

T400-Series Surgical Protocol

Rat Renal Artery: Chronic Blood Flow Measurement

APPLICATION BASICS

Site:	Renal artery
Species:	Rat
Body Weight:	250 - 400 grams
Duration:	Chronic
Vessel Diameter:	0.7 - 0.8 mm

PROBE

Size:	1 mm
Reflector:	JS
Connector:	4-pin
Cable Length:	14 cm (12 - 16 cm typical)
Catalog #:	MC-1PRB-JS-WC14-CM4S-GC

FLOWMETER	TS420 Perivascular Module
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Flow Ranges Observed

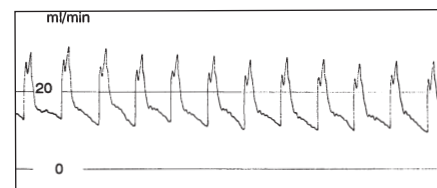


Fig. 1: Renal flow ranged from 10 to 16 ml/min in this 440 gram conscious rat.

Application

Renal blood flow measurement has an important role in hypertension research. 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 functioning implant.

Surgical Approach

Mix 5 ml ketamine (100 mg/ml) and 1.6 ml xylazine (20 mg/ml). To anaesthetize the rat, administer this solution at a rate of 9 ml solution / 100 gm body weight IM. This protocol maintains cardiac output and peripheral perfusion. On long procedures, fluid infusion (0.9% NaCl @ 1 ml/hr) through a femoral catheter is also recommended.

Surgically prep the rat for the following three incisions: ventral midline, retroperitoneal, and midscapular. Glue a small oval shaped section of surgical mesh to the back side of the Flowprobe as show in Fig. 2. Place rat in dorsal recumbency and make a ventral midline abdominal 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. After identifying the kidney and renal artery, dissect the artery free from the surrounding fatty tissue.

ACKNOWLEDGEMENT

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REFERENCES

SURGICAL VIDEO

Blood Flow Measurement in the Rat: Implantation Techniques of the Transonic Flowprobe on the Rat Renal Artery VP-10

VALIDATION

Welch WJ, Deng X, Snellen H, "Validation of Miniature Ultrasonic Transit Time Flow Probes for Measurement of Renal Blood Flow in Rats," AJP 1995; 268(1)Pt 2:F175-178.

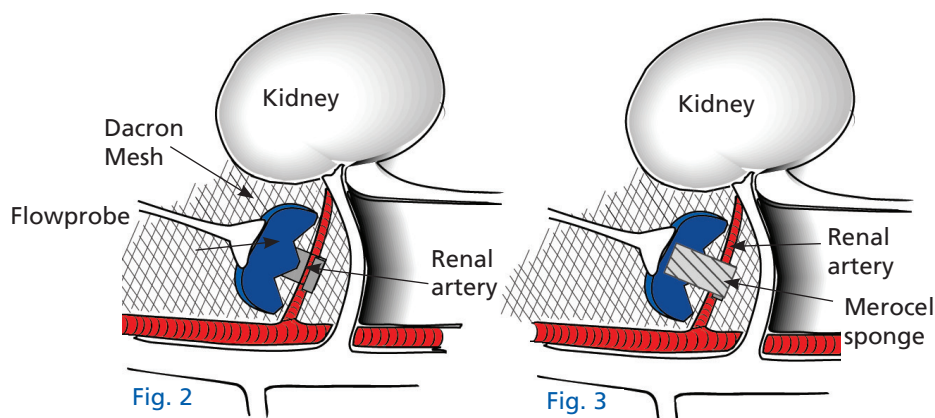
Welch WJ, Deng X, Snellen H, Wilcox CS, "The Ultrasonic Transit-time Blood Flow Meter: An Accurate Method for Measuring Renal Blood flow in the Rat," JASN 1993; 3: 528.

For additional references, visit www.transonic.com

Rat Renal Artery: Chronic Blood Flow Measurement Cont.

Surgical Approach cont.

Slide the dacron mesh between the body wall and the kidney with the cable exiting the Probe rostrally and the open J facing ventrally. Slip the reflector under the renal artery and position the Probe so that the cable is perpendicular to the vessel and the vessel is well aligned within the Probe. Secure the Probe in place with a single suture around the cable. Make a stab incision through the body wall just rostral to the suture and pass the CM4 connector and cable through the incision. Examine the alignment of the Probe and vessel. If necessary, correct the alignment by suturing the Dacron mesh to the body wall. Apply a small amount of medical grade methacrylate (Exaband) to the Flowprobe and close the opening in the J reflector with a small section of Merocel sponge (Fig. 3). Replace the abdominal contents and close the ventral midline incision in two layers. Place the animal in ventral recumbency and make a 1.5 cm midscapular incision. Create a subcutaneous tunnel with straight hemostats and pull the CM4 connector through the tunnel with sutures placed through the connector cap. Close the skin incision and place the CM4 connector in the silicone cuff. Suture the silicone cuff to the skin and close the retroperitoneal incision.



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