

# Review of Acute Care Rehabilitation Considerations for Pandemic Team-based Care

*Additional Resource: Lines, Tubes, Drains, and Catheters*

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**BRIGHTER WORLD**



Hover your mouse over each description to highlight the corresponding tube.

**INTRACRANIAL PRESSURE CATHETER AND/OR VENTRICULOSTOMY ①**

A small tube or catheter inserted into the brain to monitor the brain swelling. This may also be used to drain excess fluid.

**CENTRAL LINE/PA CATHETER ②**

A catheter in the neck, chest, or groin that helps in monitoring and treating the flow of blood. Some of these catheters may be used for giving nutrition and other medications.

**TRACHEOSTOMY TUBE ③**

A breathing tube inserted in the neck usually when ventilator (assisted) breathing is needed for a long period of time.

**ARTERIAL LINE ④**

A small tube or catheter that is inserted into the artery to continuously monitor the blood pressure.

**PULSE OXIMETER ⑤**

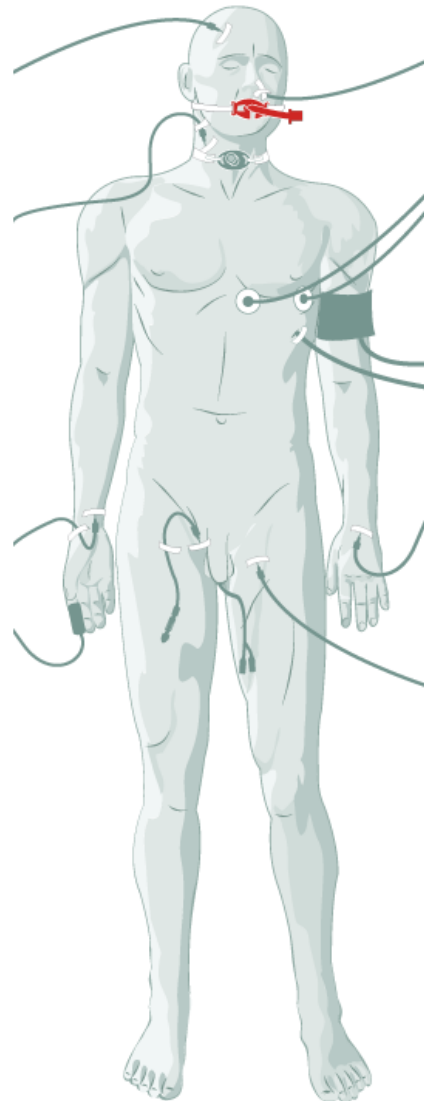
A small probe attached to the finger, nose, or ear that helps monitor the oxygen in the blood and the patient's pulse.

**DIALYSIS CATHETER ⑥**

A tube-like catheter inserted in the groin or neck. The catheter is hooked up to external tubing and a dialysis machine, which cleans the blood and assists the kidneys.

**FOLEY CATHETER ⑦**

A catheter inserted to the bladder to drain the urine into a bag.



**NASOGASTRIC TUBE ⑧**

A tube inserted into the stomach or intestines to provide nutrition and remove gastric acid or secretions.

**ENDOTRACHEAL TUBE (ETT) ⑨**

A breathing tube inserted through the mouth or nose that is connected to an assisted breathing machine (ventilator).

**HEART MONITOR LEADS ⑩**

Sticky pads are placed on the chest of almost every ICU patient in order to monitor the electrical activity of the heart.

**BLOOD PRESSURE CUFF ⑪**

A large cuff placed on the arm or the leg, which may be automatically or manually inflated so that the amount of pressure in the arteries can be evaluated.

**CHEST TUBE ⑫**

A larger tube inserted between the skin on the chest and the lungs. This tube removes free air or blood that may make it difficult for the patient to breathe.

**PERIPHERAL IV ⑬**

A small plastic tube placed into the vein, which is used to give fluid or medications.

**INTRA-AORTIC BALLOON PUMP (IABP) ⑭**

A catheter inserted into the groin, which assists the heart with pumping blood.

Sources: MyICUCare.org

<http://www.theglobeandmail.com/life/health/end-of-life/the-links-to-life-for-a-patient-in-critical-care/article2246280/#>

## Summary of Selected Airways, Catheters, Tubes, and Monitoring Equipment

	Name	Components	Entry Site/ Terminus	Normal Values (if applicable)	Purpose	PT Considerations
<b>Common medical monitoring devices, catheters, and tubes</b>						
1	Electrocardiogram (ECG or EKG)	<ul style="list-style-type: none"> <li>Electrodes</li> <li>Leads (connect to electrodes)</li> <li>Cables (connect to leads)</li> <li>Cables to monitor</li> </ul>	E: Electrodes on patient's chest wall (3-12 total) T: Electrodes connect to leads and leads to cables and cables to monitor	Adults (resting) 60-100 Adult athletes 50 10 yr 70-110 Preschool 80-120 1 yr 80-160 Newborn 90-170 <sup>1</sup>	Monitor heart rhythm	Monitor patient's HR and correlate any symptoms reported by pt w/ monitor output Ensure sufficient slack so cables don't get caught on bed
2	Pulse Oximeter (SpO <sub>2</sub> )	<ul style="list-style-type: none"> <li>Peripheral probe / Sensor</li> <li>Cable (connected to sensor)</li> <li>Cable to monitor</li> </ul>	E: Most common for PT – fingers, earlobe, toes, could use forehead or cheek if poor peripheral perfusion <sup>2</sup> T: Monitor	>94% <sup>3</sup>	Monitor oxygen saturation	Monitor patient's SpO <sub>2</sub> and correlate any symptoms reported by pt w/ monitor output Impaired accuracy with SpO <sub>2</sub> <80% <sup>2</sup>
3	Peripheral venous catheter (Peripheral IV or "PIV" or "IV")	<ul style="list-style-type: none"> <li>Hollow catheter advanced over a needle and inserted into a vein<sup>4</sup></li> <li>IV bag and solution set<sup>5</sup></li> </ul>	E: Peripheral vein T: Peripheral vein	N/A	Deliver drugs, IV fluid, blood, contrast media <sup>4</sup>	Caution with pedal IVs
4	Urinary Catheter ("Foley")	<ul style="list-style-type: none"> <li>Urinary catheter</li> <li>Tubing and collection bag<sup>6</sup></li> </ul>	E: Vagina or penis T: Bladder	N/A	Obtain urine specimens, monitor volume status and renal perfusion <sup>6</sup>	Keep drainage bag below level of bladder <sup>7</sup>
5	Nasogastric Tube (NG)	<ul style="list-style-type: none"> <li>Nasogastric tube or orogastric tube</li> <li>Suction tubing or drainage bag<sup>8</sup></li> </ul>	E: Nose (NG) or mouth (OG) T: Stomach	N/A	Feeding, drainage of gastric contents, drainage or lavage after poisoning (if indicated), stomach decompression <sup>8</sup>	

	Name	Components	Entry Site/ Terminus	Normal Values (if applicable)	Purpose	PT Considerations
<b>Artificial airways</b>						
1	Endotracheal tube (ETT)	<ul style="list-style-type: none"> <li>Endotracheal tube</li> <li>Ventilator circuit</li> </ul>	E: Mouth or nose T: Mid-trachea, below the vocal cords, 3-7 cm above the carina <sup>9</sup>	Respiratory rate: 12-20 breaths per minute <sup>1</sup>	Airway control or protection (for general anesthesia, obstruction, aspiration, respiratory failure); facilitate mechanical ventilation <sup>9</sup>	Cuffed tubes – prevents air leaks to allow ventilation; prevent aspiration of gastric contents Pediatric tubes may NOT be cuffed Ensure tube is firmly secured before initiating any mobility
2	Tracheostomy (“Trach”)	<ul style="list-style-type: none"> <li>Outer cannula</li> <li>Inner cannula</li> <li>Obturator<sup>10</sup></li> </ul>	E: Inferior border of cricoid cartilage <sup>11</sup> ; sutured in place T: Trachea	Respiratory rate: 12-20 breaths per minute <sup>1</sup>	Bypass upper airway Clean and remove secretions from an airway Deliver oxygen to the lungs <sup>12</sup>	Watch for cuffed and cuffless trachs  Video: <a href="http://www.hopkinsmedicine.org/tracheostomy/index.html">http://www.hopkinsmedicine.org/tracheostomy/index.html</a>
<b>Arterial and venous catheters</b>						
1	Arterial Catheter (“Art line”)	<ul style="list-style-type: none"> <li>Catheter</li> <li>Transducer</li> <li>IV tubing</li> <li>Pressure bag</li> <li>Cable to monitor</li> </ul>	E: radial (most common), femoral, pedal, or brachial artery; sutured in place T: radial (most common), femoral, pedal, or brachial artery	Systolic: 85-140 mmHg <sup>1</sup> Diastolic: 40-90 mmHg <sup>1</sup> MAP: 70-110 mmHg <sup>1</sup>	Monitor arterial blood pressure; arterial blood gas draws	Look for good waveform
2	Central Venous Catheter (“Central line”); Central venous pressure (CVP)	<ul style="list-style-type: none"> <li>Catheter (single to quadruple lumens)<sup>13</sup></li> <li>Transducer</li> <li>IV tubing</li> <li>Pressure bag (if CVP)</li> <li>Cable to monitor</li> </ul>	E: Internal Jugular, Subclavian, or Femoral vein; sutured in place T: Superior vena cava (IJ or subclavian) <sup>14</sup> ; Inferior vena cava (Femoral)	CVP: 2 to 6 mmHg <sup>14</sup>	Central venous catheter – administer meds, fluid, TPN, dialysis <sup>13</sup> , bloodwork  CVP = R atrial pressure; indirectly R ventricular end-diastolic pressure	Note Ciesla article incorrect re: line placement (NOT R atrium; if R atrium, risk of arrhythmias)
3	Peripherally Inserted Central Catheter (PICC)	<ul style="list-style-type: none"> <li>Catheter</li> <li>IV tubing</li> </ul>	E: Brachial or cephalic vein (most common) <sup>15</sup> T: Superior vena cava <sup>15</sup>	N/A	Medium to long-term IV therapy, total parenteral nutrition, pts with poor venous access <sup>15</sup>	Do not take blood pressure measurements in the arm with PICC line

[Click here for a video on suctioning](#)

	Name	Components	Entry Site/ Terminus	Normal Values (if applicable)	Purpose	PT Considerations
4	Dialysis catheter (temporary)	<ul style="list-style-type: none"> <li>Catheter</li> <li>Dialysis tubing</li> </ul>	E: Internal Jugular, or Femoral vein (subclavian not as common) <sup>16</sup> ; sutured in place T: Superior vena cava (IJ, subclavian); Inferior vena cava (Femoral) <sup>16</sup>	N/A	Dialysis (intermittent or continuous)	Communicate w/ team re: timing of PT during dialysis; is feasible to do PT during dialysis in outpatient setting
5	Swan-Ganz or Pulmonary Artery Catheter	<ul style="list-style-type: none"> <li>Via central venous catheter with special pulmonary artery lumens<sup>17</sup></li> <li>Transducer</li> <li>IV tubing</li> <li>Pressure bag</li> <li>Cable to monitor</li> </ul>	E: Internal Jugular, subclavian, or femoral vein <sup>17</sup> ; sutured in place T: Pulmonary artery <sup>17</sup>		Hemodynamic monitoring tool: Central venous oxygenation; cardiac output; Wedge pressure - left ventricular end diastolic pressure (indirect) <sup>17</sup>	Communicate w/ team re: patient severity of illness; Avoid therapy when balloon tip is inflated
<b>Neurologic</b>						
1	Intracranial pressure monitor (ICP)	<ul style="list-style-type: none"> <li>Ventricular catheter<sup>18</sup></li> <li>Transducer</li> <li>Cable to monitor</li> </ul>	E: via burr hole or tunneled catheter or bolted catheter or intraventricular approach in cranium <sup>18</sup> T: Subdural, parenchymal, or ventricular space (dependent on patient) <sup>18</sup>	0-10mm Hg <sup>18</sup>	Monitor cerebral perfusion	Communicate w/ team re: patient severity of illness
2	Extraventricular drain (EVD)	<ul style="list-style-type: none"> <li>Ventricular catheter<sup>18</sup></li> <li>Transducer</li> <li>Cable to monitor</li> </ul>	E: via burr hole or tunneled catheter or bolted catheter or intraventricular approach in cranium T: Subdural, parenchymal, or ventricular space (dependent on patient)	N/A	Cerebral spinal fluid drainage	Communicate w/ team re: patient severity of illness Retrospective case series considered pts with ICP <15mm for mobilization; presence of EVD did not preclude mobilization <sup>19</sup>

	Name	Components	Entry Site/ Terminus	Normal Values (if applicable)	Purpose	PT Considerations
<b>Other</b>						
1	Chest Tube	<ul style="list-style-type: none"> <li>Chest tube</li> <li>Pleural drainage system<sup>20</sup></li> <li>Petroleum gauze</li> <li>May be connected to wall suction</li> </ul>	E: Between 4 <sup>th</sup> and 5 <sup>th</sup> intercostal space <sup>20</sup> (or as indicated); sutured in place T: Between pleura and lung <sup>20</sup>	N/A	Pneumothorax, hemothorax, chylothorax, pleural effusion, post-operative <sup>20</sup>	Pneumothorax – will d/c chest tube after pleural drainage system stops bubbling <sup>20</sup> Pleural effusion - will d/c chest tube if drainage <200 mL in 24 h period <sup>20</sup>
2	Epidural Catheter	<ul style="list-style-type: none"> <li>Epidural catheter</li> <li>Epidural tubing</li> </ul>	E: Thoracic spine T: Approximately 3-5" from insertion into epidural space <sup>21</sup>	N/A	Pain relief	Watch hypotension with low pain levels <sup>22</sup> Screen motor function before mobility <sup>23</sup>
3	Ventricular assist device (VAD)	<ul style="list-style-type: none"> <li>Pump</li> <li>Cannula</li> <li>Driveline</li> <li>Controller</li> <li>Power source<sup>24</sup></li> </ul>	E: Inflow: If L ventricle: apex of L ventricle or descending aorta; if R ventricle: R atria T: Outflow (L Ventricle)= ascending aorta; (R Atria) pulmonary trunk	N/A	Circulatory assist	Most devices implanted via median sternotomy – risk of wound dehiscence; consider institutional sternal precautions <sup>24</sup>

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