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Browse to the image you would like to place. Image should be 1024x768, 1200x900, or other 4:3 aspect ratio
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Click image, go to ‘Format’
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Safe bedside vascular access for patients with COVID-19

Updated 4/13/2020
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Learning objectives

- This educational module is designed to give an overview for safe and informed care of Covid-19 patients while performing bedside vascular access
- This module provides general guidelines to consider as well as access to additional resources
COVID-19 vascular access needs

- Most COVID-19 positive patients have required vasopressors in the immediate peri-intubation period necessitating central venous access

- Most COVID-19 positive patients who require intubation can be expected to require serial arterial blood gas assessment to guide management of their respiratory failure necessitating arterial access
General Guidelines

All bedside procedures performed on COVID-19 patients

• All efforts should be made to minimize exposure to healthcare workers.

• Safety procedures, including donning and doffing of PPE, shall not be altered or rushed no matter how emergent the situation.

• Limit the number of healthcare providers in the room during the procedure.

• Procedures should be performed by the most experienced provider available.

• If multiple procedures are required, providers should make every effort to coordinate and batch these procedures to minimize trips in and out of the patient’s room and conserve PPE while ensuring procedures are done safely.
General Guidelines

All bedside procedures performed on COVID-19 patients

• Careful preparation outside the room is strongly recommended. All necessary supplies should be gathered and checked prior to entering the room.

• An outside the room time out, including a review of necessary supplies, should be performed.

• Clear lines of communication, possibly via white board, should be maintained through the window to a runner outside the room.
Proper PPE for bedside procedures

Prior to entering room
- For all providers in room
  - N95 respirator covered with surgical mask or PAPR (*Perform N95 seal test*)
  - Shield (preferred) or goggles
  - Non-sterile gown
  - Non-sterile gloves
  - Bouffant head cover
  - Consider knee-high trauma boots/shoe covers

Prior to placing sterile line
- Only for providers directly involved in line placement
  - Sterile gown
  - Sterile gloves

Sterile gown and gloves are placed over non-sterile PPE while in the patient’s room.

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Safe Putting On (Donning) of PPE

Updated Videos and content on NMI

1. Putting on PPE with a New Surgical Mask or N95 Respirator Mask
2. Putting on PPE with a Used N95 Respirator Mask
3. Putting on PPE while Wearing a Continuous Use Surgical Mask or N95 Respirator Mask and Goggles or Face Shield
4. Perform N95 Seal Check

Sterile gown and gloves will be placed over standard PPE prior to sterile portion of the procedure

SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN
   • Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
   • Fasten in back of neck and waist

2. MASK OR RESPIRATOR
   • Secure ties or elastic bands at middle of head and neck
   • Fit flexible band to nose bridge
   • Fit snug to face and below chin
   • Fit-check respirator

3. GOGGLES OR FACE SHIELD
   • Place over face and eyes and adjust to fit

4. GLOVES
   • Extend to cover wrist of isolation gown

USE SAFEWORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

• Keep hands away from face
• Limit surfaces touched
• Change gloves when torn or heavily contaminated
• Perform hand hygiene
Safe Removal (Doffing) of PPE

Updated Videos and content on NMI

1. Removing PPE

2. Removing PPE while Wearing a Continuous Use Surgical Mask or N95 Respirator and Goggles or Face Shield

3. Wearing, Discarding, and Storing Masks

If feasible change scrubs after each patient. Shower if soiled with blood or other bodily fluid.
Central venous access

• Most COVID-19 positive patients in our center have required vasopressors in the immediate peri-intubation period.
• This should be anticipated and prepared for by the care team with a plan for central venous access once the airway is secured.
• To limit exposure of PICC placement providers, triple lumen catheters are preferred as a first line for vasopressor administration.
• PICCs should be considered if vasopressor requirement is expected to last for longer than 10 days or long term central IV access is needed for other indications.

⚠️ Full PPE is required
Central venous access

Line considerations

• Unless there are contraindications, the **Left internal jugular vein** is preferred for central venous access as many critically ill COVID-19 patients will eventually require a tunneled right IJ HD catheter.

• Consider placement of a trialysis line in place of a TLC if the patient has underlying CKD or severe AKI in anticipation of renal replacement therapy.

• If trialysis catheter is not available consider double sticking left IJ

• **Perform the procedure using standard ultrasound-guided technique**

Incidence of AKI

<table>
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<tr>
<th>Incidence</th>
<th>Setting</th>
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</thead>
<tbody>
<tr>
<td>0.5-23%</td>
<td>ICU</td>
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<tr>
<td>8.3% vs 2.0%</td>
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Need for CRRT

<table>
<thead>
<tr>
<th>Need</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8-9%</td>
<td>ICU</td>
</tr>
</tbody>
</table>

More common in ICU setting

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Central venous access

Standardized site preference

In order of priority for TLC, trialysis or alternate catheter
- Left IJ
- Right IJ
- Left subclavian
- Right subclavian
- Femoral

In order of priority for temporary HD catheter (Not trialysis)
- Right IJ
- Left IJ
- Left subclavian
- Right subclavian
- Femoral

These are general recommendations. Patient factors and physician judgement should also be considered in consultation with the critical care team.

Consider avoiding subclavian access on COVID-19 patients requiring high PEEP.

Full PPE is required
Central venous access

Lower extremity access

• Many critically ill COVID-19 patients require prone ventilation making femoral access problematic due to kinking of the catheter
• Considerations for lower extremity venous access when necessary
  - Access femoral vein low to avoid the skin crease
  - Access the great saphenous vein in the thigh
  - Use long 55cm HD catheter with lateral stick and “tunnel” portion of the catheter subcutaneously to the vein
• **Perform the procedure using standard ultrasound-guided technique**

Full PPE is required
Arterial lines

• Most COVID-19 positive patients who require intubation can be expected to require serial arterial blood gas assessment to guide management of their respiratory failure. Therefore, arterial line placement is recommended in patients with respiratory failure to avoid repeated provider exposure drawing blood gases.

• Radial artery access at the wrist is the preferred location

• If radial access is not available consider brachial access over femoral access to avoid issues with line kinking should the patient require prone positioning.

• Ensure nursing team and set up a-line setup with appropriate length tubing.

• **Perform the procedure using standard ultrasound-guided technique**

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General US guided vascular access steps

Step 1 – Identify target vessel

- Identify target vein or artery prior to prepping and draping
- Using ultrasound, visualize the target vessel in short and long access view
- Confirm patency of the vessel
  - Vein – use compression with the ultrasound probe to evaluate for venous thrombosis. Patent veins should compress fully
  - Arterial
    - Perform distal pulse exam and Allen test when appropriate
    - Use color flow or doppler to confirm vessel patency
General US guided vascular access steps

Step 2 – Use real-time US guidance for puncture of the vessel

• Use sterile technique
• Use the short axis/out-of-plane or long-axis/in-plane approach
• Try to constantly visualize the tip of the needle during the approach and puncture of the target vessel
• Consider using a micropuncture system in patients who are coagulopathic, have small vessels or challenging anatomy
General US guided vascular access steps

Step 3 – Confirm needle position in the vessel

- Confirm the needle tip is placed centrally in the target vessel before introducing the guidewire
General US guided vascular access steps

Step 4 – Confirm wire position in the target vessel

- Confirm the correct position of the guide wire in a short and long axis
- Follow wire to full extent possible within the sterile field to ensure it remains within the target vessel
Conclusions

• Minimize the risk of exposure to yourself and team members with the proper use, putting on, and removal of PPE according to current guidelines
• Ensure you have all necessary equipment prior to entering the room
• The left IJ is the preferred site for central venous access
• Standard femoral access can kink in patients that require prone ventilation
• Perform the procedure using standard ultrasound-guided technique