T400-Series Surgical Protocol

Dog Hepatic Artery & Portal Vein: Chronic Blood Flow Measurement

APPLICATION BASICS

Site:	Hepatic Artery
Species:	Dog
Weight:	25 kg
Duration:	Chronic
Vessel Diameter:	2.5 mm

PROBE

Size:	3 mm (side exit)
Reflector:	L with sliding cover
Other:	Silicone wrap
Catalog #:	MC-3PSS-LS-WC100-CM4B-GC
FLOWMETER	TS420 Perivascular Module

APPLICATION BASICS

Site:	Portal vein
Species:	Dog
Weight:	25 kg
Duration:	Chronic
Vessel Diameter:	12 mm

PROBE

Size:	12 mm (side exit)
Reflector:	U with Silicone Shield
Cable Length:	1 meter
Catalog #:	MC-12PSS-USW-WC100-CRS10-GC
FLOWMETER	TS420 Perivascular Module

Application

The measurement of portal and hepatic blood flow has an important role in the study of hepatic physiology. One protocol was developed to study the hepatic extraction of metabolic substrates and also included the implantation of vascular occluders on the portal vein and the hepatic artery. Vascular access ports were also implanted in the hepatic vein, the hepatic artery and the portal vein. The concentration of any substrate may be determined from blood samples drawn from the vascular access ports. Since the total metabolic flux is the product of blood flow and the substrate concentration, total hepatic extraction may be determined. The relative contributions of the hepatic and portal vessels can be varied at will with the vascular occluders.

Flow Ranges Observed

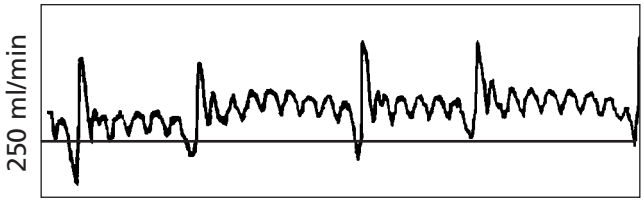

Fig. 1: Instantaneous flow ranged from 200 to 350 ml/min. This pulsatile flow example is from an acute experiment in an anesthetized dog. Note the periodic spikes from respiratory activity. Typical mean flow from chronic experiments ranged from 376 to 450 ml/min.

Surgical Approach

Premedicate with 0.02 mg/kg atropine IM. Induce with 18 mg/kg thiamylal and maintain on halothane. With anesthetized dog in dorsal recumbency, make a midline skin incision from the xiphoid cartilage to the umbilicus. Continue the incision through the linea alba and the peritoneum to expose the lobes of the liver. Deflect the lobes of the liver cranially and identify the splanchnic vessels. Carefully dissect free a 2 cm segment of the portal vein and strip all fat from it for proper acoustical coupling. Slip the large U bracket around the vein, attach the body of the Probe and secure the screws. Rotation of the Probe around the vein may be necessary to align the screwdriver with each screw. Suture the cable to the perivascular connective tissue.

(Continued on next side.)

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Dog Hepatic Artery & Portal Vein: Chronic Blood Flow Measurement Cont.

Surgical Approach cont.

Identify the gastroduodenal artery. It is the continuation of the hepatic artery after the last hepatic branch and runs adjacent to the bile duct. Ligate it to isolate the hepatic circulation from that of the stomach and pancreas.

Mobilize a 1 cm segment of the hepatic artery and strip away any fat. Pass the L bracket around the hepatic artery, close the slide and secure the screw. Wrap the silicone sheet around the Probe so that the parts of the bracket with the suture holes extend through the cutouts in the silicone sheet. Suture the ends of the silicone sheet as shown in Fig. 2. Place several 4-0 silk sutures between the each edge of the silicone wrap and perivascular connective tissue as shown in Fig. 3 Also place a single suture around the cable for strain relief.

Exit the Probe cables through a stab incision high on the abdominal wall. Make a skin incision between the shoulder blades and create a subcutaneous tunnel from the stab incision to the midscapular incision. Pull the cables through the subcutaneous tunnel. Close the body wall with 2-0 silk sutures in an simple interrupted pattern. Close the skin and the stab incisions with a subcuticular pattern.

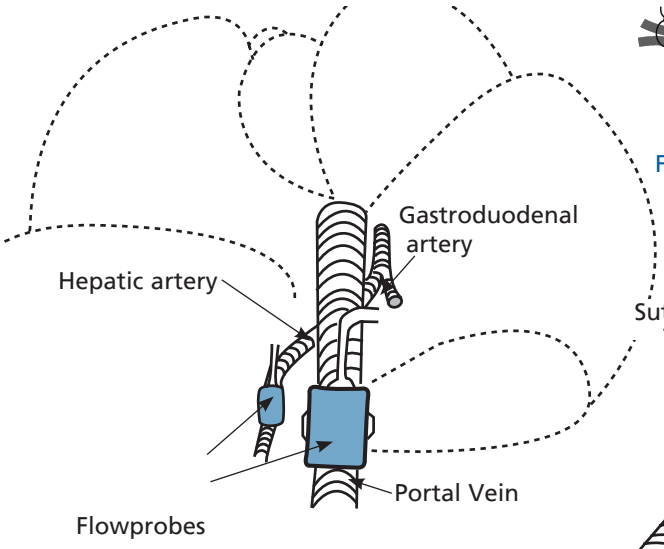

Fig. 1: Flowprobes on hepatic artery & portal vein

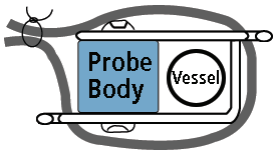

Fig. 2: Silicone Wrap

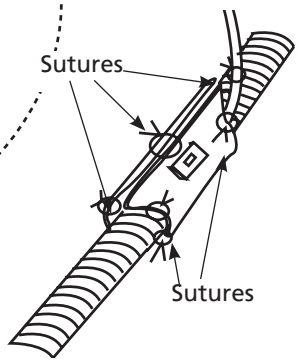

Fig. 3: Suturing

ACKNOWLEDGEMENT

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