Vitamin E and Selenium deficiency

Etiology:

Dietary deficiency of selenium and Vit E and conditioning factors like dietary polysaturated fatty acids.

Epidemiology:

* Enzootic muscular dystrophy occurs in young growing calves, lambs, goat kids and foals borne to dams in selenium deficient areas and unsupplemented. Occur world wide and common in Australia, UK great planes of north America where soils are deficient to selenium.

Vit E deficiency in animals fed poor quality forage and diets high in polyunsaturated fatty acids. Outbreaks of muscular dystrophy precipitated by exercise.

* **Mulberg heart disease in finishing pigs.**

* Selenium responsive disease occur in Australia and are not obvious clinically but respond to selenium supplementation.

Selenium and Vit E deficiency may be involved in reproductive performance, retained placenta in cattle. Resistance to infectious diseases controversial.

Clinical findings:

Muscular dystrophy characterized by groups of animals with stiffness, weakness, recombancy. Myocardial from mulberry heart disease characterized by outbreak of sudden death in finishing pigs.

1- Acute enzootic muscular dystrophy:

2-

Affected animals may collapse and die suddenly after exercise without any other sings.

The excitement associated with the hand-feeding of diary calves may be precipitate peracute death.

In calves under close observation, a sudden onset of dullness and severe respiratory may be observed in some cases.

Affected calves, lambs and foals are usually in lateral recombancy and may be unable to assume sternal recombancy even when assisted.

When picked up assisted to stand they feel and appear limp. However their neurological reflexes are normal.

Their eyesight and mental attitude are normal and they are usually thirsty and swallow unless the tongue is affected. The heart rate is usually increased up to 150-200 per minute and often with arrhythmia.

The respiratory rate is increased up to 60-72 per minute and loud breath sound are audible over the entire lung field.

The temperature is usually normal or slightly elevated.

Affected animals commonly dies 6-12 hours after onset of sings in spite of therapy.

3- Subacute enzootic muscular dystrophy

This is the most common form in rapidly growing calves (white muscle disease) and in young lambs (stiff lamb disease).

Affected animals may be found in sternal recombancy and unable to stand, if they are standing the obvious sings are stiffness, trembling of the limbs.

Weakness and in most cases an inability to stand for more than few minutes. The gait in calves is accompanied by rotating movement of the hocks and in lambs a stiff goose – stepping gait.

Muscular tremor is evident if the animal is forced to stand. On palpation the dorsolimber, gluteal and shoulder muscles firmer than normal. Most affected animals retain their appetite and will suck if held up to the dam or eat if hand fed.

Major involvement of the diaphragm and intercostals muscles causes dyspnea with labored and abdominal type of respiration.

The temperature is usually in the normal range but there may be transient fever ($41\,C^{\circ}$) due to the effect of myoglobenemia and pain.

The heart rate may be elevated but there are usually no rhythmic irregularities. Following treatment affected animals usually respond in few days and within 3-5 days they are able to stand and walk unassisted.

4- **Congenital muscular dystrophy** has been described in new born calves.

The calf will still recumbent 13 hours after birth, had increased serum creatinin kinase and decreased vit E and selenium levels. Recovery occurred following supportive therapy and vitamin E and selenium.

5- **Subcapsular liver rapture in lambs** has been associated with vit E deficiency in lambs usually 4 weeks of age. Affected lambs collapse suddenly, become limp and die within a few minutes or several hours after the onset of weakness.

6- **In foals, muscular dystrophy** occurs most commonly during the first few months of life and is common in the first week.

The usual clinical findings are failure to suck, recombancy, difficulty in rising, and unsteadiness and trembling when forced to stand.

The temperature is usually normal but commonly there is polypnea and tachycardia.

The disease is faols may be characterized by an acute fulminate syndrome which is rapidly fatal or subacute syndrome characterized by profound muscular weakness, failure of passive transfer, aspiration pneumonia and stunting are frequent complications. In the subacute form mortality rate may range from 30- 45%.

7- **In adult horse with muscular dystrophy** a stiff gait, myoglobinuria, depression , inability to eat, holding the head down low and edema of the head and neck are common.

The horse may be presented initially with clinical sings of colic.

8- **Mulberry heart disease :** usually seen in pigs .

Clinical pathology:

*** Myopathy**

- Plasma creatinin kinase (CK). The enzyme is highly specific for cardiac and skeletal muscle and is released into the blood indicate the myopathy.
  - Aspartates amino transferase.
  - Serum selenium level is low.
  - Serum vit. E level is low.
  - Decrease of glutathione peroxidase activity.

Differential diagnosis:

1- Acute muscular dystrophy of calves and yearlings

a- *Haemophilus somnus* septicemia

b- Pneumonia

2- Subacute enzootic muscular dystrophy

a- Musculoskeletal disease such as

1- Polyarthritis.

2- Traumatic or infectious myopathies (black leg) .

3- Osteodystrophy.

4- Fracture of the long bones .

b- Disease of nervous system

1- Spinal cord compression

2- *H. Somnus* minengoencephalitis

3- Organophosphate insecticide

c- Disease of the digestive tract

- Carbohydrate engorgement resulting in lactic acidosis.
- Shock, dehydration and weakness.

3- Muscular dystrophy in lambs and kids

- Enzootic ataxia and swayback disease.

4- Muscular dystrophy in foals

1- Traumatic injury of musculoskeletal system.

2- Polyarthritis.

3- Meningitis.

4- Traumatic injury of the spinal cord.

Treatment

A mixture containing 3 mg selenium as (potassium or sodium selenite) and 150 IU /ml of vit E given i/m at 2 ml/ 45 kg b.w. is recommended.