

Procedure	Level	Nonoperative/Preoperative	Intraoperative	Postoperative
Ultrasound-guided venous access	1: Limited Participaton Demonstrates basic understanding of how the tools operate. Has very basic skills. Framework: What a learner directly out of medical school should know. The attending shows and tell during the procedure."	-Demonstrates an understanding of the procedural indications but may not understand contraindications. -Understands the difference between long term and short tem access needs as well as need for multiple or single lumens and necessary flow rates for treatment. -Understands that Dialysis pateints may need vein preservation strategies that impact access -Able to identify relevant finding on imaging but may not be able to distinguish arterial and venous structures -Obtains an H&P inclusive of basic focused exam -Aware of SIR guidelines for preprocedural labs and medication holds -Respectfully communicates basic facts of the procedure but inconsistently discusses potential complications or alternatives	-maintains a sterile field -identifies relevant anatomy on intraprocedural imaging -follows intraprocedural directions but handles tools inefficiently -in cases performed under moderate sedation, learner is not familiar with typical medication dosages and needs direction from the attending	-Explains the line care basics to the patient but needs prompting to cover post-procedure expectations. -In the setting of post venous access complication, not familiar with next steps and needs attending direction -Can recognize acute and chronic line dysfunction but requires attending direction for next steps -requires supervision to remove venous access lines
	2: Direct Supervision Demonstrates an understanding of the steps of the procedure but requires direction to accomplish in a safe manner Framework: The learner can use the tools but may not know exactly how, what or where to do it. The attending actively helps throughout the case to maintain forward progression.	-Able to identify a safe site for venous access on pre-procedural imaging and distinguish venous from arterial vascular anatomy with minimal attending direction -Demonstrates an understanding of the indications, contraindications and potential complications -Understands the different types of central venous catheters for long and short term needs but may need direction to select a suitable line or site. -Respectfully communicates facts of procedure and discusses potential complications or alternatives for straightforward cases but may need direction for more complicated cases	-identifies target vein on intraprocedural imaging and identifies a safe approach needing only minimal attending direction -familiar with the tools and able to perform the beginning of the case but needs intraprocedural direction to visualize the needle tip and complete venous puncture safely -requires direct supervision when passing guide wires into the right atrium or IVC as well as selecting or modifying line length and type. -Understands the possiblity of arrythmia from wire passage or venous air embolism but needs direction by an attending to recognize or manage these potential complications -Able to flush and secure line with little supervision. -in cases performed under moderate sedation, learner is familiar with typical medication dosages	-Explains the post procedure line care and dressing basics to the patient and discusses post-procedure expectations and warning signs of line infections with minimal prompting -In the setting of post venous access complication such as bleeding or infection, demonstrates an understanding of next steps in management but needs attending direction for forward progression - Can safely remove venous access lines with supervision.

3: Indirect Supervision Can do a straightforward nontunneled IJ or femoral access but may not be successful in a more advanced case with difficult anatomy Framework: The learner can perform straightforward central lines. The attending gives passive help for tougher cases. This passive help may be given with the attending scrubbed in for more difficult anatomy or during a check-in	-Able to distinguish venous from arterial vascular structures without direct supervision - May require consultation with attending when selecting non standard access sites. -Respectfully communicates facts of procedure and discusses potential complications or alternatives with the patient or family member without supervision	-Able to identify and puncture conventional target veins reliably without direct supervision. -Able to advance wires to the right atrium or IVC safely. -Able to select line type and length without supervision and modify line lengths correctly when required. -may need some attending direction in complex cases requiring accessing small or collapsing veins or collateral veins. -may need some attending direction navigating tortuous or stenotic venous anatomy and can perform venographic mapping when necessary. -in cases performed under moderate sedation, learner is familiar with typical medication dosages and sedates patient appropriately	-Explains the post procedure line care and dressing to the patient and discusses post-procedure expectations and warning signs of line infections without prompting -In the setting of post central access hemorrhagic or infectious complications, demonstrates an understanding of next steps in management with minimal attending direction -Able to recognize site or tunnel infections and direct treatment with minimal supervision. -Recognizes and treats post line insertion site bleeding/oozing without supervision in straightforward cases Can troubleshoot acute and chronic line dysfunction with little supervision Can remove lines at the bedside only rarely requiring supervision.
4: Practice Ready Can perform easy and challenging central lines and self troubleshoot. Able to guide junior learners. Framework: The learner can perform all straightforward and difficult non-tunneled central lines and can manage post line dysfunction and complications independently. The attending is available as needed but is not routinely needed.	-Able to identify a safe approach for venous access on pre-procedural imaging independently including in cases of vascular occlusion and collateral pathways -Able to distinguish venous and arterial anatomy including variant anatomy, collapsing veins and collateral pathways that may influence access choice.	-identifies conventional and unconventional target veins and safe approach independently. -Able to advance guidewires to the right atrium or IVC and can navigate tortuous or stenotic venous anatomy independently. -Can perform and interpret venous mapping and roadmapping in difficult anatomy independently -familiar and dexterous with the tools and able to perform advanced cases from beginning to end in a safe manner -in cases performed under moderate sedation, sedates patient appropriately	-Explains the procedure to the patient and discusses post-procedure expectations and warning signs of serious complications -Manages infectious and bleeding line complications independently -Can remove venous catheters safely in complex scenarios, and guide timing of line replacement Can troubleshoot acute and chronic line dysfunction independently