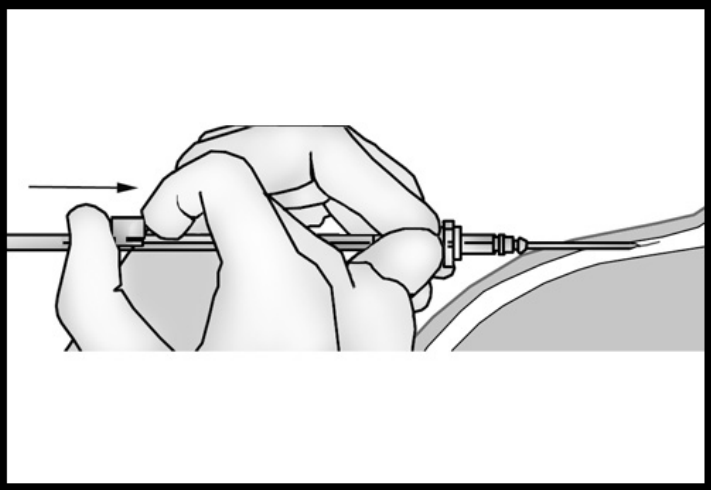
Radial cannulation explainer, as taken from:
http://www.medscape.com/features/slideshow/radial-artery/

Radial Artery Cannulation: Slideshow



An indwelling arterial catheter allows for continuous blood pressure monitoring, frequent blood sampling, and arterial blood gas measurement. The radial artery is chosen for cannulation primarily because of the superficial nature of the vessel and ease of maintenance of the site. This slideshow describes the over-the-wire technique, generally used in adults and larger children.

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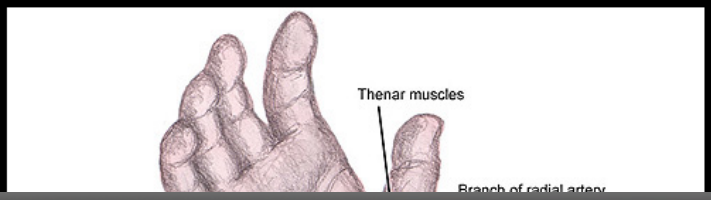

The radial artery lies between the brachioradialis tendons and flexor carpi radialis tendons, approximately 1-2 cm from the wrist, medial to the bony head of the distal radius. The initial puncture site should be as distal as possible, but at least 1 cm proximal to the styloid process, to avoid puncture of the retinaculum flexorum and the small superficial branch of the radial artery.

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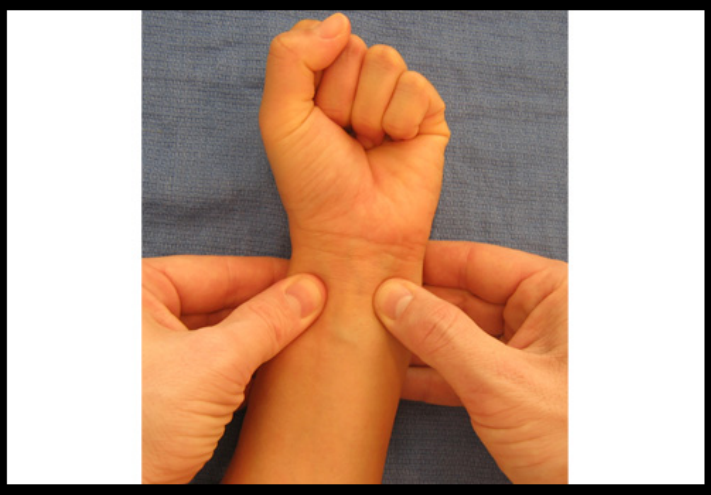

Before radial artery cannulation, many experts recommend performance of the Allen test. This procedure, originally described by the American physician Edgar Van Nuys Allen in 1929, evaluates for adequate collateral circulation to the hand via the ulnar artery. Elevate the hand and ask the patient to make a fist for 30 seconds while applying simultaneous pressure to the ulnar and the radial arteries to occlude them.

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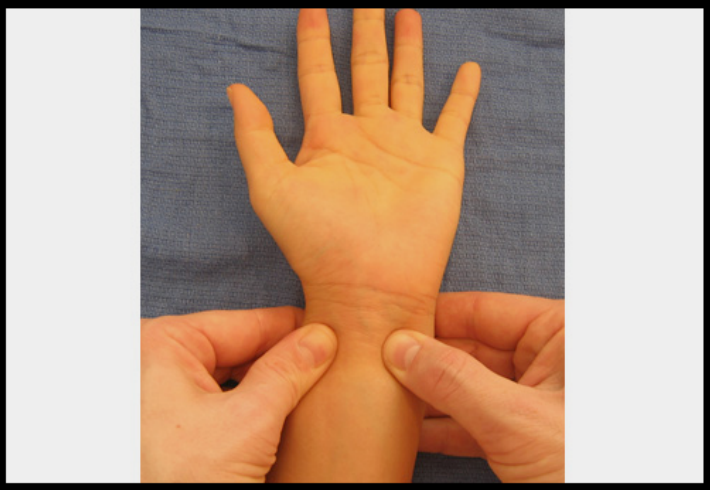

While still occluding the radial and ulnar arteries, ask the patient to open the hand. It should appear blanched.

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Release pressure over the ulnar artery and time the return of color to the palm in seconds. If color returns to the hand within 5 seconds, the Allen test is negative (normal) and the radial artery can safely be cannulated. If color does not return to the palm within 5 seconds, the Allen test is positive (abnormal). In this case, the collateral blood supply to the hand may not be sufficient, and an alternate site of arterial cannulation should be used.

The value of the Allen test is controversial, and a negative Allen test may not guarantee adequate

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With the patient lying supine, the arm should be maintained in neutral position with the palm up and the wrist adequately exposed. Hyperextension of the wrist to 30 degrees using a rolled-up towel or roll of gauze may allow easier cannulation of the radial artery by decreasing the tortuosity of the vessel.

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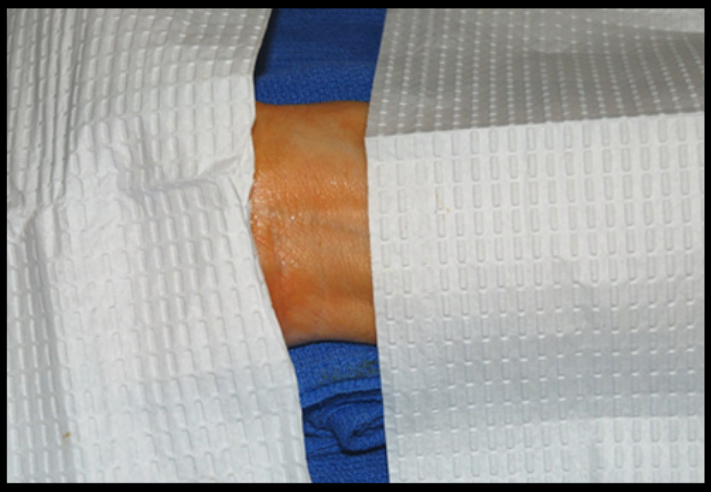

Clean the skin over the wrist in a sterile fashion using 4% chlorhexidine gluconate or povidone-iodine and establish a sterile field around the site using sterile towels or drapes. If desired, inject local anesthetic around the anticipated puncture site, using 1-2 mL of 1% lidocaine (without epinephrine) and a 25- or 27-gauge needle. Be careful to not create a wheal so large that it obscures landmarks or the pulse.

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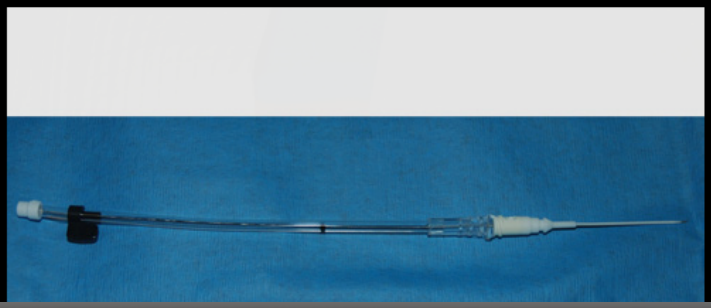

Check the arterial catheterization catheter and needle for proper function before use. Flush the needle introducer with heparinized flush to facilitate flashback of blood up to the needle hub upon entry of the artery.

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Identify the radial artery by palpation. Prepare to insert the needle over the radial artery. Making a small nick in the skin with a no. 11 scalpel blade at the site of needle insertion may avoid catheter kinking on the skin during advancement.

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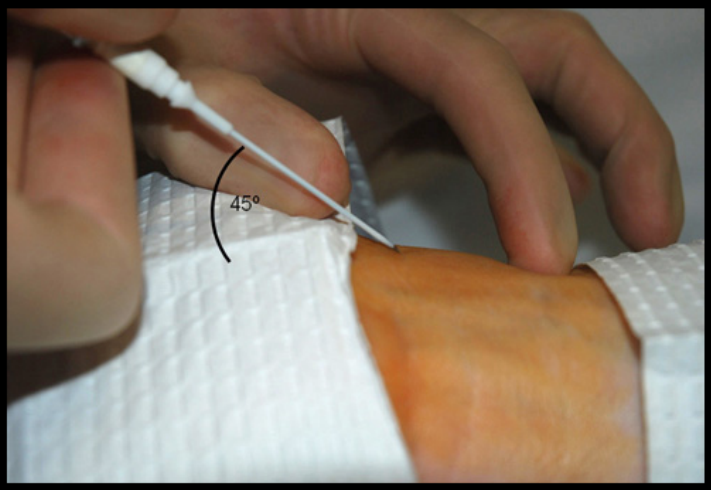

Position the catheter and needle at an angle of 30-45 degrees from the skin with the needle bevel up.

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Advance the arterial catheterization catheter and needle toward the artery at an angle of 30-45 degrees from the skin until a flash of blood is noted in the clear hub of the introducer needle. This initial flash is obtained when the needle tip, which protrudes beyond the end of the catheter, has entered the vessel lumen.

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Stabilize the introducer needle and carefully advance the guidewire using the actuating lever. If resistance is encountered while advancing the guidewire, withdraw the entire unit and attempt a new puncture. Once the guidewire has been introduced as far as possible into the vessel lumen, advance the needle and catheter assembly 1-2 mm farther into the vessel. Hold the introducer needle in place and advance the catheter forward over the guidewire and into the vessel.

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Hold the catheter in place and remove the needle, guidewire, and feeding tube assembly. Confirm that the catheter remains in the vessel lumen by monitoring for blood return at the hub. Blood should flow freely from the end of the catheter hub after the needle, guidewire, and feeding tube assembly are removed.

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Attach the intravenous tubing T-connector and syringe filled with heparinized flush to the end of the catheter, being careful not to dislodge the catheter. Flush the radial artery catheter slowly with 1-2 mL of heparinized flush and monitor for infiltration. If the catheter is within the artery, the skin around the insertion site blanches during catheter flushing.

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Secure the angiocatheter hub to the skin with Steri-Strips™, tape, or suture.

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Cover the site with sterile Tegaderm™ or other clear semipermeable sterile dressing.

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Attach the T-connector to the pressure transducer. Use the inline 3-way stopcocks for blood sampling. Check pulse wave form on the monitor to ensure good wave form. If the pulse wave form appears dampened initially, this may be secondary to arterial spasm. If this occurs, wait for arterial spasm to resolve.

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