Polioencephalomalacia (PEM)

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Pathology

- Literally means softening of the cerebral cortical grey matter of the brain.
- Disease characterized by a disturbance in the central nervous system.
- Brain of the infected animal becomes inflamed and swollen, and eventually becomes necrotic.
Pathology cont’d

• Diagnosis is usually done by performing a necropsy on the brain of the dead animal.
• Dead grey matter will fluoresce under a wood’s lamp.
Causes

- PEM sometimes occurs on high grain diets, and diets that include plants high on thiaminases and sulfur.
- Thiaminases are enzymes found in a few plants, such as bracken fern.
- When ingested these enzymes split thiamin (Vitamin B1), an important compound in energy metabolism, and render it inactive.
Causes cont’d

• Normally ruminants are fairly resistant to thiamin deficiency since rumen microbes provide the animal with sufficient amounts of thiamin.

• However, the ingestion of thiaminases will lead to deficiency.

• young growing ruminants, especially cattle and sheep, fed high-grain diets are especially susceptible.
Causes cont’d

• Diets high in grains can encourage the growth of certain thiaminase-producing bacteria in the rumen.
• These bacteria can produce enough thiaminases to induce thiamin deficiency.
• When thiamine is deficient, key tissues that require large amounts of thiamine, such as the brain and heart, are the first to show lesions.
Clinical signs

• Usually occurs suddenly
• Affected animals sit or stand alone, are blind and arch their necks back and stare upwards and become "star gazers“ (opishotonus).
• They are disoriented, lose their appetite, and they do not want to drink
• Temperature and respiratory rate are usually normal but the heart rate may be depressed.
Clinical signs cont’d

• Excitement may be seen but is usually replaced with dullness.
• The animal may go down on its side with its head thrown back.
• The legs may be rigidly extended and convulsions may occur.
• If not treated on time, most animals with PEM will die within 48 hours.
Treatment and Prevention.

- Sheep suffering from polioencephalomalacia generally respond very well to treatment if caught early.
- They can be successfully treated with 200 to 500 mg of thiamin injected intravenously, intramuscularly, or subcutaneously.
- Because thiamine is water-soluble, it is quickly eliminated from the body through the kidneys and, therefore there is little risk of overdosing.
Treatment and Prevention cont’d

• Dexamethasone is often administered along with thiamine to reduce brain swelling.

• Although recovery is usually quick, if significant brain damage has occurred, the recovered sheep rarely regain satisfactory levels of productivity. Therefore, very early treatment is critical.