

# T400-Series Surgical Protocol

## Sheep Pulmonary Artery: Chronic Blood Flow Measurement

### APPLICATION BASICS

Site:	Pulmonary artery
Species:	Sheep (Merino)
Weight:	40 - 50 kg
Duration:	Chronic
Vessel Diameter:	16 - 20 mm

### PROBE

Size:	20 mm
Connector:	10-pin
Cable Length:	1 meter
Catalog #:	MC-20PAU-WC100-CRS10-GAC

<b>FLOWMETER</b>	TS420 Perivascular Module
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### Application

The pulmonary Flowprobe is useful in any application which requires continuous measurement of cardiac output. The combination of arterial blood pressure and cardiac output provides a continuous measurement of total peripheral resistance.

### Surgical Approach

The animals are seated vertically on the floor resting back against the holders knees and a 18 g temporary indwelling catheter is placed in a foreleg brachial vein. Propofol (administered as rapidly as possible via the catheter, 20 ml, or 200 mg is usually sufficient for an adult animal) is used for induction and intubation. Anaesthesia is maintained and the animals positively ventilated with halothane and oxygen. A large area of the left thorax is clipped and prepared as a sterile field, extending from the middle of the back line to the sternum and from the point of the elbow anteriorly caudal almost to the rib line.

A skin incision is made above the third left intercostal space and lies approximately in the middle of the flat area of the thoracic wall immediately behind the point of the elbow. The length of the incision depends on the skill of the operator but it should be remembered that the PA lies in the dorsal third of the thorax. The muscles of the chest wall are dissected (blunt and with electrosurgical gear) to expose the relevant intercostal space. The third intercostal space is the best choice in Merinos but in more stocky chested animals the fourth often gives better access. Check the spaces by located the first rib with the flat of the hand.

A 5 mm midline incision is made through the dorsal third of the intercostal muscle using a combination of scissors and blunt dissection. A longer incision will probably be needed initially until the operator is familiar with the anatomy

*(Continued on next side.)*

### Flow Ranges Observed

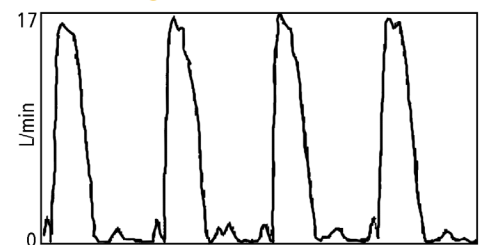


Fig. 1: Instantaneous flow ranges from 0 L/min to 17 L/min.



Fig. 2: PAU-Series COnfidence Flowprobe® with chronic Ultrafit Liner.

## Sheep Pulmonary Artery: Chronic Blood Flow Measurement Cont.

### Surgical Approach cont.

and the position of the PA. Some sort of pediatric rib spreader is needed to give good exposure. A 4 cm incision is made in the pericardium above the PA. Dissecting behind the PA to allow access for the Flowprobe is probably the most difficult part of the implantation and potentially the most dangerous. Locating the plane of dissection is best done with a gloved finger. We sometimes use right angle forceps to extend the dissection once we have opened a track behind the vessel but mostly we utilize a "finger dissection."

Place the chronic Ultrafit liner around the pulmonary artery rotating the liner so that the opening is on top. Use a pair of straight or right angle forceps to maneuver it around the vessel. Place the body of the Probe over the liner so that the top of the Probe covers the gap in the liner. Secure both Probe and liner with sutures through the suture holes in the liner. Note: PS-Series Probes may be used instead of PAU Probes.

The wound is then closed layer to layer with 0 Dexon or equivalent until the subcutaneous fat/fascia layer is left. A coarse purse string suture is placed around the exit of the Flowprobe lead so that, when closed, the suture does not make contact with the surface of the Probe lead. We do not use a chest drain but merely slightly over inflate the lungs several times and hold at peak inflation when the purse string is pulled tight.

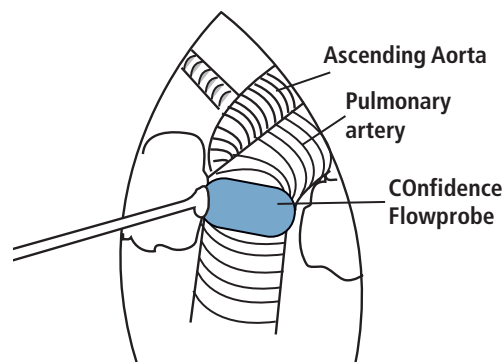
It is important that the plug and lead are not tunnelled immediately below the skin but slightly deeper beneath the fat/fascia layer. Otherwise the lead can erode through the skin over time. We usually tunnel in two stages almost to the dorsal midline. A 20 cm loop of plastic coated bell wire is inserted using a large needle through a fold of skin immediately above the final lead exit so that approximately 8 cm of the wire is beneath the skin in an anterior/posterior direction. A small leather coin purse with a belt loop is held in position by the looped and knotted wire. The Probe lead plug is inserted into the purse through a hole in the purse back and the hole is closed with a suture. A coarse purse string (0 silk) is placed around the Probe lead at the exit and sutured to the skin purse string. It is important that the lead exit point is behind the back of the purse to minimize the exposed length and the opportunity for the animal to catch the lead with its toe when scratching. Sheep have surprisingly mobile hind feet! The remainder of the fascia and the skin is closed over the wound in the thorax.

Antibiotic (1gm ampicillin & 80mg gentamicin sulphate, both i/v) are given prophylactically immediately after surgery and for three days. Flunixin meglumine, 50mg i/m, is given prior to surgery and post-operatively once daily for two days as an analgesic and anti-inflammatory agent.

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## Sheep Pulmonary Artery: Chronic Blood Flow Measurement Cont.

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