CERVICAL CENTESIS IN STANDING HORSES

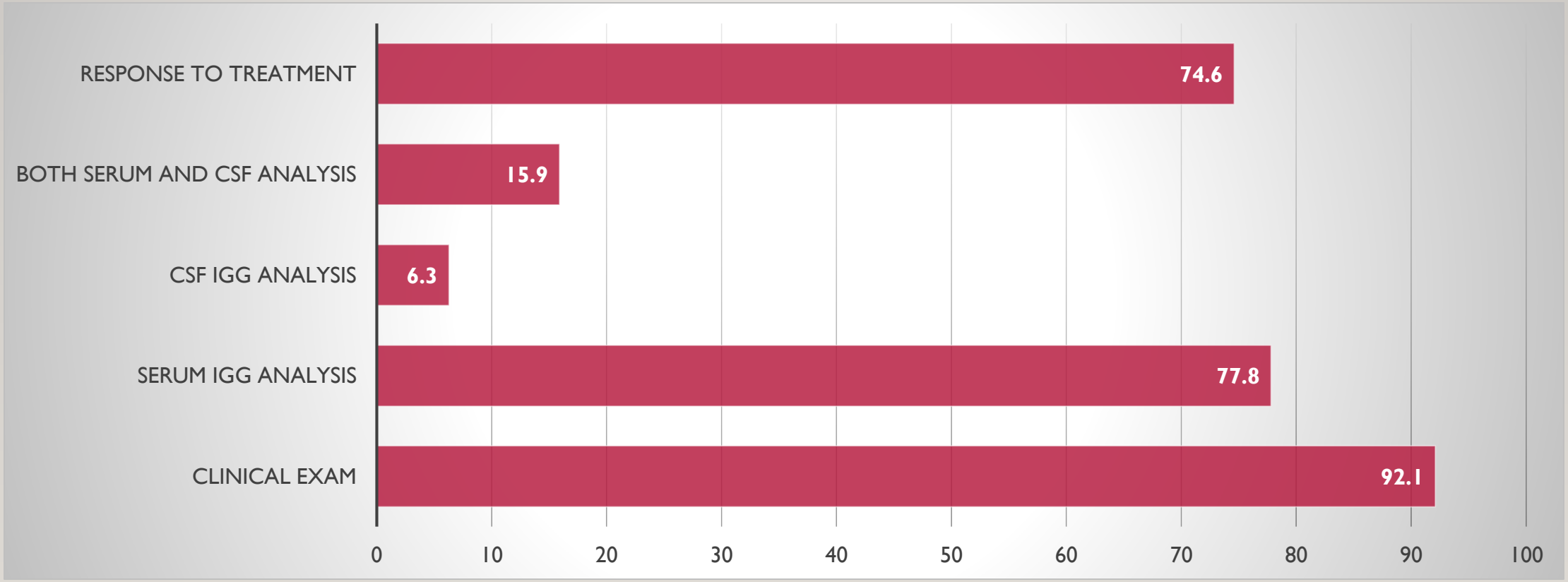
FIELD INSTRUCTIONS FOR OBTAINING AND EVALUATING CEREBROSPINAL FLUID IN THE STANDING HORSE (ACCOMPANIED BY VIDEO DEMONSTRATION)

COURSE 8081

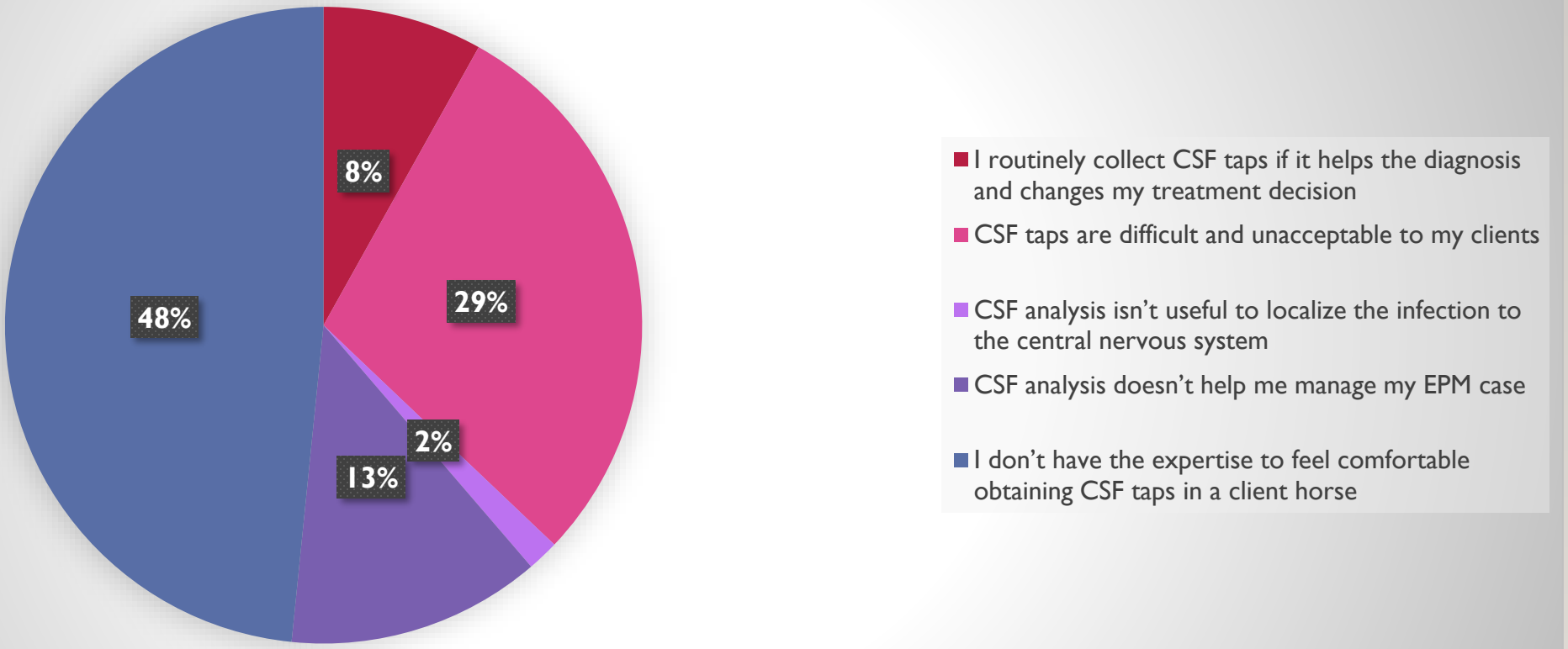
WILL AN INSTRUCTIONAL VIDEO DEMONSTRATING A TECHNIQUE TO OBTAIN CSF IN A STANDING HORSE BE USEFUL TO FIELD VETERINARIANS?

A brief survey of clinicians indicated that they may use the procedure if the technique was demonstrated.

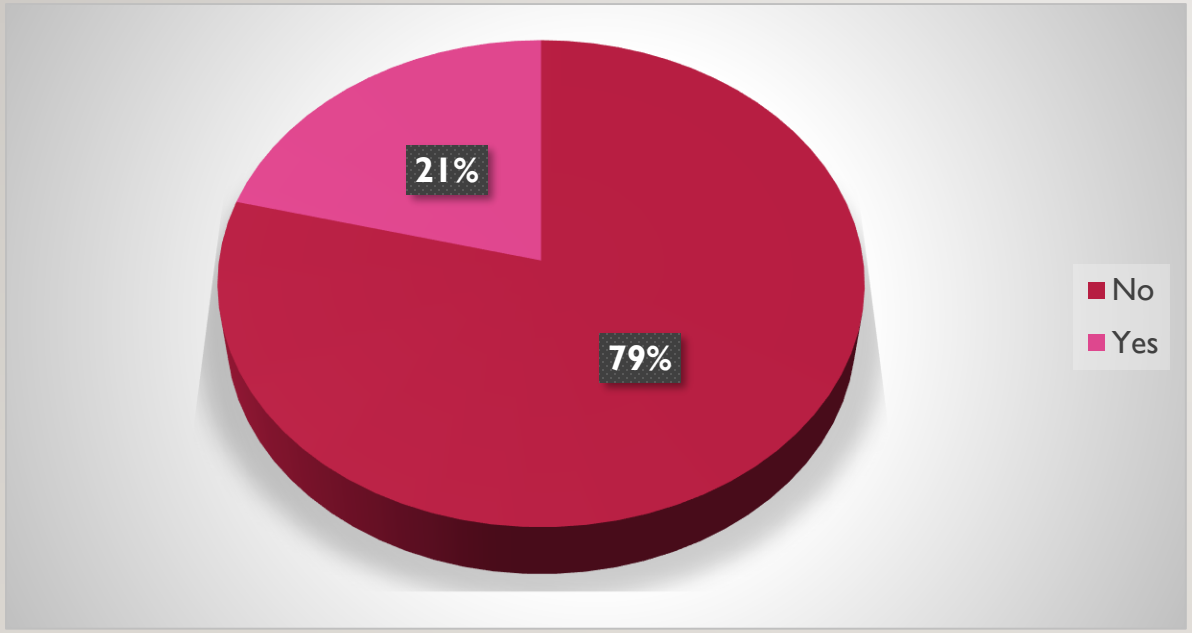
ONLY 6.3% OF THE VETERINARIANS USE CSF ANALYSIS TO DEMONSTRATE ANTIBODY TO PROTOZOA IN EPM-SUSPECT HORSES. WHEN ASKED HOW A PRESUMPTIVE DIAGNOSIS OF EPM WAS MADE VETERINARIANS RESPONDED:



92% OF THE VETERINARIANS POLLED FIND CSF DIFFICULT TO OBTAIN, UNACCEPTABLE TO CLIENTS, OR THINK THAT CSF ANALYSIS WILL NOT HELP MANAGE THEIR EPM CASE. HERE ARE THEIR RESPONSES:



79% OF THE VETERINARIANS POLLED ANSWERED NO WHEN ASKED IF THEY WERE FAMILIAR WITH *AN ULTRASOUND GUIDED CERVICAL CENTESIS TECHNIQUE TO OBTAIN CEREBROSPINAL FLUID IN THE STANDING HORSE**.



An instructional video may bring awareness of a useful technique.

*VET RADIOLOGY AND ULTASOUND 2012 53(1) 92-95

WHY COLLECT CEREBROSPINAL FLUID?

- Cytologic analysis of CSF in neurologic horses may help in treatment decisions
- *Immediate results may indicate a course of treatment*
- Add standing centesis to field skills set
- Add to the general knowledge about neurologic disease in horses

THE AO CENTESIS TECHNIQUE LOOKS TECHNICALLY DAUNTING FOR FIELD USE. STOCKS AND PLACING THE HORSES HEAD IN A HEADSTAND ARE REQUIRED.

Paper

Ultrasound-guided atlanto-occipital puncture for cerebrospinal fluid analysis on the standing horse

M. Depecker, C. Bizon-Mercier, A. Couroucé-Malblanc

The atlanto-occipital site (AO) is convenient for retrieving an adequate volume and quality of cerebrospinal fluid (CSF) in the diagnosis of neurological disease in horses. However, general anaesthesia is not always possible for horses displaying severe neurological signs, or for economical reasons. The objectives of the present work were to determine the feasibility and safety of ultrasound-guided CSF puncture at the AO site on the standing horse. Seven horses (six healthy and one mildly ataxic) were sedated with acepromazine (0.02 mg/kg bodyweight intravenously or 0.04 mg/kg bodyweight intramuscularly) and detomidine (0.01 mg/kg bodyweight intravenously), and placed in stocks or in a recovery stall with the head kept on a headstand. Puncture was performed by ultrasonographic guidance with a parasagittal technique, as previously described, using a 20 g, 3.5 inch spinal needle. In all horses, no adverse reaction was observed when crossing the dura mater and 20 ml of CSF was rapidly retrieved without any blood contamination. Ultrasound-guided CSF puncture can be performed easily at the AO site on a healthy standing horse. Regarding the potential risk of this procedure, safety measures and close observation are essential. Further studies on a larger amount of ataxic horses are also required before considering this technique as an alternative option for CSF puncture.

ULTRASOUND-GUIDED CERVICAL CENTESIS TO OBTAIN CEREBROSPINAL FLUID IN THE STANDING HORSE

ANTHONY PEASE, ASHLEY BEHAN, GEORGE BOHART

Abstract Horses with intracranial lesions and severe ataxia are not good anesthesia candidates; however, only one method to obtain cerebrospinal fluid (CSF) from the cervical region in a standing horse has been reported. This method is not performed routinely due to the difficulty for sample acquisition. Our hypothesis is that standing cervical centesis can be performed in horses without complication. Ultrasound-guided centesis of the CSF between C1 and C2 in 11 clinically normal horses and two horses with neurologic signs were performed. Horses were sedated and ultrasound was used to identify the subarachnoid space and spinal cord between C1 and C2. With ultrasound guidance, a needle was introduced into the dorsal aspect of the subarachnoid space using a lateral approach. Ten milliliters of CSF was obtained and analyzed. Two normal horses in this study had moderate red blood cell contamination in the CSF (940 and 612 RBC/μl). One horse had 11 RBC/μl and the remaining horses had <4 RBC/μl. The total procedure time was approximately 2 min. No reaction was observed and no complications were detected up to 48 h after the procedure. Ultrasound-guided centesis between C1 and C2 is a rapid procedure that causes minimal to no reaction in standing, sedated horses used in this study. The use of ultrasound to guide a standing C1–2 centesis of the subarachnoid space provides an additional route to obtain CSF for analysis in the equine patient. © 2012 *Veterinary Radiology & Ultrasound, Vol. 53, No. 1, 2012, pp 92–95.*

Key words: cervical, CSF, equine, horse, ultrasound.

WHY COLLECT CSF IN A *STANDING* HORSE?

- Many veterinarians have the skills to learn the techniques
- The equipment is available to most veterinarians
- A modified field procedure uses common sedation techniques
- The risk of general anesthesia/recovery in a neurologic horse is eliminated
- No need to wait for the horse to recover from general anesthesia
- Clients may perceive the technique as less invasive

CSF ANALYSIS MAY BE PART OF A COMPLETE NEUROLOGICAL EXAMINATION THAT IS LIFESAVING

Useful in diagnosing central nervous system disorders

- ✓ Encephalitis
- ✓ Meningitis
- ✓ Compression
- ✓ Bacterial infection
- ✓ Fungal infection
- ✓ Bleeding
- ✓ Abscess
- ✓ Cancer

MODIFIED SEDATION WITH BLOCKING TECHNIQUE FOR COLLECTING CSF IN THE STANDING HORSE

1) Restraint
2) Site preparation
3) Sedation
4) Ultrasound instruction

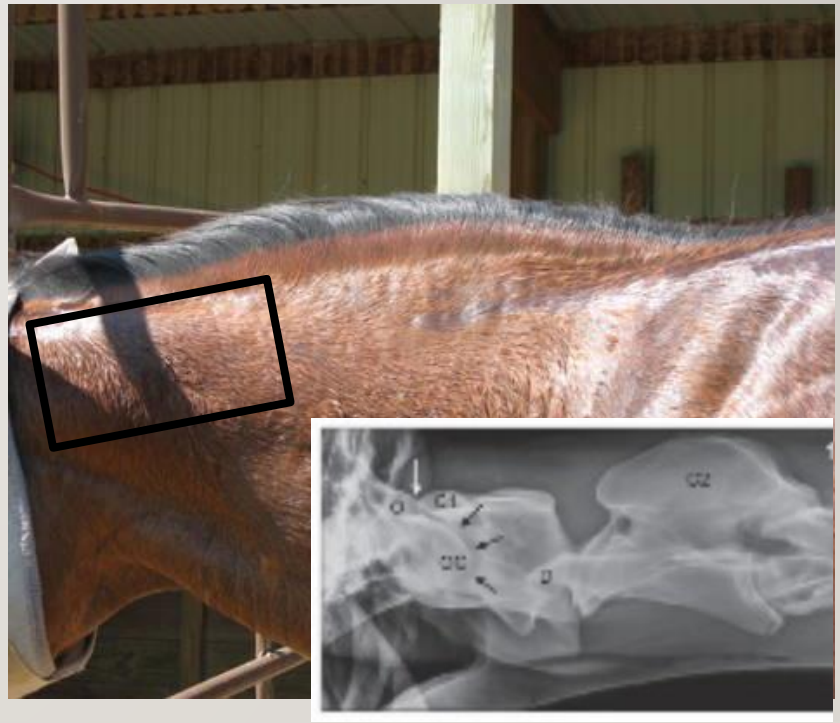
Revised sedation used by Scott Langton Corner Lake Equine FL.

WHAT YOU WILL NEED

- Sterile tray with
  - Clippers, razor, scrub, alcohol,
  - Collection tubes (red and lavender top tubes, red top with 90% ethanol), 12 and 20 cc syringe
  - Optional: culture tube, urine dip strip tests, 3% sulfosalicylic acid, Pandy's reagent,
- Acepromazine (0.02 mg/kg IV or 0.04 mg/kg IM)
- Detomidine hydrochloride 1-2 ml/1100 lb (Dormosodan 10 mg/ml, Zoetis)
- Lidocaine hydrochloride, 5 ml in a syringe with a 1½ inch 18-20 g needle
- Twitch
- 10-4 MHz micro convex curvilinear transducer
- 18 g, 3.5 in spinal needle with stylet

RESTRAINT AND SITE PREPARATION

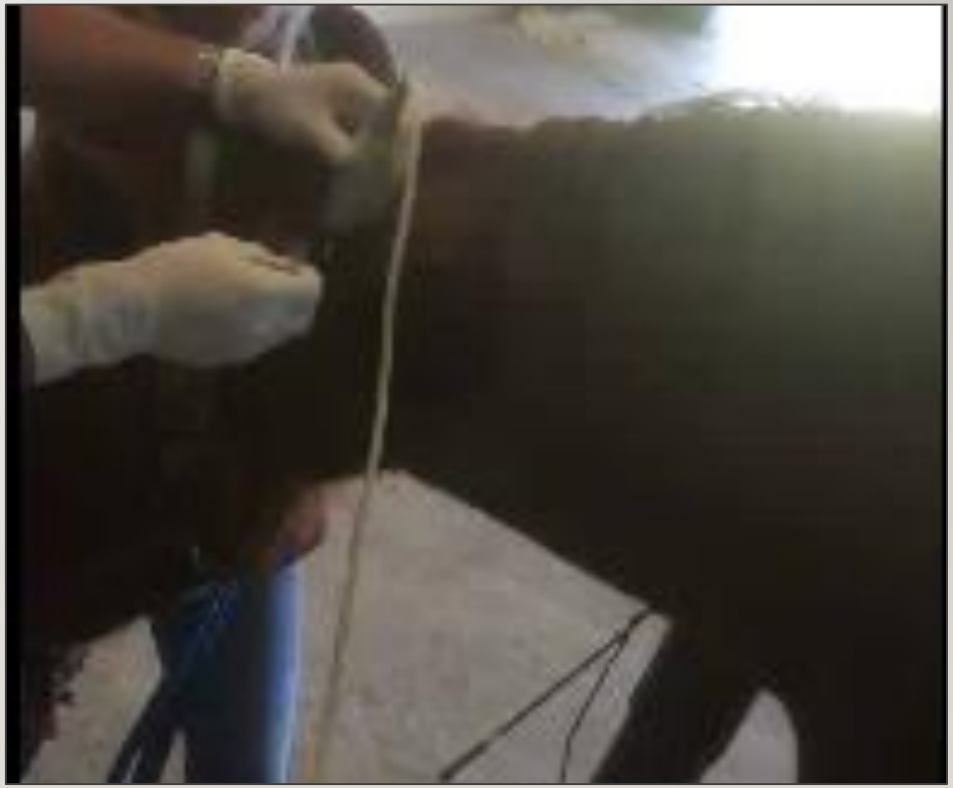
- Hold the horse in a quiet place.
- Shave and aseptically prepare a 15 cm x 15 cm area, caudal to the caudal aspect of the transverse process of C1 and 3 cm ventral from the dorsal midline of the mane over C1 and C2.
- Sedate horse with IV detomidine hydrochloride (Dormosodan)
- Place an 18-20g, 1.5 inch needle on a syringe containing 5-7 ml lidocaine. Deposit 3 ml deep into the neck muscles of the horse over C1-C2. Allow the hub of the needle to depress the tissues slightly. Slowly inject the remaining 2 ml as the needle is withdrawn.
- Place a nose twitch on the horse



Radiograph image figure 1 Can Vet J 2014 Nov;55(11): 1069-1073.

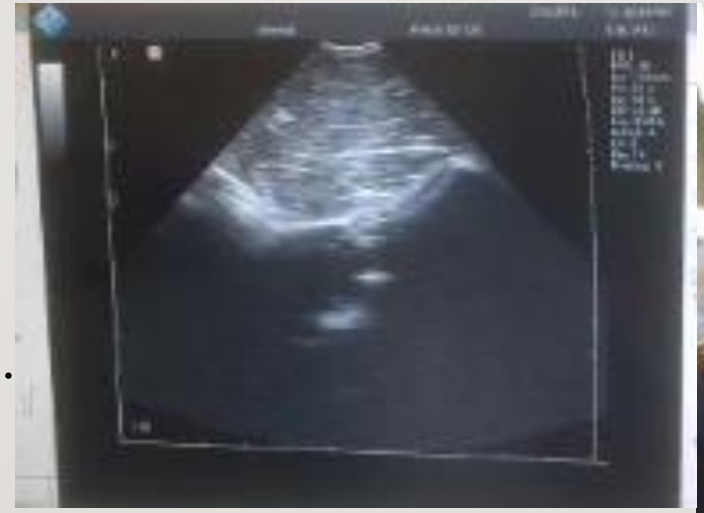
ULTRASOUND PROBE PLACEMENT FOR C1-C2 TAP

- Place a sterile glove over the ultrasound probe
- Orient the probe dorsoventrally to obtain transverse plane images of the spinal cord. Place the probe on the dorsolateral surface of the neck, 2 cm ventral to the mane at the level of C1-2.



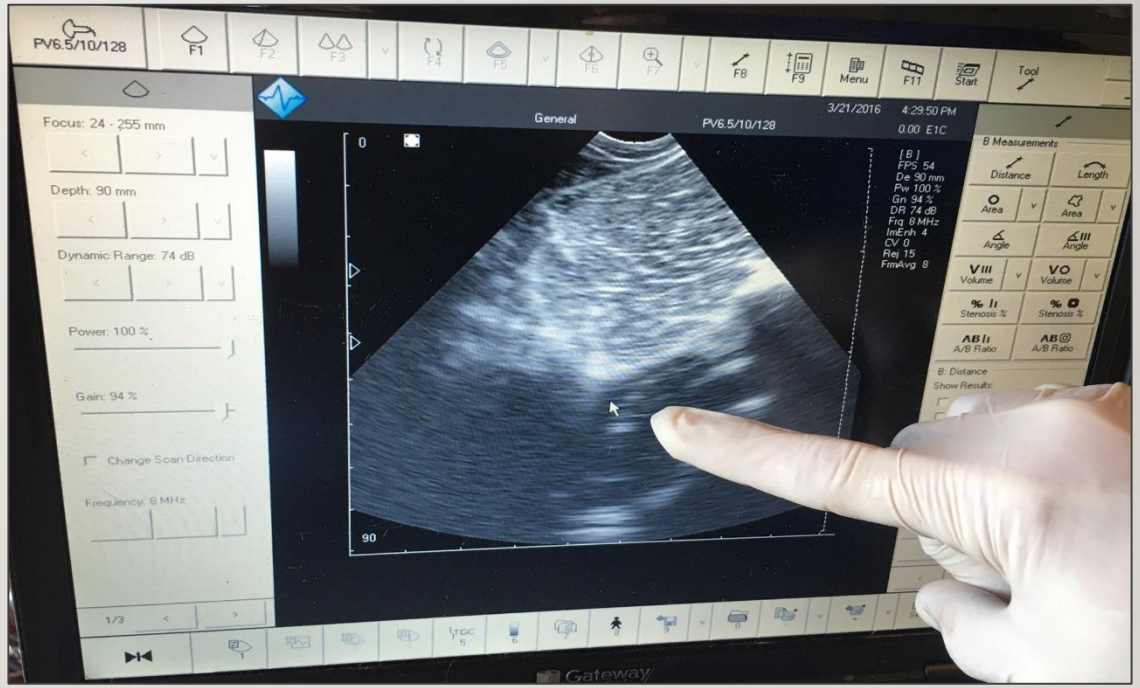
ULTRASOUND VIEW OF NEEDLE PLACEMENT

Introduce an 18 g, 3.5 in needle, with stylet, ventral to the ultrasound transducer and advance to the level of the dura mater in a dorsomedial direction.



ULTRASOUND PROBE PLACEMENT

- Advance the needle through the dura mater and into the subarachnoid space. You may remove the stylet before entering the dura.
- Carefully attach a 20 ml syringe and gently aspirate the fluid. If blood is evident, change the syringe after collection of 5 ml.
- Remove the needle. Monitor the horse for any neck pain for 2-24 hours.



TRANSPORT CSF SAMPLE TO LABORATORY QUICKLY

- Collect CSF in a red, lavender, or green top tube
- Specimens for culture should not be refrigerated, exposed to extreme cold, heat, or sunlight. Do not place in ethanol if you intend to culture the CSF sample. Some red top tubes are toxic to cells. Use a culture transport tube for culture samples.
- Transport between 20C and 35C
- Culture within 2 hours
- Total cell counts must be performed within 30 minutes of collection. Fix sample in 90% ethanol if transport is >30 min

CEREBROSPINAL FLUID ANALYSIS

- Color and clarity. Normal CSF (1) is colorless and clear
  - Red (2) is indicative of acute hemorrhage or blood contamination
  - Yellow-tinged (3) (xanthrochromia) indicates bilirubin from RBC breakdown or free conjugated bilirubin from serum that crosses the blood brain barrier
  - Protein >80 mg/dl may be yellow; due to inflammation, hemorrhage,
- Protein concentration is normally 12-40 mg/dl
- Total cell counts normally are (0-8ul) but up to 23 cells mm^3 can be seen
- Differential cell counts. Normal cell types are lymphocytes and monocytes Neutrophils should be <10% of cells

1 2 3

PRIMARY REFERENCES ARE AVAILABLE CONTACT US AT WWW.PATHOGENES.COM

- Ultrasound-guided atlanto-occipital puncture for cerebrospinal fluid analysis on the standing horse. 2013. Veterinary Record doi:10.1136.
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- Analysis of cerebrospinal fluid in horses. 2000. Johnson PJ, Constantinescu GM. Equine Vet Edu 13-17.

THANK YOU!

- We acknowledge and thank veterinarians that took time to answer the survey questions.
- Scott Langton DVM, Corner Lake Equine Hospital, produced the video and modified the standing sedation technique demonstrating and teaching field adapted modifications. We thank he and his staff for alpha testing the procedure. Our gratitude to Dr. Langton for his interest in bringing this skill to fellow veterinarians.
- Thank you to veterinarians that beta tested the procedure from the video instruction.

ANSWER THE FOLLOWING QUESTIONS FOR 3 CE CREDITS SEND THE ANSWERS TO SELLISON@PATHOGENES.COM

Color and clarity are visually instructive when examining CSF. Normal CSF is colorless and clear, red is indicative of acute hemorrhage or blood contamination, yellow-tinged (xanthrochromia) indicates bilirubin from RBC breakdown or free conjugated bilirubin from serum that crosses the blood brain barrier. Increased protein in the CSF may be detected by color or viscosity, samples with increased protein may be yellow and due to to inflammation or hemorrhage.

- Please answer True of False to the following:

1. You were able to obtain a CSF sample from an acutely neurologic horse using the ultrasound guided procedure. The fluid is colorless and perhaps cloudy, it's hard to tell. You submit the sample to the lab and will later find out that the sample is abnormal. The total cell count is slightly high with a predominance of lymphocytes, the total protein is normal. Rabies should be on your differential in this horse?

ANSWER THE FOLLOWING QUESTIONS FOR 3 CE CREDITS SEND THE ANSWERS TO SELLISON@PATHOGENES.COM

Please answer True or False:

2. You obtain a CSF sample from a horse with suspected EPM. The horse has an abnormal gait and perhaps some one-sided muscle atrophy over the right hip.

The CSF in horses will contain protozoa if they have EPM and protozoa are seen on a stained smear, if the sample is prepared within 30 minutes.

ANSWER THE FOLLOWING QUESTIONS FOR 3 CE CREDITS SEND THE ANSWERS TO SELLISON@PATHOGENES.COM

3. Please answer True or False.

The CSF is obtained from the subarachnoid space in the standing horse. The approach is in a dorsomedial direction between C1-2 (just caudal to the caudal aspect of the transverse process of C1) and approximately 3 cm ventral from the dorsal midline of the mane.

ANSWER THE FOLLOWING QUESTIONS FOR 3 CE CREDITS. SEND THE ANSWERS TO SELLISON@PATHOGENES.COM

4. Please mark True or False.

You have successfully placed a needle into the subarachnoid space between C1 and C2. You should not expect CSF fluid to readily flow and will need to gently aspirate with a syringe connected to the needle.

ANSWER THE FOLLOWING QUESTIONS FOR 3 CE CREDITS SEND THE ANSWERS TO SELLISON@PATHOGENES.COM

Please answer True or False:

5. It is not necessary to remove the stylet from the needle when entering the dura (to minimize needle movement).

ANSWER THE FOLLOWING QUESTIONS FOR 3 CE CREDITS SEND THE ANSWERS TO SELLISON@PATHOGENES.COM

Please answer True or False.

6. The CSF fluid should not be placed in 90% ethanol if culture will be performed. However, if a differential count won't be performed within 30 minutes preservation in 90% ethanol is indicated.

ANSWER THE FOLLOWING QUESTIONS FOR 3 CE CREDITS SEND THE ANSWERS TO SELLISON@PATHOGENES.COM

Please answer True or False.

7. True or False. There is some clinical value to field observations using urine dip sticks to determine protein in CSF fluid, a value of 2+ or greater is highly reliable.

ANSWER THE FOLLOWING QUESTIONS FOR 3 CE CREDITS SEND THE ANSWERS TO SELLISON@PATHOGENES.COM

Please answer True or False

8. A CSF with a high protein concentration will foam when shaken and the foam may not disappear after a few minutes. If elevated CSF protein is suspected a field test using saturated ammonia may indicate the protein is globulin rather than albumin.

ANSWER THE FOLLOWING QUESTIONS FOR 3 CE CREDITS SEND THE ANSWERS TO SELLISON@PATHOGENES.COM

Please answer True or False

9. An increase in albumin concentration in the CSF may suggest the loss of the blood brain barrier integrity.

ANSWER THE FOLLOWING QUESTIONS FOR 3 CE CREDITS SEND THE ANSWERS TO SELLISON@PATHOGENES.COM

Please answer True or False

10. In an attempt to obtain CSF by the ultrasound guided cervical centesis you aspirated reddish color fluid. You changed syringes and collected a clear sample. The first sample would be best for bacterial culture.