



Title: Collecting Clinical and Biochemical Data From Cattle While Minimizing Contact

SOP Number: 047

Purpose: This document outlines the standard operating procedures for collecting clinical and biochemical data from cattle while minimizing contact of animals by handlers. This SOP includes methods for non-surgical jugular catheter insertion, rectal temperature device placement and heart rate belt placement. Specific experiments may warrant modifications to the general procedures described below.

COLLECTING BLOOD NON-SURGICAL JUGULAR VEIN CATHETER INSERTION FOR CATTLE

- A. Temporary indwelling jugular catheters consisting of approximately 150 mm of PTFE tubing (6417-41 18TW; Cole-Palmer; o.d. = 1.66 mm) will be inserted using a 14-gauge by 2-inch thin-walled stainless steel biomedical needle (o.d. = 2.11 mm). Catheters and needles will be gas sterilized if possible, or cold sterilized in Nolvasan® solution before use.
 1. The procedure is rapid and requires only a single puncture of the jugular vein with a biomedical needle.
 2. The catheter is maintained in place using tag cement and 2-inch (= 50.8 mm) wide porous surgical tape.
 3. The catheters will be fitted with extensions made of sterile plastic tubing (Tygon S-50 HL; VWR Scientific; i.d. = 1.59 mm; o.d. = 3.18 mm) for collection of blood samples.
 4. After blood collection is completed, the catheters are removed by simply pulling off the tape. Pressure is applied to the insertion site, and iodide is sprayed on the site to prevent infection.
- B. Following catheter insertion, cattle are placed into individual stalls.
 1. Catheters are suspended above each animal using a cord minder.
 2. During blood collection, a person can walk up to the cattle and collect blood samples without making direct contact with the animal.
 3. First, 3 to 5 mL of fluid (heparin-saline) is drawn from the catheter.
 4. Then, a maximum of 60 ml/kg (per IACUC Policy 07: Acceptable Methods of Blood Collection) of blood is withdrawn.
 5. Then 5 to 20 mL of saline is returned to the catheter to replace the volume of fluid withdrawn. Three to 5 mL of heparin- saline is pushed into the catheter to prevent blockage from coagulated blood.
 6. The amount of saline pushed into the catheter is equivalent to the amount of blood withdrawn and the amount of heparin-saline is equivalent to the amount of fluid to fill the entire catheter (without pushing heparin into the blood stream).

INDWELLING RECTAL PROBE (RP) DEVICES

- A. A device has been constructed to collect continuous rectal temperature in cattle without having to make contact with the animal for each data point (FIGURE 1).

1. The device is composed of a Tidbit ® v2 Temp Logger (0 mm in diameter and 15 mm thick) which is placed in an egg-shaped aluminum holder (Designed by USDA-ARS, manufactured by Calco, 35 mm diameter, 50 mm long).
 2. The logger-holder is threaded to a self-threading pvc probe (8 mm diameter, 150 to 305 mm long).
 3. The end of the probe is threaded into a coupling that secures the probe into the aluminum tail mount.
 4. The mount is lined with padding and a dab of tag cement.
- B. The logger-holder and pipe is gently inserted into the rectum of the animal with the aid of lubricated jelly.
 - C. The mount is secured to the tail using vetwrap and a dab of tag cement. Some RP devices (for larger cattle (+300 kg) have tail-head arms, (see FIGURE 1) to prevent the animal from flipping its tail and pulling the internal portion of the rectal device out.
 - D. Special care is taken to not wrap the tail too tightly or below the “tabs” at the bottom of the mount thus preventing blood-flow restriction of the tail.
 - E. Once the animal has the device placed, it can freely move about.
 - F. Feces can still be excreted around the holder and pvc piping.
 - G. About four hours after initial placement, the tails and probes are examined for proper placement and adjustment.
 - H. Probe placement and tails are routinely checked daily.
 - I. The probes are removed by cutting away the vet wrap and gently pulling the logger out of the rectum.

HEART RATE BELTS

- A. Heart rate can also be continuously measured without making contact with the animal for each data point.
- B. Heart rate monitors and belts (Polar USA, 610 or 810 monitor and Equine polar belts) have been modified for use on cattle.
 1. The heart rate belt is placed inside a protective canvas belt 2.5 – inches wide (= 63.5 mm).
 2. This belt consists of cloth with conductive-foam probes which fasten into a transmitter.
 3. The entire belt is placed around the circumference of the animal, just behind the forelegs.
 4. The shorter probe, closest to the transmitter is placed ventrally, behind the left foreleg,
 5. The longer probe is placed more dorsal on the right side, over the rib cage.
 6. Conductive grease (Luberex, GC Electronics) lubricates the foam probes.
- C. For long term use (+24 h) belts will have a small tube inserted into the probe so that luberex can be re-applied without removing the belt.
- D. A pocket is placed dorsally on the animal’s canvas belt and once the monitor is started, it is placed into the pocket.
 1. Heart rate can be recorded (in beats per minute) every 1, 15, or 60 seconds.
 2. The entire device is removed at the end of the data collection period.
 3. Belts are also checked daily.

- E. During winter months or whenever excessive hair is present, cattle may need hair clipped around the probe sites.

DAILY HEALTH OBSERVATIONS AND ASSESSMENTS

- A. Catheters are flushed with sterile saline at least twice daily.
 - 1. Catheters that become non-functional are removed and possibly replaced with a new, clean catheter.
- B. Tails are checked daily for RP placement.
 - 1. RP devices that fall out are completely replaced with a clean, new probe.
- C. Heart rate belts may need to be adjusted once daily. However, because the addition of the conductive foam swells as the belt loosens, little re-tightening of belts should be needed.
 - 1. The Lubrex conductive grease needs to be applied to the probes every 12 h.

FIGURE 1. Rectal probe device. The aluminum logger holder containing a Tid bit V2 Logger is placed in the rectum with lubricated jelly. The logger-holder is attached to a probe, which connects to the tail-mount with the coupling. The tail-mount is secured to the tail by vetwrap and tag cement. The tail-head arms are used for larger animal s to prevent the tail from flipping the probe out of the rectum. The open slot was added to relieve pressure off the tail vein, preventing blood flow constriction. The tabs were added to prevent the vetrap from falling below the probe.

