Chute side (point-of-care) diagnostics in beef cattle practice

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Abstract
Making a correct diagnosis at the time of physical examination is imperative while dealing with beef cattle to decrease stress and number of times the animal is required to go in the chute. Ancillary tests can be used to assist physical exam interpretations and facilitate proper treatment of the animal. Chute side diagnostics can decrease trips to the ranch and increase efficiency. Point-of-care diagnostics including blood tests and imaging modalities are readily available.

Keywords: bovine, chute side, point of care, diagnostics, ultrasound

Physical exam
A systematic and thorough physical examination is the most important chute side diagnostic aide available to the bovine practitioner. After obtaining a complete history, the habitus, rectal palpation and in the left paralumbar space (2-3 contractions should be auscultated and can also be palpable via rectal palpation and in the left paralumbar space (2-3 contractions in 2 minutes). A rectal examination and mouth examination are performed, as well as a withers pinch. The physical examination gives direction to what further diagnostics may be included, as well. All of this gives a lot of information in a short amount of time.

The reference ranges in mature cattle are RR (12-36 bpm); HR (50-80 bpm); rectal temp (100.5-102.5°F, 38-39°C); rumen contractions should be auscultated and can also be palpable via rectal palpation and in the left paralumbar space (2-3 contractions in 2 minutes). A rectal examination and mouth examination are performed, as well as a withers pinch. The physical examination gives direction to what further diagnostics may be useful and comprehensive physical examination techniques have been previously discussed and should be reviewed.

Bovine viral diarrhea virus (BVDV)
There are very few commercial point-of-care tests available to the beef cattle practitioner. The BVDV SNAP test has proven to be valuable in my practice for the pre-weaned respiratory disease calf that is still on its dam. If the calf is BVDV negative, then I will treat with appropriate antibiotics and have the owner test the rest of the calves in the herd and address mineral status. A positive test can be repeated in 3 weeks to confirm persistently infected (PI) status.
Cytology and fluid analysis

Blood smears can be helpful to rule in *Anaplasma marginale*, perform white blood cell differentials and assess other blood disorders. The author has diagnosed juvenile lymphosarcoma in a 2-year-old periparturient beef master cow that presented for inappetence by looking at a blood smear that had many large lymphocytes that were easily recognized as abnormal.

Total protein of joint and peritoneal fluid is a simple and easy test along with visual analysis of fluid. Total protein of normal joint fluid is <2.5 g/dL and septic arthritis is >4.0 g/dL. Peritoneal fluid should be <3.0 g/dL.

Rumen fluid can be assessed by making a wet mount on a slide and quickly ascertaining quantity and mixture of rumen bugs present. Evaluation is done by adding a drop of fluid to a warm microscope slide and at low power, ≥40 protozoa per field is adequate. The slide should look like a bustling city, with >10 entering the field in 30 seconds. Both ciliated (holotrichs) and flagellated (entodiniomorphids) protozoa should be present and moving. The proportions of these populations can vary based on the diet of the animal.1

Urine can be quickly analyzed with a urine strip or pH strips, and a clinical refractometer. I use these tests to decide whether the animal is at risk for urolithiasis. I also worry about kidney function when the urine is very dilute in a clinically dehydrated animal or animals with azotemia. Visual examination of color and odor may also lead a practitioner to decide to do a sediment exam or whether there is a need for a urinary culture in suspect pyelonephritis cases.

Urinary strips can be useful in the evaluation of cerebrospinal fluid as they detect weak concentrations of total protein. Normal protein content of CSF is 12-40 mg/dl and most of it is albumin.4 Meningitis can be suspected as TP in CSF increases (>100-200 mg/dl).10 This translates to 1+ (30mg/dl) being generally considered normal and >2+ (>100mg/dl) specific for increased protein. Increased protein is a non-specific indicator of pathology that can be attributed to disruptions in the blood brain barrier, intrathecal immunoglobulin production, or necrosis.7

CSF can also be examined physically by placing in a test tube and shaking it for 5 minutes. Normal protein levels within the CSF will have slight foam that disappears after a few minutes. Foam that remains for a longer period of time indicates increased protein levels.5

Imaging

Digital imaging is the most valuable chute side diagnostic tool available in my practice, with ultrasound being the most readily available to the bovine practitioner. The limitations of ultrasound are that only structures adjacent to the body wall are visible and most abdominal organs are not entirely visible. The rectal probes (5-10 MHz) that most bovine practitioners have for reproductive use can be used to assess the surface of the lungs, look for peritonitis in the ventral abdomen, assess the liver and kidneys, as well as other soft tissue structures of the body including the eye and retrobulbar area. An excellent resource for ultrasonography is the *Veterinary Clinics of North America Food Animal Practice Series, Bovine Ultrasound*.1,4

Most adult beef cattle are too big for abdominal radiography, but it can be useful in calves and small ruminants. A single dorsopalmar/dorsoplantar view of the foot can often help with diagnosis and prognosis in complicated foot lesions or in non-specific lameness involving the distal limb.

With the high proportion of horned cattle in my practice, I use radiography to assess horn health routinely. Bucking bulls are required to have their horns “tipped” leaving a blunt distal end of the horn to a minimum size of a 50-cent piece (2.5cm) for competition. It is best to avoid an open sinus to decrease the chance of fatal complications of meningitis and brain abscesses. In order to do this, radiographs can be taken with a metal marker placed on the horn and a cut can then be safely made distal to the sinus to avoid complications and promote faster healing (Figures 1 and 2). During our routine radiographs for tipping, many asymptomatic infected horns are identified as incidental findings with indications of sequestration as diagnosed by lytic areas distal to sinus (Figure 3).
Figure 2: Radiographs can be taken with a metal marker placed on the horn and a cut can then be safely made distal to the sinus to avoid complications and promote faster healing.

Figure 3a: Radiograph of a horn of a 7-year old bucking stock bull that presented for routine “tipping” of horns to comply with performance standards. The radiograph reveals a lytic area consistent with a cornual process of the frontal bone sequestration involving the entire apex.

Figure 3b: The apex of the horn ("tip") appears healthy outwardly and the bull did not show any clinical signs.

Figure 3c: The metal marker is placed to determine where to cut the horn distal to healthy cornual sinus.
References

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