Adult CVC Placement and Exchange

Note: This algorithm is used by Acute Care Procedures Team

Patient pending CVC placement [internal jugular (IJ), subclavian or femoral]. All requests placed to Infusion Therapy.

Assess patient history

Are vital signs unstable? 

Yes

History of arrhythmias (i.e., atrial fibrillation)

History of pacemaker

Current anticoagulation medication use

History of blood clots to upper extremity central veins (axillary, IJ, subclavian, SVC)

History of radiation, surgery, trauma or lesion/wound to neck, chest or access site, or any visible anatomical variants that may obscure landmarks

- Patient with renal disease\(^2\), with or without dialysis and/or
- Platelets less than 20 K/microliter

Patient has no pertinent history or contraindications to procedure

Hemodynamically unstable\(^1\)/ new onset symptoms

Symptoms of severe cough, chest pain, shortness of breath, fever, vomiting, diarrhea, etc.

Proceed to Patient Evaluation on Page 2. Also, find information for patients needing simultaneous port removal on Page 3.

- Inform primary team
- Send to EC for evaluation with nursing escort

No

Page thoracic fellow/vascular service to discuss the following:

- Safety of treatment
- Obtaining further imaging [venous ultrasound duplex study, CT chest obtained within 30 days (contact radiology for vasculature review)]
- If contralateral site is free of thrombus, then APP may attempt
- Referring case to vascular service, if needed

- Consider contralateral site. If no other site available, consider utilizing alternate site for access after discussion with on-call vascular service and primary team.

- Consider IJ placement
- Consult vascular service if platelets less than 10 K/microliter

Coagulopathy Threshold

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Minimum platelet threshold</th>
<th>Threshold to infuse platelets during procedure</th>
<th>INR</th>
</tr>
</thead>
<tbody>
<tr>
<td>IJ</td>
<td>20 K/microliter</td>
<td>10-20 K/microliter</td>
<td>2</td>
</tr>
<tr>
<td>Subclavian</td>
<td>30 K/microliter</td>
<td>20-30 K/microliter</td>
<td>2</td>
</tr>
<tr>
<td>Femoral</td>
<td>20 K/microliter</td>
<td>10-20 K/microliter</td>
<td>2</td>
</tr>
</tbody>
</table>

\(^1\) Heart rate greater than 110 bpm or less than 60 bpm, oxygen saturation less than 92% and systolic blood pressure less than 95 mmHg or greater than 170 mmHg

\(^2\) Stage 3b or higher with glomerular filtration rate less than 45 mL/minute

\(\text{APP}=\text{Advanced Practice Provider} \quad \text{EC}=\text{Emergency Center}\)

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson’s specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient’s care.
Ultrasound assessment

Patient evaluation for CVC placement or exchange

Is patient alert and oriented?

Yes

No

Assess ability for patient to follow commands and stay stable for placement

Patient able to follow commands and stay stable?

Yes

No

Ultrasound assessment

Does patient exhibit any of the following: anxiety, uncooperative behavior, or language barrier?

Yes

No

Vein can be assessed, vein depth 2-5 cm

Vein flat

Vein depth less than 2 cm

Vein depth greater than 5 cm

Continue with the following procedures:

- If vein is completely flat after venous access attempt, abort procedure. Do not re-attempt. If other side is appropriate for placement, have patient return next day after obtaining a bilateral duplex venous ultrasound.
- If venous access successful but unable to thread wire after 4 attempts, attempt second venous access. If unable to advance wire after third attempt, have patient return next day after obtaining a bilateral duplex venous ultrasound if contralateral vein is patent.
- If wire migrates to neck, have patient turn head to ipsilateral side of catheter placement and attempt to pass. Repass no more than 4 times. May repeat venous access for 2 attempts, and repass wire. If other side is appropriate for placement, have patient return next day after obtaining a bilateral duplex venous ultrasound.
- If unable to pull out wire after inserting, do not pull forcefully. Attempt rotation or consult a more experienced provider.
- If arterial puncture or severe venous bleeding occurs post-dilation and/or catheter insertion, do not remove dilator or catheter; leave in place for tamponade/hemostasis and consult surgery immediately.

Post procedure: patient must await final chest x-ray read from radiology before being discharged from clinic

If post-procedure pneumothorax on chest x-ray, see Post Central Line Placement Pneumothorax Management on Page 4

1 For CVC exchanges only, refer to information on wire placement within Box B
2 If language assistance is needed, an interpreter is required at bedside for duration of entire procedure
3 Consider IJ placement or refer to vascular service for placement as needed

1

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Patient pending simultaneous CVC placement and port removal

Central line placement contralateral to port removal side

Proceed with central line placement first

Is central line placement successful?

Yes

Proceed with port removal (refer to Implanted and Tunneled Port and Catheter Removal algorithm)

No

Do not remove port-a-cath; consult vascular surgery for central line placement and port removal

If patient has history of multiple attempts on each side (PICC line or port or catheter), obtain ultrasound prior to referral to vascular surgery

● For ipsilateral attempt, consider obtaining bilateral venous duplex ultrasound prior to placement to rule out obstruction
● If attempting subclavian catheter placement on same side as IJ port, do not remove port first. Proceed with placing subclavian catheter first before port removal.
● Do not attempt ipsilateral subclavian CVC placement with subclavian port as well as IJ CVC placement with IJ port

Central line placement ipsilateral to port removal side

Note: This algorithm is used by Acute Care Procedures Team
Post Central Line Placement Pneumothorax Management

Pneumothorax found on post-line insertion chest x-ray

- Contact via page:
  - On-call surgery fellow to evaluate patient and staff with on-call surgery attending
  - Primary team
- Contact via email:
  - APP supervisor and proceduralist medical director

Yes

Is patient symptomatic and/or hemodynamically unstable¹?

- Infusion therapy team (ITT) RN requests STAT Interventional Radiology (IR) consult for pigtail catheter placement
- Admit patient

No

Place patient in Clinical Decision Unit (CDU) for monitoring

Perform chest x-ray at 1 hour and 3 hour intervals after diagnosis

- Infusion therapy team (ITT) RN requests STAT Interventional Radiology (IR) consult for pigtail catheter placement
- Admit patient

On-call surgical attending must determine whether to admit to:
- Surgery service
- Primary team’s service
- General internal medicine (per the determination of the Admitting Service Workflow [#ATT1942] within the Clinician Scope of Services and Responsibilities Policy [#CLN0598])

Proceduralist APP should round on inpatient until discharged home or delegate to scheduled ITT proceduralist on the subsequent day

Normal chest x-ray result

Discuss with surgical fellow for clearance

Patient scheduled through CDU for repeat chest x-ray the subsequent morning

Abnormal chest x-ray result

Refer to Box C below

Consult IR for pigtail catheter placement

Schedule repeat chest x-ray the subsequent morning with ongoing evaluation

¹ Heart rate greater than 110 bpm or less than 60 bpm, oxygen saturation less than 92% and systolic blood pressure less than 95 mmHg or greater than 170 mmHg
SUGGESTED READINGS


SUGGESTED READINGS - continued


SUGGESTED READINGS - continued


This practice consensus statement is based on majority opinion of the Acute Care Services experts at the University of Texas MD Anderson Cancer Center for the patient population. These experts included:

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