Differentiating neurologic diseases in cattle

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Cattle presenting with neurologic disease represent a significant diagnostic challenge to the veterinarian. Accurate differentiation and diagnosis is critical, due to the potential zoonotic and herd-level implications of many bovine neurologic diseases. This session will use photos and videos to demonstrate localization of neurologic lesions in cattle. Common areas of confusion will be clarified using real-life examples. The sign-time graph will be presented as a useful tool in categorizing differential diagnoses based on clinical course of the disease. Video presentations will demonstrate the characteristics of lesions located in each segment of the central and peripheral nervous systems: cerebrum, cranial nerves, spinal cord and peripheral nerves. Notes for this session will provide a nearly exhaustive list of differential diagnoses for each anatomic segment. Differentiation of central (cerebral) and peripheral blindness will be outlined, with discussion of the major differential diagnoses for each type. As time allows, treatment options, herd implications, and prognoses will be discussed.

Cerebral Diseases

Clinical Signs: Depressed mental state, cortical blindness, circling/leaning, yawning, head pressing, opisthotonus, bellowing, seizures, bizarre behavior

Differential Diagnoses:

Polioencephalomalacia
Lead toxicity
Vitamin A deficiency (peripheral blindness)
Salt Toxicity/Water Deprivation
Rabies
Pseudorabies
Nervous Coccidiosis
Bacterial Meningitis
Malignant Catarrhal Fever
Bovine Herpesvirus 1 & 5
Urea Toxicity
Ammoniated Feed Tox.
Hepatoencephalopathy
Bovine Spongiform Encephalopathy
Sporadic Bovine Encephalomyelitis (*Chlamydia*)
West Nile Virus
Hydrocephalus
    Hydranencephaly
    Nervous Ketosis
    Milk Fever
    Grass/Winter Tetany
    Brain Abscess
    Pituitary Abscess
    Neospora

Cerebellar Diseases

Clinical Signs: Ataxia without paresis, mentally alert, intention tremors, nystagmus, truncal sway, base-wide stance, hypermetria, pick up feet and slam down hard, excellent muscle tone, fall over backwards, no conscious proprioceptive deficits, may lack menace response but have normal vision

Differential Diagnoses:

Cerebellar hypoplasia
Cerebellar abiotrophy
Breed-Associated Malformations – Shorthorn, Ayrshire, Angus, Hereford, Brown Swiss, others
Storage Diseases - α mannosidosis, β mannosidosis, GMI Gangliosidosis, GMII Gangliosidosis

Brainstem Diseases/Central Vestibular Diseases

Clinical Signs: Depression, mania, ataxia and paresis, cranial nerve deficits, irregular respiration, head tilt, eyelid droop, circling, hemiparesis, nystagmus, ataxia with weakness, recumbency (lesion side down) with contralateral limbs hyperextended and hyperreflexic, loss of appetite

Differential Diagnoses:

Listeriosis
Thrombotic meningoencephalitis (*Histophilus*)

Peripheral Vestibular Diseases

Clinical Signs: Usually not depressed, head tilt, ear droop, leaning, circling all towards lesion, horizontal nystagmus, ataxia without weakness, bright, alert, good appetite

Differential Diagnoses:

Otitis media/interna/externa, ear ticks

Spinal Cord Diseases

Clinical Signs: Paresis, ataxia, dysmetria, recumbency, mentally normal

Differential Diagnoses:

Trauma
Vertebral Body Abscess
Epidural Abscess
Aberrant Parasite Migration
Neoplasia (LSA)
Spondylitis
Botulism
Tetanus
Spastic Paresis
Spastic Syndrome
Trace Mineral Deficiencies (Vit E/Se/Cu)
Grass Staggers

Tick Paralysis
Delayed Organophosphate Toxicity
Peripheral Nerve Diseases

Clinical Signs: Weakness, paralysis, decreased muscle tone, muscle atrophy

Obturator
Cannot adduct hind limbs – splay hind legs
Cause: Dystocia, splits, pelvic fracture

Sciatic
Extended stifle, flexed hip, flexed or extended hock or fetlock
Causes: Dystocia, inappropriate IM injections

Femoral
Flexed stifle, extended hip, crouching stance in young calves
Causes: Hiplock dystocia in calves

Peroneal
Extended hock, flexed fetlock
Causes: Prolonged recumbency, sciatic damage

Tibial
Partially knuckled fetlock, flexed hock
Causes: Treatment for spastic paresis, sciatic damage

Suprascapular
Short strided gait, abduction of the leg and shoulder during weight bearing, atrophy of supraspinatus and infraspinatus mm.
Causes: Crashing into headgates

Radial
Dropped elbow to complete forelimb paralysis, high damage: can t bear weight, flexed elbow and fetlock, low damage: can bear weight, flexed fetlock
Causes: General anesthesia or prolonged lateral recumbency, hydraulic tip chutes, humeral fracture

References and Suggested Readings

1. Stokol T, Divers T, Arrigan JW, McDonough SP. Cerebrospinal fluid findings in cattle with central nervous system disorders: a retrospective study of 102 cases (1990-2008). Vet Clin Path 2009;38:103-112.

2. Ruminant Neurologic Diseases. Vet Clin N Am Food Anim Pract 2004:20(2).