



Femoral Arterial Blood Flow Measurement, Acute



Application

Site: **Femoral Artery**
Species: **Rat**
Vessel diameter: **0.25 mm - 0.5 mm**
Body Weight: **200 gm - 400 gm**
Duration: **Acute**

Probe Data

400-Series: **MA0.5PSB**
TX06-Series: **0.5VB-WC60-CH10-Acute**

Surgical Approach

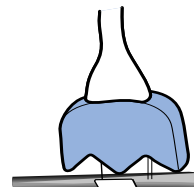
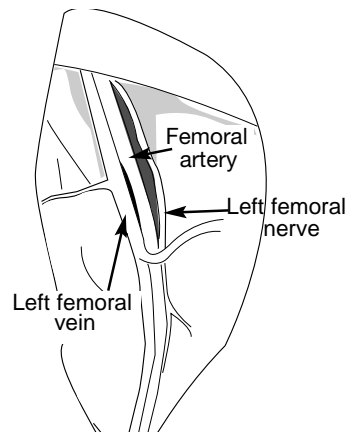
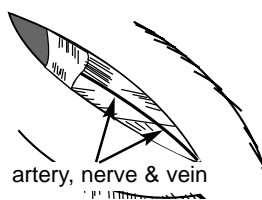
Anaesthetize the rat with ketamine/xylamine solution (.09 ml solution / 100 gm body weight IM (thigh)). The use of a heating pad or heat lamp is recommended as hypothermia also reduces flow. A 0.5 ml bolus of saline placed subcutaneously every half hour is also recommended.

Place the rat in dorsal recumbency and visually identify the femoral vessels on the medial thigh. They should be readily visible through the shaved and prepared skin. Gently stretch the skin caudally, make a 1.5 cm incision adjacent to the femoral vessels, and release the skin so that it slides back over the vessels.

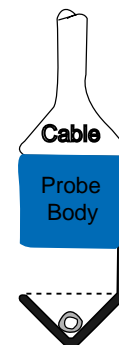
Now that the combined femoral artery, vein and nerve are exposed, we need to carefully separate the vessels from the surrounding fascia. First pass a small curved needle completely under the vascular bundle and back out the other side, then use a fine pair of curved forceps to tease away the fascial layers. Continue this process until the vascular bundle is completely undermined and freely movable.

Finally, we need to separate the vessels. This is often the most difficult step of this procedure. One technique is to take a pair of forceps with a very blunt tip and repeatedly open and close them in a direction parallel to the vessels. Try to make a small gap between the vessels. The vein may be identified by alternately applying pressure proximally and distally to distend and collapse the vein. When the femoral artery is isolated, place the V flowprobe around the artery making sure that the vessel is nestled in the bottom of the V reflector.

Remove the plunger of a 30 cc syringe and load the syringe with sterile lubricating jelly, taking care to prevent the formation of air bubbles. Place a flexible 20 ga. catheter on the tip of the syringe. Insert the catheter through the probe's acoustic window adjacent to the artery and deposit the jelly while withdrawing the syringe. The lubricating jelly acts as an acoustic couplant and must replace the air space. Press the test mode button on the meter to verify that signal amplitude is close to 1 Volt. A low signal or an acoustic error can usually be traced to an insufficient amount of lubricating jelly or to an air bubble.



Highest sensitivity lies within the deepest angle of the V.

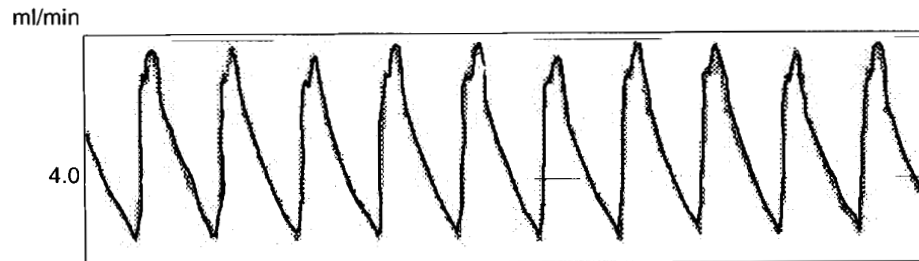




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Flow Ranges Observed



Flow trace courtesy of T.L. Smith, Bowman Gray School of Medicine, Winston Salem, NC.

Applications

The femoral artery is a convenient site for the blood flow measurement in basic hemodynamic research as it is relatively accessible and does not require highly invasive surgery. Since access does not require opening the abdomen or the thorax, there are fewer complications from hypothermia and shock. This site is also relatively free of adipose fat.

References

1. Shimura, H., Watanabe, Y., Imanishi, N., and Shibuya, T., "A New Simultaneous Method for Measuring the Blood Flow in Small Experimental Animals Using the Transit-Time Ultrasonics Volume Flowmeter", Japanese Journal of Pharmacology, Vol. 40 sup., p. 101P, 1986.
2. Hoffman, A., Grossman, E., Ohman, K.P., Marks, E., Keiser, H.R., "Endothelin Induces An Initial Increase in Cardiac Output Associated with Selective Vasodilation in Rats", Life Sciences, Vol. 45, No. 3, p. 249-255, 1989.
3. Wachter, C., Heinemann, A., Jovic, M., Holzer, P., "Visceral Vasodilatation and Somatic Vasoconstriction Evoked by Acid Challenge of the Rat Gastric Mucosa: Diversity of Mechanisms," Journal of Physiology, Vol 486, No. 2, p. 505-516, 1995. (rat, gastric, coeliac, superior mesenteric, carotid, femoral, acute)