

Central Venous Access Site Comparison

Intro: There are three sites commonly used for central venous access: the internal jugular vein, the subclavian vein and the femoral vein. While working in the ED, I have observed and performed all three variations without fully understanding the indications, risks, and benefits of the different site choices. I chose to explore this topic further to enhance my knowledge and proficiency of this procedure and my choice of insertion site.

General Site Selection Tips:

- Consider the ease of placement in all sites based on body habitus and/or patient cooperation
- Consider risks associated with the procedure, including infection, thrombosis, or mechanical complications
- Consider experience of the operator and personal preference for any site over the others

Internal Jugular Access:

- Associated with **low rate of severe mechanical complications** in the ICU
- Preferred for short-term access (< 5-7 days)
- Preferred for **hemodialysis** catheters
- Placement Complications: placement of catheter in RA (can be corrected by pulling back on the catheter), malposition in the axillary vein
- Arterial punctures have been shown to be more common than in subclavian access, but are usually controlled by **manual compression**. However, a large hematoma could produce serious, yet rare, complications including airway obstruction, retrograde aortic dissection, AV fistula, or cerebrovascular events
- Risk for vessel occlusion found to be similar to that of subclavian access

Subclavian Access:

- Associated with a **lower risk of infectious complications** from skin organisms; route of choice if the risk for infection is high (controversial: see Marik paper below)
- **Preferred for nontunnelled catheters**
- Preferred for long-term access (> 5-7 days)
- Placement Complications: placement of catheter tip in opposite subclavian vein or neck vein
- Arterial punctures have been shown to be less common, but bleeding from subclavian artery is **more difficult to control and harder to detect**; thus, not preferred choice for patients on anticoagulation
- Virtually no risk for cerebral thromboembolism or airway compromise
- **Higher risk of PTX** than compared to the IJ access
 - Failure of the first attempt for catheter insertion was associated with a steep increase in PTX risk
- Risk for vessel occlusion found to be similar to that of IJ access
- Avoid this approach when emergent hemodialysis is indicated to decrease the risk of thrombosis

Femoral Access:

- Associated with a **higher risk for infection (controversial), colonization and thrombosis**, compared to subclavian route

- Should be used in patients in whom PTX or hemorrhage would be unacceptable
- Preferred for patients that are **mechanically ventilated** and without severe hemostasis disorders or respiratory failure

	When TO Use...	When NOT to Use...	Watch Out For...
Internal Jugular	<ul style="list-style-type: none"> - Short-term access anticipated (<5-7 days) - Patients who need Hemodialysis 	<ul style="list-style-type: none"> - When infection risk is high (debatable) 	<ul style="list-style-type: none"> - Arterial puncture - Hematomas
Subclavian	<ul style="list-style-type: none"> - Long-term access anticipated (>5-7 days) - When infection risk is high - When using nontunnelled catheters 	<ul style="list-style-type: none"> - When mechanical complication risk is high - Patients on anticoagulation 	<ul style="list-style-type: none"> - Uncontrolled bleeding - PTX
Femoral	<ul style="list-style-type: none"> - Mechanically ventilated patients - Patients without hemostasis d/o or respiratory failure 	<ul style="list-style-type: none"> - When infection risk is high (debatable) 	<ul style="list-style-type: none"> - Colonization - Thrombosis

Sources:

- Timsit, JF. What is the best site for central venous catheter insertion in critically ill patients? Crit Care. 2003; 7(6): 397-399. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC374364/#B12>.
- <http://www.ncbi.nlm.nih.gov/pubmed/22809915?dopt=AbstractPlus>