Small ruminant emergencies

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Floppy kid syndrome
Trauma PE/History

Semi comatose – floppy kid/cria

Marked depression/ semicomatose

Premature Unerupted incisors Dyspnea

Surfactant Aspiration pneumonia Coanal atresia Hypo/hyperglycemic

Season Exposure Extremities Hypoglycemia

Starvation BCS Hypoglycemia

Coccidiosis/ Crypto > 2 weeks. Hypoglycemia/Fecal

Diarrhea Ecoli C perfrin D Abomasal bloat

Metabolic acidosis Milk consumption

FPT Septicemia Hypoglycemia Polyarthritis Meningitis

White muscle disease CK/AST

Hypoglycemia

Milk consumption

C perfrin D

Abomasal bloat

Hypo/hyperglycemic

Surfactant

Aspiration pneumonia

Coanal atresia

Hypo/hyperglycemic

Metabolic acidosis

Milk consumption

C perfrin D

Abomasal bloat

White muscle disease

CK/AST

Hypoglycemia

Milk consumption

C perfrin D

Abomasal bloat

White muscle disease

CK/AST
Semi comatose - floppy kid/cria

Marked depression/
Semi-comatose
Paralysis

Trauma
PE/History

Season
Exposure
Extremities
Blood glucose

Starvation
BCS/BG

Diarrhea
Ecoli
C perfrin D
Abomasal bloat

Metabolic acidosis
Milk consumption

FPT
Septicemia
Hypoglycemia
Polyarthritis
Meningitis

Premature
Erupted incisors
Dyspnea

Coccidiosis/ Crypto > 2 weeks. Hypoglycemia/Fecal

Surfactant
Aspiration pneumonia
Coanal atresia
Hypo/hyperglycemic
Semi comatose – floppy kid

Metabolic

Lactic acidosis

White muscle disease

Which muscle in calves

Hypoglycemia

Milk overload

Diarrhea

Starvation

Exposure

Miss-mothering

Failure of passive transfer

Polyarthritis

Septicemia

Meningitis

Hypoglycemia

Ecoli

C perfrin D

Abomasal bloat

Dehydrnation

Tissue perfusion

Caused by

Causes

Which muscle in calves

Coccidiosis

Crypto

Neuro

Seizures

Salt toxicity

Hypoxia

< surfactant

Aspiration pneumonia

Caused by

Caused by

Prematurity

Caused by

Caused by

Caused by

Caused by
Floppy kid syndrome

- Depression, weakness and flaccid paralysis
- Abdominal distension.
- Repeated episodes of spontaneous recovery and comatose state. Could be every 15-20 min.
- Results from over-consumption of milk + "infectious agent" (Clostridium/ E. coli)
- Suckle more often and consume more milk.
- Supplementing the nannies with corn or a concentrate feed Irrigated/improved pastures some time before parturition.
- Production of lactic acid in GI because of bacterial fermentation
Floppy kid

• Diagnosis/Treatment:
  • Clinical signs
  • Systemic metabolic acidosis
  • Reverse acidosis with isotonic bicarb (156 mEq /liter) over 1-3 hours or calculate deficit (deficit x body weight Kg x 0.4 = mEq deficit. 4.2% bicarb=0.5mEq/ml; 8.2%=1mEq/ml)
  • Oral bicarb (1g baking soda= 12mEq bicarb; 1 teaspoon=5gm baking soda)
  • Antibiotics/Vit E selenium.
  • Should see improvement over 6-10 hours
  • Small amount of milk for 2 days then back with doe
Hypoglycemia: Coccidiosis/Sepsis/Exposure

• Looks like floppy kid
• Blood glucose < 50
• 2- 10 ml 50% Dextrose IV or 20ml 50% Dextrose mix with 30ml ml water. Inject IP just lateral and caudal to umbilicus with back legs hanging
• Continue with 2.5% - 5% Dextrose in isotonic fluids
• Leucopenia/degenerative left shift/ high fibrinogen
• Antibiotics/anti-inflammatory
• Treat coccidiosis
Coccidiosis treatment

• Oral
  • Amprolium solution (Corid® - 9.6%).
    • If multiple cases treat all adult goats, yearlings and kids.
    • Kids are very susceptible at weaning.
    • Not approved by the US FDA for use in goats.
    • Can predispose to polio
  • Ponazuril 10-20mg/kg once a day for 3 days (E mac in camelids)
  • Sulfa drugs (sulfadimethoxine-sulfamethazine). Not approved in goats
Coccidiosis treatment

• Feeds
  • Feeds containing decoquinate (brand name Deccox®) US FDA-approved for prevention of coccidiosis in non-lactating goats.
  • Monensin (brand name Rumensin®) US FDA-approved in feed for prevention of coccidiosis in non-lactating goats.
  • Lasalocid (brand name Bovatec®) has US FDA approval for sheep but not goats.

• Drinking water.
  • Amprolium.
    • Limit access to any other water source.
    • Does not assure that all animals will receive an appropriate dose
Salt toxicity

Pet lamb/calf on milk replacer (2.6% salt). No free water

Signs:
- Diarrhea may be hemorrhagic
- Blindness
- “Star gazing”
- Vocalization
- Ataxia
- Head pressing
- Nystagmus
- Muscle twitching
- Seizures (paddling; loss of consciousness)
- Hemoglobinuria
Salt toxicity

• Hemoglobinuria
  • Rapid intake of water following deprivation
  • Psychogenic polydipsia
  • Lepto

• Pathophysiology
  • Acute or chronic
Salt toxicity

• Diagnosis:
  • History & clinical signs
  • CSF > 160 mEq/liter
  • Blood: hyper or hyponatremic depending on water intake

• Necropsy
  • Cerebral edema
  • Laminar cortical necrosis
  • Polioencephalomalacia
  • Meningeal & perivascular eosinophils & mononuclear cells
Mechanism

140mEq Na 280 mosm -> Sodium load -> 160mEq Na 320 mosm

Cell shrinkage

Energy dependent Na transport mechanisms
Glycolysis

140mEq Na 280 mosm

Cell swelling and death

Rapid Na correction
Or water intake
Water moves into cell

300 mosm

315 mosm

Organic osmolytes
Salt toxicity

• Increased sodium - >165 mEq/L
  • Sodium correction rate of not more than 0.5 mEq/L fluid replacement/hr = 12 mEq in 24 hours
  • Use 0.45% NaCl (77 mEq Na)
  • Change in Na conc. caused by 1 liter infusate = \( \text{Na infuse} - \text{Na present} \) = 
    \[ \text{[body weight Kg x 0.6]} + 1 \]

\[
\frac{77}{165} = \frac{98}{7} = -40 \text{mEq}
\]

(20 x 0.6) +1

1 liter of 0.45% NaCl will reduce the total body water by 40 mEq. We need to remove 12 /24 hours = 3.5 L
Treatment.

• Make a high sodium crystalloid solution (HSCS) that is 10 – 15mEq less than animal’s blood concentration.

• Use dry table salt (17mEq Na and Cl/gram) and add to 0.9% NaCl (145mEq/Liter)

• IV at 1-3ml/kg/h. Monitor neuro signs and blood Na concentrations 24-48 hours

• Prognosis guarded.
Polio-encephalomalasia

- Depressed
- Blindness
- Star gazing
- Head pressing
- Ataxia
- Opisthotonus
- Extensor rigidity/paddling and seizures
Polio: Thiamine deficiency

• Thiamin (B1) is essential for the oxidative decarboxylation of the multienzyme branched-chain ketoacid dehydrogenase complexes of the citric acid cycle

• Uncouples mitochondrial energy metabolism

• Symptoms more centered on brain because of high metabolic rate

• High sulphur increases demand for thiamine and decrease the availability of Zn and Cu
Polio: Causes

• Predisposing causes
  • Idiopathic

• Iatrogenic
  • Use of amprolium for coccidiosis treatment particularly camelids
  • Thiamine analogue
• Rumen acidosis. *Bacteroides sporogenes* and *Bacillus thiaminolyticus*
  • Thiaminase production

• High Sulphur in feed or water

• Thiaminase containing plants
Polio: Treatment

• Remove predisposing cause
• Thiamine 20mg/kg IV tid. Give sub cutaneous in camelids
• Antibiotics in absence of diagnosis  - Listeria
Listeria

- Clinical forms include:
  - Neonates.
    - Septicemia. FPT. Crias
    - Acute deaths
  - Abortion
  - Multifocal brainstem disorder
  - Diffuse meningoencephalitis
  - Myelitis
Listeria – Clinical signs

• Anorexia, depression, fever
• Asymmetric CNS signs
  • Conscious proprioceptive deficits
  • Cranial nerve deficits
  • Head pressing
  • Compulsive circling
  • Recumbent
  • Torticollis; head tilt; unilateral vestibular signs
Listeria – Clinical signs

• Cranial nerves 5-7 usually dysfunctional
  • CN V - dropped jaw; asymmetric jaw closure; facial analgesia or anesthesia.
  • CN V1 – medial strabismus on ipsilateral side of lesion
  • CN V11 – Ptosis; loss of menace; absent palpebral reflex; drooped ear; loss of levator nasolabialis function; depressed lip tone; deviated muzzle

• Exposure keratitis
Listeria – Clinical signs

- Head tilt and circling towards the side of the lesion
- CN V111 Nystagmus changes as position of head is altered. Nystagmus can be horizontal, vertical or rotatory and is inconstant
- CN 1X, X, X11 Dysphagia; stertorous breathing; paresis/paralysis of the tongue
- Decreased consciousness, coma, convulsions
Listeriosis

• Diagnosis
• Clinical signs/ progression/response to treatment
• CSF
  • > Protein; mononuclear cells
  • Rarely diagnosed on culture
Listeria

• Pathophysiology
  • Unclear if spread hematogenously or ascent from cranial nerves. Can be produced by iv inoculation
  • Produces a hemolysin and microabscesses
  • Eruption of permanent teeth in younger animals
Listeria

• Epidemiology
  • Silage – aerobic conditions with pH >5.4
  • Decaying forages and rotting hay
  • Asymptomatic carriers. Excreted in feces and milk esp during late pregnancy and parturition
  • Survives for long periods in environment – up to 2 years in dry soil
Listeria: Treatment

• Poor response to treatment common
• Must treat early and continue for up to 1 month
• Oxyteracycline IV 10mg/kg twice a day
• Potassium penicillin IV 40 – 50,000 IU/kg every 6 hours for first 7 days the procaine penicillin 20,000 IU/kg IM once a day for 3 weeks
• Fluid and electrolyte balance should be maintained
Melting ulcer
Draw string suture
• Treatment
• Topical
  • Serum tid
  • Fluoroquinolone bid
  • Atropine tid
• Parenteral
  • Oxytetracycline
  • Opioids
  • NSAID
Milo

• 13 year old castrated male pygmy goat

• Complaint:
  • Anorexia
  • straining to urinate and defecate (no feces or urine seen in the past 2 days)
Milo

- Distended abdomen
- Abdominal U/S: no free fluid, no abnormalities
- Orogastric intubation: small amount of reflux
- Ruminocentesis: normal protozoa and pH
- CBC/chemistry: unremarkable
Necropsy: Thymoma
Pregnancy Toxemia

• Patient Profile and History
  • Late pregnancy
  • Obesity
  • Multiple lambs
  • Sudden feed changes
  • Cold Weather
Pregnancy Toxemia

• Clinical Findings
  • Neurologic signs - ketoacidosis
    • Head pressing
    • Circle
    • “Star Gaze”
    • Tremors; Convulsions
  • Other signs
    • Recumbent; comatose
    • Death due to decomposition of fetuses
Pregnancy Toxemia

• Etiopathogenesis
  • High glucose drain from fetuses
  • High blood cortisol response cause insulin resistance
  • Some sheep have low insulin response (pregnancy diabetes)
  • Starvation; stress induced lypolysis
  • Ketoacidosis and fatty liver
Pathophysiology: Lipids

- Excessive amounts of fatty acids released from adipose tissues – Hormone sensitive lipase (HSL) steroids; growth hormone; glucagon; catecholamines
- Blood nonesterified fatty acid (NEFA) levels rise
- The liver takes up fatty acids with the aim of oxidizing them (beta oxidation), but fatty liver develops when the liver is overwhelmed and fatty acids are converted back into TG
HEPATIC LIPIDOSIS

Triglyceride accumulation

LIVER

Maximum VLDL output

NEFA

Adipose tissue

Muscle

NEFA
Pregnancy Toxemia

- Diagnosis
- Clinical signs
- Hypoglycemia < 75 mg/dL
- Ketonemia; ketonuria
- Hypocalcemia sometimes
- Low insulin
- Elevated serum NEFA concentrations
- Low serum triglycerides (VLDL)
- Elevated ammonia (waste product)
- Low BUN (product of ammonia catabolism)
- Stress leukogram
Liver Biopsy

- Standard tru-cut® instrument
- Abnormal if triglyceride content exceeds 20% (wet wt.)
- Floats in formalin if >34%
- Histopathological examination:
  - Number of affected hepatocytes
  - Macrovacuoles (> size of nucleus)
Centrilobular region

Periportal region
Pregnancy Toxemia

• Treatment
  • Cesarian section
  • Glucose iv 5%
  • Balanced electrolyte solutions
  • Insulin 20-40u protamine zinc insulin
  • Oral propylene glycol
  • Alfalfa; grain
Treatment of Individual Animals

1. Establish a positive energy balance
   • Offer a variety of different feeds
   • Orogastric intubation
   • Alfalfa meal slurries
   • Electrolytes
   • Propylene glycol (glucose precursor)
     • Aminoacids
   • Transfaunation
Pregnancy Toxemia

• Prevention
  • Increasing plane of nutrition last 2 months
  • Grain .25 pound 4-6 weeks prior to gestation
  • Grain 2 pounds last 2 weeks
  • 12% protein
  • Fat ewes should loose weight first 8 weeks of gestation
Questions?
Other causes of emergencies

• Corneal ulcers
• Blue bag
• Acute dyspnea
• Red urine
Common medical emergencies

- Polio
- Listeria
- Anemia
- Hypoglycemia
- Pregnancy toxemia/keto-acidosis/fatty liver
- Grain overload
- Hepatic encephalopathy
Pregnancy Toxemia

• Treatment
  • Cesarian section
  • Glucose iv 5-7 g 6-8 times per day
  • Balanced electrolyte solutions
  • Insulin 20-40u protamine zinc insulin every other day for 3 days
  • Oral propylene glycol
  • Alfalfa; grain
Gastrointestinal emergencies

• Enterotoxemia
• Diarrhea
• Bloat
• Regurgitation
• Grain overload
• Enterotoxemia
“Downer” emergency

- Anemia
- Protein energy malnutrition
- Hypoglycemia
- Floppy kid
- Hypothermia
- Pregnancy toxemia/keto-acidosis/fatty liver
- Copper deficiency
- Vitamin E/Selenium
Emergencies with overt neuro signs

- Polio-encephalomalasia
- Listeria
- Hepatic encephalopathy
- Hypocalcemia
- Hypomagnesemia
- Sodium toxicity
- Meningeal worm
- Brain abscess
- Tetanus
- Caprine arthritis encephalitis
Blood electrolyte/glucose/acid-base abnormalities

• Hyperkalemia/Hyponatremia
  • Ruptured bladder

• Hypoglycemia
  • Coccidiosis/Sepsis/Exposure/Pregnancy toxemia

• Hypokalemia
  • GI sequestration/Alkalosis/Anorexia

• Hyperchloremia
  • Iatrogenic NH₄CL

• Hypernatremia
  • Salt toxicity/water deprivation