

- SOP No:** ATT 017
- SUBJECT:** Lumbosacral Cerebrospinal Fluid aspiration in Ruminants
- POLICY:** This procedure may only be performed by, or under the supervision of operators skilled in the technique
- PRECAUTIONS:** Aseptic conditions are required to avoid introduction of bacteria into the cerebrospinal fluid (CSF) space. Restraint of the animal is necessary: for cattle this is ideally a crush with a headlock; for smaller ruminants this may be achieved by manual standing restraint. If possible, a recumbent animal should be placed in sternal recumbency such that the hips and pelvis are not off centre.
- EQUIPMENT:**
- 2% lignocaine / lidocaine (local anesthetic)
  - #11 scalpel blade (or similar)
  - xylazine (or similar sedative) and syringes and needles
  - Animal Clippers
  - Surgical preparation solutions (iodine or chlorhexidine or similar)
  - Sterile dry cotton gauze 8 cm x 8 cm squares (or similar)
  - Sterile surgical gloves
  - Non-sterile working tray / table
  - Small sterile drape for working surface (tray, table or similar)
  - Sterile syringes (e.g. 3 to 12 mL)
  - Sterile small gauge needles (e.g. 22g, 21g X 1 1/2 inches)
  - Sterile spinal needles sized to animal (e.g. 18g x 3 1/2 inches for adult bovine, 20g x 1 1/2 inches for small calf)
  - Sterile 3-way stopcock (optional)
  - Sterile Pressure manometer (optional)
  - Collection tubes and culturettes
- PROCEDURE:**
1. **Restraint:** The animal is restrained using methods appropriate for its size, demeanour and health status. If the disease process is such that the animal is hyperexcitable, light sedation (xylazine or similar) may be used. Excessive sedation may result in an animal which does not stand in the correct orientation for successful collection of CSF. The clinician should palpate the animal prior to the next step to identify the site for CSF collection. (In young bovine and in small ruminants the site is often the lumbosacral space. In the older bovine it is often the first intervertebral space cranial to the lumbosacral space.)
  2. **Preparation of site:** The area around the lumbosacral space, including up to two intervertebral spaces cranial, is clipped so all hair within 10 to 15 cm of the collection site is removed. The site is prepared as for aseptic surgery (using either the iodine or chlorhexidine preparation solutions).
  3. **CSF Aspiration:** The clinician puts on sterile gloves. Sterile syringes, needles and optional stopcock and manometer are placed on the sterile working surface. The clinician injects 3 to 5 mL (less required for non-adult bovine) local anesthetic at the first site. In small ruminants, the spinal needle is then inserted through the skin and subcutaneous tissue and gradually continued into subarachnoid space within the vertebral canal. (In older bovines, a small stab incision with the #11 blade may be needed to allow the spinal needle through the skin.) The spinal needle is oriented with the bevel directed cranial. It is very important to maintain the spinal needle orientation perpendicular to the vertebrae in both the

craniocaudal and sagittal planes to avoid missing the subarachnoid space. A 'pop' sensation is often felt as the tip of the needle enters the vertebral canal. When the popping sensation is felt, or when an appropriate depth is attained, the clinician should advance the needle slowly removing the stylet after each advance to determine if CSF appears at the hub of the needle. If so, a few mLs may be collected by gentle aspiration. If not, a small syringe (e.g. 5 mL) containing 1 to 2 mL of air may be attached to the needle and gentle aspiration applied to determine if CSF is present. If unsuccessful, the stylet is replaced, the needle advanced another small distance, and the process repeated. If no CSF is obtained the stylet is replaced and the needle be removed. The procedure may be repeated at the intervertebral site immediately cranial to the site just attempted.. Should the needle touch bone during the process, the needle orientation is corrected and the process continued.

**Optional:** CSF pressure may be measured by attaching a 3-way stopcock to the spinal needle and a manometer to the stopcock. The stopcock must be supported. Fluid is allowed to rise in the manometer and the maximum height recorded.

CSF collected from the manometer or directly from the spinal needle should be placed in the collection tubes as soon as possible.

**RECOMMENDATIONS:** Results of fluid analysis will determine the recommendations.

**DATE APPROVED:** April 2009

**REVISED:**

#### REFERENCES

1. Chapter 3. Ancillary diagnostic aids. In: *Large Animal Neurology*. Joe Mayhew. WileyBlackwell 2009. ISBN 978-1-4051-5493-2