Symptoms**
    - Breathing okay
    - Does not feel well overall
    - Coughing
    - Headache or sore throat
    - Loss of smell or taste
    - Chest pain/tightness
  - URI, Fever & Cough
    - COVID Suspect
      - Home isolation 14 days and ≥ 3 days symptom resolution
      - Symptomatic tx
      - Consider Tamiflu, Xofluza or antibiotics
  - **Negative COVID Test**
  - **Positive COVID Test**

### Triage to MD / APRN / PA or Call Center if no clinician available

- **Severe Symptoms**
  - Unable to get out of bed
  - Dyspneic (RR ≥ 25)
  - Chest pain
  - Tachycardic (HR > 110)
  - Difficulty completing sentence
  - Confused
  - Needs ED and hospital admission
  - Call before sending to inform “COVID suspect” can self transport
  - If ambulance needed must inform “COVID Suspect”

### ADVICE FOR ALL PATIENTS:
- Self monitor per CDC
- Call back for worsening
- Advise against emergency room or walk-in
- We do not recommend testing at this time

### Exposures/
- Work exposure:
  - HCW - monitor for symptoms and continue to work
- Household exposure:
  - Self isolate ≥ 14 days, monitor for symptoms

**ADVICE FOR ALL SYMPTOMATIC PATIENTS:**
- Self isolation per CDC
- Call back for worsening
- Advise against emergency room or walk-in
- We do not recommend testing at this time (inadequate supplies)
- **Home isolation 7 days and ≥ 3 days resolution of symptoms in the absence of test results**

**ADVICE FOR ALL SYMPTOMATIC PATIENTS:**
- Self isolation per CDC
- Symptom management
- Call back for worsening
- Advise against emergency room or walk-in
- Consider testing

**NURSING or CLINICIAN:**
- Review exposure
- COVID exposure
- **Home isolation ≥ 14 days (assess for safety) & resolution of cough**
- Symptom management
- Regular patient outreach
  - See COVID positive pathway
Appendix D:

**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 x-rays should be minimized when possible (e.g. for line placement, get one film after all lines placed).
- Examples of indications for CXR
  - 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.
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.
3. We are not currently recommending Chest CT as a tool to guide admission decisions or medical management decisions for COVID as no data suggests clear benefit over traditional approach using clinical risk factors, labs, etc. Doing so wastes PPE and increases risk of spread to staff.
Appendix E

PPE for Patients with Suspected or Confirmed COVID-19 in ED and Acute Care Settings

Hospital Settings

Emergency Room and Acute Care

COVID Precautions
N95, eye shield, gown, gloves
(surgical mask if N95 not available)
Private room with door closed
Negative pressure not required
N95 fit-testing not required

Aerosol Generating Procedures

COVID Precautions
N95/PAPR, eye shield, gown, gloves
Negative pressure room
(if not available, place in private room with door closed using above PPE)

• Respiratory specimens can be collected in a normal pressure private room with the door closed wearing a mask or N95, eye shield, gown and gloves
• Care team entering room should be limited to 1 Physician/UP and 1 nurse with limited dedicated assistants as needed.
• Students\(^1\), non-essential staff or visitors are not to enter the room.
• Respirators, masks and eye shields are to be reused per PPE Reuse and Extended Use protocol.
• Cluster care to minimize people entering room and PPE use
  - Masks, respirators, eye shields and gowns can be worn between patients per the PPE Reuse and Extended Use protocol.
  - Nursing should pull trash and linen and place by door for EVS to pick up.
  - Nursing to clean high touch surfaces (bed rails, call bell, tray tables, etc.) with disinfectant wipes daily.
  - Nursing should prepare patient for transport and push into corridor for transporter to receive.

\(^1\) Aerosol Generating Procedures: Examples include intubation, non-invasive ventilation, CPR, bronchoscopy, open suctioning of the respiratory tract, nebs.
\(^2\) Medical students serving in a role as sub-intern which are essential to patient care are an exception.

3/24/2020

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