



# PUGET SOUND QUARTERLY

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## LOCATION! LOCATION! LOCATION!

### The Importance of Central Line Tip Location

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The past two to three decades have seen the development of a variety of central venous access devices that can enhance patient care in many diagnoses. Tunneled and cuffed catheters, peripherally inserted central catheters (PICCs), and chest or arm implanted ports offer patients and their health care providers varied options for reliable venous access necessary for the plan of treatment.

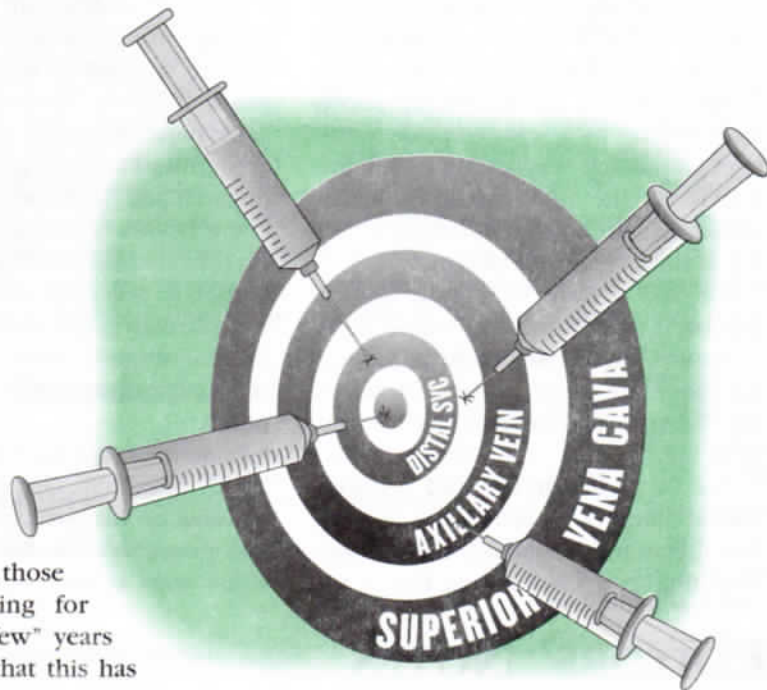
This access to the central venous system enables treatment with irritant and vesicant therapies, intermediate-to-long term regimens, facilitates laboratory testing, and preserves peripheral veins, ensuring patient safety, comfort, satisfaction, and uninterrupted treatment.

Although central venous access devices are not without their risks and require careful assessment to determine the best choice for the patient, complications can be avoided or minimized by correct catheter placement and tip location.

As early as the 1950's the superior vena cava (SVC) was described as the acceptable location for the tip of a central venous catheter (Position

Statement, Association for Vascular Access [AVA], 1998). However, those of us in nursing for more than a "few" years have observed that this has not been a consistent practice in central line placement. We remember times when tips were placed in the subclavian vein, brachiocephalic (innominate) vein, even the axillary vein. These catheters were called midclavicular, deep lines, or long lines and deemed appropriate to use as central access. Over the past decade central line tip location has been growing as a topic of attention and controversy.

What has happened over the last decade to bring the issue of central line tip location to the forefront of vascular access? Along with the increasing use of central venous access devices, our knowledge has improved regarding coagulation pathways, hypercoagulable conditions, and the way many diseases impact coagulation states. A number of studies found positive correlations between catheter tip location and the complications of thrombosis, malposition, and malfunction. A central line tip



not in the distal SVC, but in another vein of the chest has a greater incidence of these complications. Likewise, central line tips in the proximal (high) SVC or at the confluence of the SVC and brachiocephalic veins also have a greater incidence of these complications (Hadaway, 1998; Position Statement, AVA, 1998).

As a result of the above complications, the distal SVC, or the junction of the SVC and right atrium, is now recognized as the optimal location for the tip of a central line, and has become the standard of care. When a central line tip is in the distal (lower) SVC, it is more likely to hang freely, parallel to the vessel wall without being in contact with that wall (particularly if inserted from the patient's right side), because of the rapid laminar flow of blood in the SVC. The blood flow in the SVC is 2000-2500 milliliters per minute, providing speedy

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