

# T400-Series Surgical Protocol

## Llama Fetal Carotid & Femoral Arteries: Chronic Blood Flow Measurement

### APPLICATION BASICS

Site:	Carotid & Femoral arteries
Species:	Llama fetus
Stage of gestation:	60% - 70%
Weight:	40 kg
Duration:	Chronic
Vessel Diameters:	Carotid artery: 3 mm Femoral artery: 2 mm

### PROBE

Size:	3(2) mm (side exit)
Reflector:	L with sliding cover
Connector:	4-pin
Cable Length:	1.5 m
Catalog #:	MC-3(2)PSS-LS-WC150-CM4S-GC

### FLOWMETER

TS420 Perivascular Module

## Application

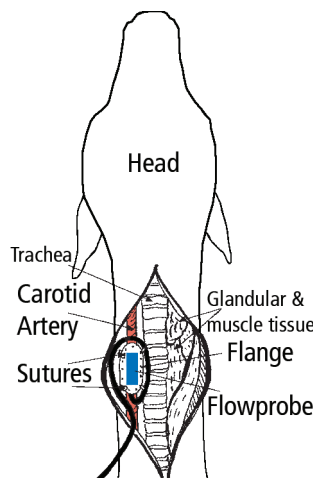
Measurement of fetal carotid and femoral blood flows are used specifically as indices of a redistribution of the combined ventricular output during intra-uterine compromise, e.g. during acute hypoxemia (Fig. 1). Control of the fetal cardiovascular responses to stress involves neural responses, which are usually rapid in onset, and endocrine responses which develop more slowly. Greater information relating to the control of any specific cardiovascular response may thus be obtained, in the first instance, by determining its rate of onset. Continuous blood flow monitoring with Transonic® Flowprobes permit such measurement to be studied in detail.

## Surgical Approach

Following food and water deprivation for 24 hours pregnant llamas are pre-mediated with atropine (1 mg I.M.). Anesthesia is induced with ketamine (10 mg/kg I.M.) and maintained with halothane (1-2% in 50/50 O<sub>2</sub> and N<sub>2</sub>O). During surgery the llama is constantly hydrated with warm saline I.V. at a rate of 15 ml/kg/hr to compensate for fluid loss.

The llama is placed in the dorsal recumbency and a 10 cm ventral paramedian incision is made anterior

(Continued on next side.)



## Flow Ranges Observed

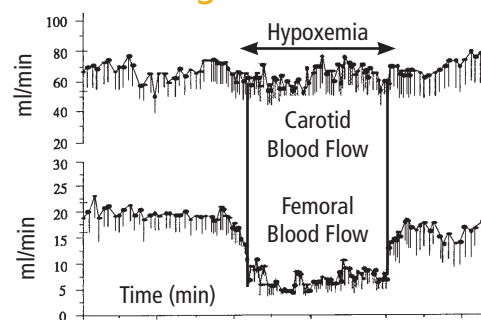


Fig. 1. Continuous carotid & femoral blood flow (means  $\pm$  S.E.M.) in 5 fetal llamas at 60% - 70% of gestation during basal and hypoxemic conditions. Basal carotid and femoral blood flows were  $65 \pm 13.6$  and  $18 \pm 3.4$  ml/min respectively.

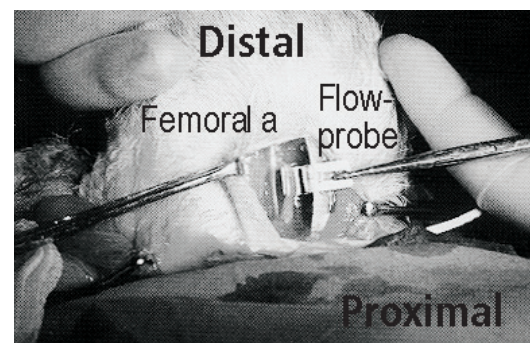


Fig 2: Flowprobe implantation around the femoral artery.

# Llama Fetal Carotid & Femoral Arterial: Chronic Blood Flow Measurement Cont.

## Surgical Approach cont.

to the mammary tissue from the umbilical scar. Sterile gauzes are used as abrasives to separate tissue from the peritoneum and the abdominal cavity is opened along the linea alba. A trochar is used to perforate the lateral wall of the abdominal cavity and the transducer lead is passed through the cannula. The cannula is then removed.

The fetus is palpated to identify orientation and a transverse uterine incision is made with an electrocautery to allow exteriorization of a fetal hindlimb. The femoral artery pulse is located within the cleft formed by the quadriceps and biceps femoris muscles and a 3 cm incisions made on the skin anterior to the abdomen and running parallel to the limb. The femoral artery is exposed by blunt dissection, taking care not to damage the femoral nerve, and the Probe reflector bracket is passed underneath it. The sliding cover is then closed and the Probe secured in place by tying four stitches through the Probe silicone flange into muscle tissue (Fig 2). The Probe cable is looped underneath the skin to prevent traction and the incision closed with a 2-0 silk simple continuous suture. A locking continuous suture is sewn over the edges of the uterine incision to aid hemostasis and prevent hemorrhage and the uterine wall closed with a continuous Cushing pattern.

A second uterotomy is made to allow exteriorization of the fetal head and neck. The trachea is palpated and a median 5 cm incision is made below the larynx. The carotid artery is located within the cleft formed by the sterno-hyoid and sterno-cleidomastoid muscles and exposed over 3 cm. The Flowprobe is passed underneath the artery and secured as for the femoral artery. The second uterine incision is closed as for the first one and the abdominal wall and skin closed as routinely.

## ACKNOWLEDGEMENT

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## REFERENCES

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