HYPOMAGNESEMIC TETANY

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Out line:

• HYPO MAGNESEMIC TETANY :
  1. LACTATION TETANY, GRASS TETANY, GRASS STAGGERS, WHEAT PASTURE POISONING
  2. HYPO MAGNESEMIC TETANY OF SHEEP
  3. HYPO MAGNESEMIC TETANY OF CALVES
LACTATION TETANY, GRASS TETANY, GRASS STAGGERS, WHEAT PASTURE POISONING

- **Etiology:**
  Hypomagnesemia caused by a combination of nutritional deficiency and metabolic factors which reduce Mg’s availability or increase its loss by the body.
Epidemiology:

a. Occurrence:

- Commonest in 4-7yr old cows in early lactation
- Occurs principally in well-defined management circumstances:
  - Lactating cows turned out from barns onto lush grass-dominant pasture in spring – classical lactation or grass tetany
  - Any type of cattle grazing young green cereal crops-wheat pasture poisoning
  - Beef or dry dairy cattle running at pasture in winter with inadequate nutrition and changeable inclement weather
  - Housed cattle in poor feed.
- Morbidity variable, up to 12% ; case fatality rate high, 30-100%
b. Risk factors:

- Grass-dominant pastures-low Mg contents
- Cool- season grasses most hazardous
- Grasses with high K content relative to Ca, Mg
- Pasture top- dressed with nitrogen dangerous, more so if potash added.
- Early growing season, especially during rapid growth after cold wet weather.
b. Risk factors.....

- Cereal crop grazing has high K, low Mg content
- Local soil types influence electrolyte content of pasture
- Bouts of diarrhea, as on lush pasture, reduce sojourn in colon, reduces Mg absorption
- Preserved feed made from low Mg content pasture fed to housed lactating animals
- Partial starvation reduces Mg intake
- Cold, wet, windy weather without shelter
Clinical findings:

- Acute:
  - Sudden onset of anxiety, extreme alertness
  - Muscle tremor, ear twitch
  - Extreme hypersensitivity, slight disturbances precipitate bouts of bellowing frenzied galloping.
  - Staggering gait, easy falling
  - Tetanic–clonic convulsions with opisthotonus, nystagmus, jaw champing, frothy salivation, ear pricking, eyelid retraction
  - Quiet periods between convulsions
  - Hyperthermia
  - Heart, respiratory rates high, heart sounds very loud
  - Response to TX with Mg solutions IV very good but untreated cases die after a course of 30-60 minutes
Subacute:
- 3-4 day onset
- Slight inappetence, milk yield reduced
- Wild expression
- Exaggerated movements
- Throws head about
- Frequent urination, defecation
- Ruminal movement decreased
- Tremor
- Mild tetany of hind limbs and tail
- Unsteady, straddling gait
- Trismus, opisthotonus
- Convulsions easily stimulated
- Spontaneous recovery in few days or:
  - Good response to TX with Mg solution IV, tendency to relapse, or
  - Continuous convulsions, death
Grass tetany causes death in calves
Hypomagnesemic milk fever syndrome:
- Paresis- recumbency- circulatory collapse syndrome but hyperesthesia, tetany instead of somnolence, flaccidity
- Poor response to TX with Ca alone, good with combined Ca and Mg solutions

Chronic:
- Many subclinical cases in herd
- Some sudden deaths
- Dullness, indifferent appetite
- Depressed milk yield of a herd as a whole
- Occasional cases of acute, subacute hypomagnesemia or the hypomagnesemic parturient paresis syndrome
Clinical pathology:

- Serum Mg levels below 1.2 mg/dl (0.4 mmol/l)
- Lower levels of serum Mg encountered in clinical normal animals in high risk herds
- Serum Ca levels often reduced to 5-8 mg/dl
- Hyperkalemia common in acute disease and in wheat pasture poisoning
- Ventricular CSF Mg levels reduced, normals are same as in serum, levels unchanged at death until 12 hrs later
- Urinary Mg levels decreased, can be used as herd guide, creatinine-corrected urinary Mg concentration a more sensitive indicator of herd Mg than serum levels.
• **Necropsy findings:**
  - Blood extravasations in subcutis, under pericardium, endocardium, pleura, peritoneum, intestinal mucosa in some cases
  - Mg content vitreous humor up to 48 hrs after death is accurate indicator of patient’s premortal Mg status, provided external temp. not exceed 23 °C.

• **Diagnosis:**
  - Similar diseases
    - ✓ Lead poisoning
    - ✓ Bovine spongiform encephalopathy
    - ✓ Rabies
    - ✓ Nervous acetonemia
    - ✓ Claviceps paspali poisoning
• Treatment:
  - 500 ml IV injection solution containing:
    - Ca. borogluconate 25 %
    - Mg. hypophosphosphate 5%
  - Followed by a S/C injection of 200 ml of 50 % Mg sulfate
  - Mg. sulfate (200-300 ml of 20% solution) alternatively to the combined solution recommended in some areas but is likely to be cardiotoxic
  - All animals in the group to receive dietary Mg supplement
Control:

- Dietary supplementation of Mg as oxide, carbonate, sulfate, phosphate, at daily rate of at least 60 g magnesium/day by:
  - Foliar dusting in intensive grazing systems
  - Mixing with molasses into hay
  - Drenching
  - Mg–rich pellets
  - Heavy, reticulum retention bullets
  - Pasture top-dressing with Mg-rich fertilizers
  - Supplement in drinking water
dusting in intensive grazing systems; pasture supplementation of Magnesium
Managing pastures by :
- High –risk pastures to be grazed by low-risk animals
- Feeding high-risk animals on rough pasture plus Mg-treated hay
- Including legumes in seeding mixture
- Avoiding use of potash fertilizers or using only in fall
- Use of Mg-rich fertilizers
- Providing shelter sheds or trees
- Postpone calving season.
HYPOMAGNESEMIC TETANY OF SHEEP

- Recorded in any class of sheep, including wethers grazing young green cereal crops
- Also in ewes with heavy milk yield, raising fat lambs
- Clinical syndrome similar to ovine hypocalcemic paresis
- Serum Mg. levels 0.5 mg/dl
- TX. is 50 ml IV injection solution containing Ca. borogluconate 25%, Mg. hypophosphite 5%
- Prophylaxis is target of 7 g Mg intake/day by methods described under cattle disease
HYPOMAGNESEMIC TETANY OF CALVES

• Etiology:
  □ Dietary deficit of Mg

• Epidemiology:
  a. Occurrence:
    ✓ Recorded only in calves, produced experimentally in foals
    ✓ Poor calf rearing practices in winter housing usually milk–only diets for calves older than 2 months
    ✓ Sporadic cases, occasional outbreaks
  b. Risk factors:
    ✓ A milk diet for calves heavier than 50 kg
    ✓ Roughage low in Mg.
    ✓ Chronic diarrhea, reducing Mg absorption

c. Importance:
  ✓ Serious death losses on affected farms
  ✓ Uncommon disease
HYPO MAGNESEMIEIC TETANY OF CALVES

• Clinical findings:
  ➢ Constant ear flicking first sign
  ➢ Hyperesthesia to touch
  ➢ Apprehensive when approached, retraction eyelids
  ➢ Exaggerated tendon reflexes
  ➢ Head – shaking, droopy ears
  ➢ Opisthotonus
  ➢ Ataxia
  ➢ Difficulty getting to bucket interferes with drinking
Clinical findings ....

- Tremor
- Kicking at belly
- Frothing at mouth
- Limb tetany
- Convulsions with trismus, apnea, clonic-tonic limb movements, defecation, urination, alternating retraction, protrusion of eyeballs, extreme tachycardia
- Cyanosis, death after course of 20-30 min, or
- Recovery to normal with subsequent recurrences
Subclinical Hypomagnesaemia
HYPOMAGNESEMIC TETANY OF CALVES

• Clinical pathology:
  - Serum Mg. levels below 0.8 mg/dl (0.33 mmol/L)
  - Depressed serum Ca. levels
  - Bone Ca: Mg ratio greater than 90:1 indicates severe Mg. depletion, normal is 55:1
  - Urine Mg. levels depressed
• Necropsy findings:

- Calcification spleen, diaphragm, calcified plaques in aorta, endocardium in some cases

- Extensive congestion in all organs, hemorrhages in gall bladder, under endocardium, in pericardial fat, aorta, mesentery, intestinal wall, all associated with terminal venous necrosis in some cases.
HYPOMagneseMIC TETANy OF CALVES

• Diagnosis:
  - Similar diseases are:
    - Acute lead poisoning
    - Tetanus
    - Strychnine poisoning
    - Polioencephalomalacia
    - Enterotoxemia due to Cl. perfringes type D
    - Hypovitaminosis A
    - Encephalitis
    - Meningitis
HYPOMAGNESEMIC TETANY OF CALVES

• Treatment:
  - IV. Mg. sulfate solution (100 ml of 10 %) corrects deficit for 24 hrs, supplement with dietary Mg.

• Control:
  - Dietary supplementation beginning at 7 days old, after that skeletal attrition will have occurred, continued to 10 weeks old
  - Mg 1 g/day to 5 weeks, 2 g/day to 10 weeks, 3 g/day after 10 weeks
  - Sheep: Mg-rich bullets
  - Indoor calves on milk diet need Ca, Mg, vitamin D supplement