Central Venous Catheterization

Central venous catheterization is when a physician puts a long, thin, hollow tube into one of the large veins of the body, which are found in the neck, upper chest, legs or arms. This is similar to intravenous (IV) tubes that are placed in the smaller veins of the arms except that a bigger blood vessel is being used. Such a catheter has special benefits but it also has a greater risk than the usual IV.

Common reasons for its use and benefits:

- To deliver a large amount of fluid or blood rapidly. This is particularly important during shock.
- To take measurements to see how much fluid a patient needs. The catheter can have special sensors to measure pressure inside the blood vessel.
- To give medication through the veins for a week or longer. A large blood vessel can tolerate an intravenous tube for a longer time than a small vessel.
- To be able to take frequent blood samples (more than once each day) without new needle sticks.
- To deliver special nutrition, when food or liquids can't be given through the stomach or bowel.
- As part of the procedure of inserting a right heart catheter (also known as pulmonary artery or Swan Ganz catheter; see related Information Sheet on Right Heart Catheterization).

Risks:

Some of the risks of central venous catheterization include:

- Pain during placement - Discomfort can result from the needle stick and placement of the catheter at the time it is inserted. Doctors try to lessen the pain with a local numbing medicine (anesthetic like novocaine). The discomfort is usually mild and goes away once the catheter is in place.
- Collapsed lung - This is called a pneumothorax. The lung is very close to the veins of the neck or chest. If the needle passes through the vein, it could pierce the lung causing it to leak and collapse on that side. If this happens, the doctor can place a tube between the ribs into the chest to suck out the air that is leaking from the lungs (see related Information Sheet on Chest Tube Thoracostomy). This complication is particularly dangerous when a patient is on a breathing machine. Rarely, collapse of the lung can cause death. This complication can even happen when everything is done correctly.
- Infection - Any tube (catheter) entering the body can make it easier for bacteria to get in and infect the patient. The longer a catheter remains in the body, the more likely it is to become infected. Special care in bandaging the skin at the needle site and changing the connecting tubes and fluids help to decrease this risk. With great care, these catheters can remain in the body for several weeks without becoming infected.
- Bleeding - Bleeding around holes in the veins is usually mild and seals on its own. Since the major arteries run alongside the major veins, the arteries can be punctured by accident. Even bleeding from an artery can stop on its own before serious problems occur. Rarely, the chest fills with blood, which can be life-threatening. In that situation, it may be necessary to place a tube between the ribs to drain out the blood (see related Information Sheet on Chest Tube Thoracostomy).

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• Clotting around the catheter - Blood clots can commonly form in and around these catheters inside the veins. Such clots usually do not cause problems. Once the catheter is removed, the body can often dissolve the clot over time. Sometimes, clots can break off and travel out into the lungs. This is called a pulmonary embolism. A blood clot in the lungs can cause breathing problems and, very rarely, death.

• Air entering through the catheter - Rarely, air enters the catheter as it is being inserted. The air bubbles can travel through the heart and cause lung injury and low blood pressure. This problem is called an air embolism. Special care is taken to avoid air entry.

When the catheter is placed into the large veins of the arms or legs, any of the above complications can occur with the exception of collapsed lung.