T400-Series Surgical Protocol

Rat Renal Artery: Acute Blood Flow Measurement

APPLICATION BASICS

Site:	Renal artery
Species:	Rat
Body Weight:	< 300 grams
Duration:	Acute
Vessel Diameter:	0.7 - 0.8 mm

PROBE

Size:	1 mm
Reflector:	V / JS
Connector:	CRA10: 10-pin
Cable Length:	60 cm
Catalog #:	MA-0.7V MA-1PRB

FLOWMETER TS420 Perivascular Module

Flow Ranges Observed

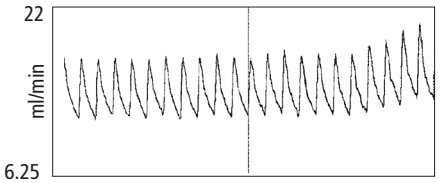

Fig. 1: Renal flow in the rat varies greatly with the anesthetic used and the plane of anesthesia. In general, protocols with ketamine will show higher flows than those with pentobarbital. Hypothermia is also a common cause of lower than expected flow measurements.

Application

The measurement of renal blood flow has an important role in research on hemodynamics, electrolyte regulation and pregnancy induced hypertension. Flow-pressure relationships are essential in defining renal autoregulation. Other studies have focused on diuretics, cardiovascular drugs, and nephrotoxic agents. While average renal flow may also be obtained from the renal vein, the pulsatile waveform of the renal artery provides additional information and visual confirmation of a measurement with a properly functioning Flowprobe.

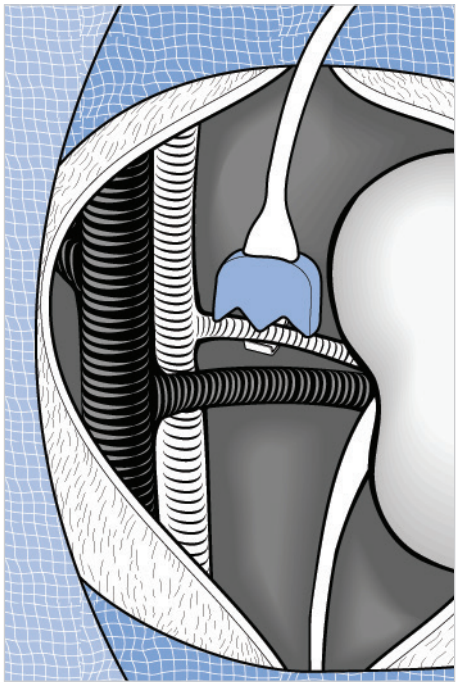

Fig. 2: Flowprobe on renal artery.

Surgical Approach

Anesthetize the rat with Inactin anesthesia (100 mg/kg IP). If Inactin is not available, sodium pentobarbital (60 mg/kg IP) may be used instead. Note that pentobarbital anesthesia is less stable than Inactin and may significantly depress flow when compared to that of the conscious animal. The use of a heating pad or hot water bottle is recommended as hypothermia also reduces flow. In long procedures, fluid infusion (0.9% 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 left kidney. To expose the right kidney, deflect the intestines to left. Identify the large renal

(Continued on next side.)

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Rat Renal Artery: Acute Blood Flow Measurement Cont.

Surgical Approach cont.

vein; the renal artery is much smaller, cranial and deep to the vein. Carefully locate and dissect out the renal artery. Remove adjacent fat for proper acoustical coupling. Place the Probe around the artery (Fig. 2). Manually position the artery so that the vessel lies within the lumen of the Probe. A micromanipulator may be used to stabilize the Flowprobe position on the artery.

Remove the plunger of a 30 cc syringe and load the syringe with Surgilube acoustic gel, taking care to prevent the formation of air bubbles. Place a flexible catheter on the tip of the syringe. Insert the flexible catheter through the Probe's acoustic window adjacent to the artery and deposit the gel while withdrawing the syringe. The lubricating gel acts as an acoustical couplant and must replace all air space. Check the signal bar indicator on the Meter to verify that signal amplitude is about 1 Volt. A low signal or an acoustic error can usually be traced to an insufficient amount of lubricating gel or an air bubble.

ACKNOWLEDGEMENTS

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