

## Arterial Catheterization

An arterial catheter (kath'ətər) is a thin, hollow tube that is placed into an artery (large blood vessel) in the wrist, groin, or other location to measure blood pressure more accurately than is possible with a blood pressure cuff. This is often called an "art line" in the intensive care unit (ICU).

The catheter can also be used to get repeated blood samples when it is necessary to frequently measure the levels of gases (oxygen and carbon dioxide) in the bloodstream.

Oxygen and carbon dioxide are the important gases exchanged in the lungs and carried by the blood. Oxygen is brought into the body when we breathe in. All cells in the body require oxygen to survive. Delivery of oxygen can be affected by problems in the lungs, circulation (movement of blood through the arteries and veins), or blood.

Carbon dioxide is a gas produced by cells in the body as they function. It carries excess acid from the body as a person breathes it out. A build-up of carbon dioxide in the body can be harmful. This build-up of carbon dioxide can occur with lung or circulation problems.



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### Why Do I Need Arterial Catheterization?

Common reasons an arterial catheterization is done include:

- **Low blood pressure (hypotension or shock)**—Low blood pressure can be treated by administering IV fluids (fluid given intravenously or "by vein") and, in some instances, very powerful medicines. By knowing precisely what the blood pressure is, doctors can use the least amount of fluid and/or medicine (that have possible side effects) needed to get the blood pressure to a safe level. The need to measure pressures in the large blood vessels is greatest when the patient is receiving powerful medicines that stimulate the heart as a way of keeping the blood pressure up. The arterial catheter allows accurate, second-to-second measurement of the blood pressure; repeated measurement is called monitoring.
- **High blood pressure (hypertension)**—In some situations, the blood pressure can go so high that it is life-threatening. Such high blood pressure must be lowered gradually in steps, and measurements with an arterial catheter help guide the treatment.
- **Severe lung problems**—When a patient has a lung problem that is so severe that it requires checking

the levels of oxygen or carbon dioxide in the blood more frequently than 3 to 4 times a day, the arterial catheter can be used to draw blood without having to repeatedly stick a needle into the patient. An arterial line can provide valuable information to adjust oxygen therapy or mechanical ventilator (respirator; breathing machine) settings. The blood oxygen pressure measures from an arterial line give more detailed information than that from a pulse oximeter (a sensor that is clipped on to a patient's finger, toe or earlobe) in a very ill patient.

### Risks of Arterial Catheterization

Some of the risks of arterial 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 (an anesthetic). The discomfort is usually mild and lessens once the catheter is in place.
- **Infections**—As in the case with all catheters inserted into the body, bacteria can travel up the catheter from the skin and into bloodstream. The longer the catheter remains in the artery, the more likely it is to get infected. Special care in bandaging the skin at the catheter site and changing the tubing can help to decrease the risk of infection.

■ **Blood clots**—If blood clots form on the tips of arterial catheters, the clots can block blood flow. If another blood vessel does not carry blood to the area beyond the clot, this can cause the loss of a hand or leg. Such a loss is very rare, and most people have other blood vessels that also supply the arm or leg that will make up for some limited blood flow when a catheter is in place. To decrease the likelihood of these problems, the intensive care unit (ICU) staff checks regularly for blood flow in the hand or leg when a catheter is in the artery.

■ **Bleeding**—Bleeding can occur at the time the catheter is inserted. The bleeding may stop without doing anything. Sometimes, the ICU staff needs to remove the catheter and apply pressure to the site.

### Preparation for Arterial Catheterization

The patient's skin will be cleaned and a small amount of an anesthetic will be injected into the skin (or an anesthetic may be applied to the skin) to numb it before the procedure.

### Common Questions

#### **How long will the catheter stay in?**

In general, the tube will stay in only so long as it is needed (to measure low blood pressure, high blood pressure, or to take frequent blood samples). Although some hospitals take out the tube and replace it in another artery every 5 days, they can be kept in place longer safely if great care is taken to keep the site dry and clean.

#### **Can the patient move around while the catheter is in?**

It is possible for a patient to move around while the catheter is in, but most critically ill patients who have the catheter are bed-bound. However, just like any intravenous (IV) line, a patient can move or sit up with care and assistance to avoid dislodging (accidentally removing) the catheter.

#### **Can the arterial catheter be used to give medicine like an intravenous (IV) line?**

All arterial lines are maintained with some fluid, like normal saline. Sometimes a blood thinner is also given to prevent clotting of the line. Other medications are not generally given in an arterial line because they can be too irritating, although there may be some (rare) exceptions.

#### **Will there be any pain or possible complications when the catheter is removed?**

There can be a little bit of bleeding, and the site can be a little tender. Usually the blood circulation returns to normal after the catheter is removed.

Source: Manthous, C., Tobin, MJ, *A Primer on Critical Care for Patients and Their Families*,  
ATS Website: [www.thoracic.org/assemblies/cc/ccprimer/mainframe2.html](http://www.thoracic.org/assemblies/cc/ccprimer/mainframe2.html)

#### *Additional Information*

**American Thoracic Society:**

[www.thoracic.org](http://www.thoracic.org)

**ATS Public Advisory Roundtable:**

[www.thoracic.org/aboutats/par/par.asp](http://www.thoracic.org/aboutats/par/par.asp)

**National Heart Lung & Blood Institute:**

[www.nhlbi.nih.gov/index.htm](http://www.nhlbi.nih.gov/index.htm)

**Centers for Disease Control & Prevention:**

[www.cdc.gov/](http://www.cdc.gov/)



You/your loved one has or is scheduled to have an arterial catheter placed to better monitor blood pressure and/or blood gases.

- ✓ Talk with the doctor about the use of numbing medicine that will reduce discomfort during placement of the catheter.
- ✓ Have the ICU nurse show you how the line is bandaged and how it is watched to reduce the risk of infection or circulation problems.
- ✓ A little bleeding at the site is not unusual and typically does not cause any problems.

**Doctor's Office Telephone:**

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