

Blood collection from radial artery

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Blood collection from the radial artery is safe, effective and quick. Learn how to do it and use it in those patients with poor venous access.

If someone has hands, then they have a radial artery. Blood runs through the radial artery under arterial pressure. You can get that blood...

The radial artery is a fantastic artery to draw blood from for a number of reasons:

- It is a superficial artery that is easy to palpate.
- It is a reasonable large bore vessel (e.g., some interventional cardiologists now routinely do their angiograms by feeding the catheter through the radial artery rather than femoral).
- It isn't an "end" artery - in most people, the radial and ulnar arteries anastomose to form the [deep palmar arterial arch](#).
 - That means, both ulnar and radial arteries can usually completely supply the hand in isolation.
 - Even if you completely destroy the radial artery, you won't be left with an ischaemic hand
- You have two hands - usually at least one radial artery is easy to sample.

If you can take an arterial blood gas from the radial artery, then you should be able to collect blood for other blood tests.

Equipment

- 23 gauge needle
- 3 or 5 mL syringe
- alcohol wipes
- cotton ball
- tourniquet
- pathology tubes (consider paediatric tubes if multiple tests)

Everyone has a different technique when it comes to ABGs / arterial sampling. If you have a technique that works for you, then use it. This is, however, the way "I" do it. I'm right-handed so if you are a "lefty", then swap "sides" below.

Allen's test. I'm not going to tell you **not** to do it but in most cases it isn't necessary. If you can palpate and feel the pulsations of both the radial and ulnar arteries, then more than likely you have good flow in both.

Position is everything for a radial artery stab. Both yours, and the patient's. The patient should be seated comfortable, and his or her upper limb must be comfortable as well. Your goal is to keep the skin over the radial artery taut so it is best for the wrist to be in an



Allen's test
(from [visuals:unlimited](#))

extended position. This can be accomplished by having the patient rest their forearm on a table with the wrist extended dorsally over the edge. Having the patient rest their forearm on a pillow on the table may be more comfortable.

I never use local anaesthetic for radial artery sampling. I personally almost never miss on the first pass so I don't see the point in subjecting the patient to another needle. It also takes more time, and obscures both the view and sensation of the pulsation. Nevertheless, some people always use local anaesthetic so do whatever you find works.

Clean the wrist with an alcohol wipe.

With your gloved left hand, find the area of maximal pulsation of the radial artery. You should be able to feel not just the pulsation but also the radial artery as a cord-like structure that you can roll beneath your fingers. If you cannot, try to adjust the patient's position (extend the wrist further back). Some people have relatively mobile radial arteries but with good wrist extension, it is usually mostly fixed in place.

With the fingers of your left hand over the radial artery, imagine / visualise the course of the radial artery underneath your fingers in three dimensional space - think about how deep it is and where it runs.

Hold the 3-5 mL syringe attached to a 23 gauge needle in your right hand like a pencil. Approach the skin at 30-45 degrees in line with the radial artery pointing proximally. Your aim is so that the point of the needle will enter the radial artery immediately below the gloved fingers of the left hand.

Try to keep the skin taut - enter the skin quickly as it is penetration through the skin that hurts the most.



This is a radial artery cannulation but the position and general idea is the same (from [visuals:unlimited](#))

Once in the soft tissue, slowly advance the needle to where you think the radial artery is. **Slowly** is the key as it is easy to go straight through the radial artery if you are impatient.

Look inside the syringe at where it attaches to the needle - once you hit the radial artery, you will see a tiny pulsation of blood (unlike an ABG syringe, it will not automatically fill). Once you are experienced, you may feel a slight give once inside the lumen of the radial artery. In young people with supple arteries, this may be fairly subtle. In older patients, the crunch of a calcified radial artery is unmistakable.

Once you are in position, it is important to instruct the patient to keep still as if they flex their wrist, the needle may dislodge.

With the fingers of your left hand, hold firmly onto the exposed metal shaft of the needle as it inserts into the skin. This will help keep it in position. With your right hand, gently aspirate back the plunger of the syringe. Blood should flow readily and easily.

When done, remove the needle from the wrist, and apply pressure over the puncture site with a

cotton ball. Use the tourniquet over the cotton ball to apply pressure for you. Keep it there for 5-10 minutes. That's it! Radial artery blood collection is my preferred method when venepuncture is difficult (e.g., after failing venepuncture twice). I have **never** been unable to collect blood by radial puncture, but you do have to select your patients and it shouldn't be first line. If you need large volumes of blood, brachial artery puncture may be a better choice.

Hints

- The reason for a 3 or 5 mL syringe is that it is difficult to balance a larger syringe when using this technique. You can use a 10 mL syringe if you have a compliant patient.
- A 25 gauge needle can be used, though I usually find this too small to hold onto well and in some patients with "thick" wrists, the needle virtually goes completely inside the wrist - again, making it difficult to keep stable while drawing back on the syringe. A 21 gauge is a bit too large - I find 23 gauge a good compromise.
- I strongly advise the use of a tourniquet to apply pressure with the cotton ball. If you ask the patient to do it themselves, they are usually unreliable and will let go after about a minute. Appropriate local pressure for about 5-10 minutes will significantly reduce the risk of a haematoma or bruise.
- If quite a few blood tests are required, then use paediatric tubes. Surprisingly little blood is needed for most tests.
- Remember, the risks of formation of an A-V fistula or even worse, arterial occlusion with an ischaemic hand are real possibilities. Always try venepuncture first and be satisfied that the gains outweigh the risks before arterial puncture.

Updated: Michael Tam (19 June 2006)

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