



Acute Abdominal Aortic Blood Flow Measurement in the Rat

Application

Site: **Abdominal AORTA**
Species: **RAT**
Vessel diameter: **1.0 mm**
Body Weight: **270 gm**
Duration: **ACUTE**

Probe Data

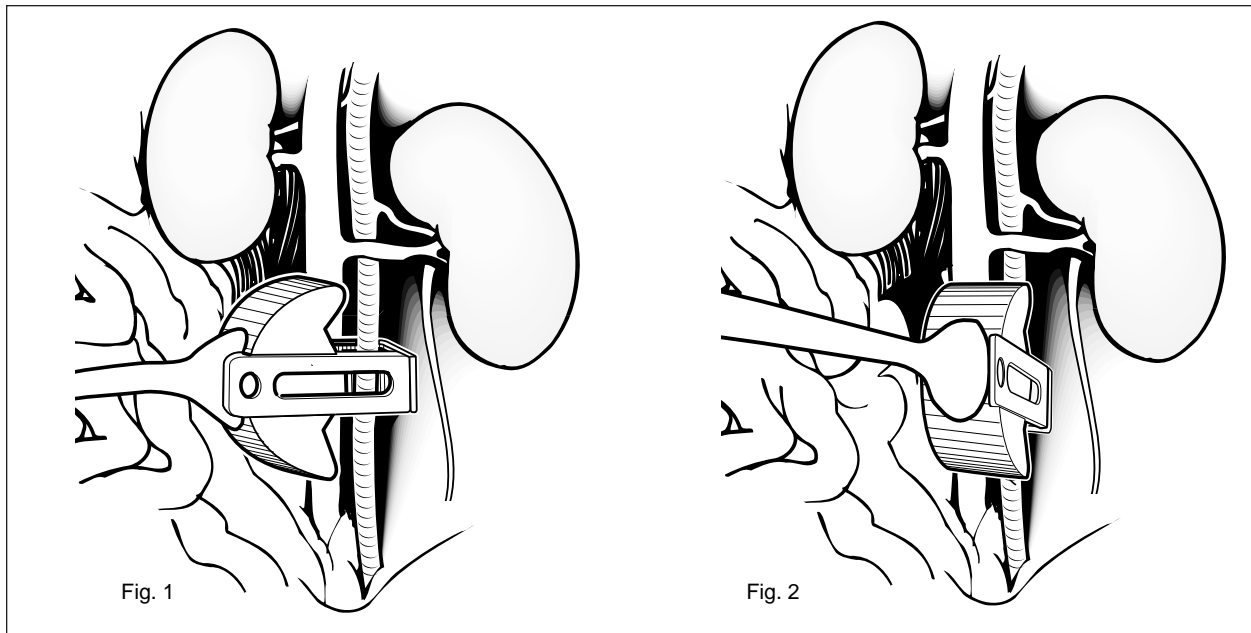
Probe style: **2SB**
Reflector: **L with sliding cover**
Connector: **CH10**

Surgical Approach

Anaesthetize the rat with sodium pentobarbital 60 mg./kg. IP. Note that pentobarbital will depress flow when compared to that of the conscious animal. The use of a heating pad or hot water bottles is recommended as hypothermia also reduces flow. In long procedures, fluid infusion (.9% NaCl @ 1 ml/hr) through a femoral catheter is also recommended.

Place rat in dorsal recumbency and make a ventral midline abdominal skin incision. Extend the abdominal incision through the linea alba into the abdominal cavity. Deflect the intestines to the rat's right to expose the abdominal aorta and the left kidney. Carefully dissect free a 1 cm. segment of the aorta just caudal to the kidneys. Remove adjacent fat for proper acoustical coupling. Place the 2SB probe around the artery, close the slide. Manually position the probe so that the artery is centered within the window and then tape down the probe cable to help stabilize the probe. If there is sufficient connective tissue, the probe may also be sutured in position.

Remove the plunger of a 30 cc syringe and load the syringe with sterile HR lubricating jelly, taking care to prevent the formation of air bubbles. Place a flexible catheter on the tip of the syringe; the catheter may be inserted into the probe's acoustic window adjacent to the vessel and the jelly deposited as the syringe is withdrawn (see Transonic Surgical Protocol #40 for more information). A low signal or an acoustic error can usually be traced to an insufficient amount of lubricating jelly or an air bubble.



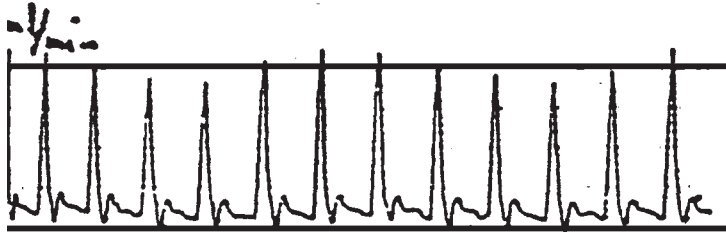
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Surgical Methods Protocol #17



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Flow Ranges Observed



Instantaneous abdominal flow in an anaesthetized rat ranged from 2 to 25 ml/min.

Applications

The measurement of blood flow on the abdominal aorta is commonly used by researchers for protocols that require relative cardiac output, vascular resistance or absolute flow to the hind limbs. The surgical approach to the abdominal aorta is less difficult than the corresponding approach to the ascending aorta and does not require mechanical ventilation.

Acknowledgements

Flow trace courtesy of Dr. Wayne Schwark, Department of Pharmacology, New York State College of Veterinary Medicine, Cornell University, Ithaca, NY 14853.

References

Validation

D'Almeida, M.S., Gaudin, C., Lebrec, D., "Validation of 1- and 2- Transit Time Ultrasound Flow Probes on Mesenteric Artery and Aorta of Rats," American Journal of Physiology, Vol. 268, Vol. 3, Pt. 2, p. H1368-1372, 1995.

Applications

- 857A Haque, S.M., Usui, N., Ilboshi, Y., Okuyama, H., Masunari, A., Chen, K., Nezu, R., Takagi, Y., Okada, A., "Quantification of Intestinal Blood Flow by Ultrasonic Transit Time Flowmetry in Fed and Endotoxaemic Rats," European Journal of Surgery, Vol. 162, No. 7, p. 561-565, 1996. (*rat, abdominal aorta, superior mesenteric, acute*)
- 790A Cohn, S.M., Farrell, T.J., "Diaspirin Cross-Linked Hemoglobin Resuscitation of Hemorrhage: Comparison of a Blood Substitute with Hypertonic Saline and Isotonic Saline," Journal of Trauma: Injury, Infection and Critical Care, Vol. 39, No. 2, p. 210-216, 1995. (*abdominal aorta, rat, acute*)
- 727A Myers, S.I., Turnagem R., H, m Kadesky, K.M., Seelig, A.R., Bartula, L., "Endotoxic Shock After Long-Term Resuscitation of Hemorrhage Reperfusion Injury Decreased Splanchnic Blood Flow and Eicoanoid Release," Annals of Surgery, Vol. 224, No. 2, p. 213-218, 1996. (*rat, abdominal aorta, sma, acute*)
- 678A Bitterman, H., Brod, V., Weisz, G., Kushner, D., Bitterman, N., "Effects of Oxygen on Regional Hemodynamics in Hemorrhagic Shock," American Journal of Physiology, Vol. 271, p. H203-H211, 1996. (*rat, renal, abdominal aorta, sma, acute*)

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