جاسم الله الرحمن الرحيم
Examination of musclo Skeletal system

**Items:-**

1. Main function of musclo Skeletal system
2. Principle manifestations of musclo Skeletal system disorders.
3. Examination of each component of the musclo Skeletal system.
Function:

1. Support the body in normal location & posture.
2. Some skeletal structures are involved in respiration, mastication, urination & defecation.

This system include:

1. Muscles
2. Bones
3. Joints
Principle manifestations of musculoskeletal disorders:

1. Lameness
2. Failure in support → recumbency
   Fail to stand or set down
3. Insufficient movement, confirmation.

- Forelimbs crossing each other (X-shape) → Ketosis
- Lordosis → Kyphosis
- Scoliosis → Lateral deviation
- Recumbancy → Lateral recumbancy (milk fever)
  - Set on sternum, deviate head & neck to ward left flank
  - Neglection of offspring (No suckling)
- Walking on fetlock joint: ↓ vit. E → stiff Lamb disease
A. Muscle examination:

→ examination of superficial muscles is by inspection & palpation

1. Abnormalities in size:
   ▪ Reduction (Atrophy) in size in case of:
     - Limited use
     - Nerve paralysis
     - Painful conditions of bone & joints
   ▪ Muscular hyperatrophy → due to genetic factors.

2. Abnormalities in tone (increase tone of musculature):
   - Continuous (Tonic spasm) → Tetanus
   - Intermittent (Colonic spasm) → strychnine intoxication
   - Tremors: repetitive twitching of the voluntary muscle may result from → dehydration, electrolytes imbalance,

3. Degenerative changes (Myopathy):
   Non-inflammatory, degenerative disease of voluntary muscles, characterized by:
   Muscle weakness, changes in posture & may recumbency, alteration in cardiac function.
1. Stiff Lamb disease (Enzootic muscular dystrophy), white muscle disease at cow:

- Due to vit. E deficiency, decrease selenium, decrease unsaturated fatty acids.
- Muscle: rubbery, hard, swollen.
- Symptoms: unable to get up
  - stiffness of gait
  - circulatory dysfunction
  - respiratory dyspnea
  - rotatory movement
  - step gauze movement
- P.M - muscles appear as boiled especially heart muscle became white coloured
- Fleshy appearance of muscle

2. Falling disease at cow:

- Due to Cupper Deficiency, animal try to get up then die from myocardial degeneration
3. Monday sickness, coffee urine, Myoglobin urea, Azotourea:

- Mainly in equines when animal eat at day of rest the same ration of concentrates
- Concentrate metabolized at liver & converted to glycogen

Lactic acid, sarcolactic acid, those have Nephrotoxic, hepatotoxic, muscle degeneration, at kidney → cause degeneration of renal tubules, so Myoglobin pass with urine, on muscle specially Quadriceps muscle causing muscle stiffness, paralysis: Myoglobinurea paralytica

→ **Differentiation between Hb urea, Myoglobinurea, haematourea:**

- **perform Benzedine test**
  - Benzedine reagent + urine sample
    - +ve test (Hb-urea, hemateurea)
    - -ve test at Myoglobin urea

- to differentiate between Hb-urea, hematourea:
  - Put samples in the centrifuge
    - Sediment → RBCs → Haematourea.
    - All red color → Hb → Hburea

4- Damage of nerve supply of muscle cause degeneration
4- In inflammatory changes (myositis): muscle hot, painful, loss of function

1- Black leg diseases:
-Due to clostridial disease characterized by hotness, redness, loss of function, gases under skin at quadriceps, glutteal muscles, fever

2- Chronic myositis:
-In cattle, affect tongue in actinobacillosis.
-Muscle painless, firm, enlarged.

3- Traumatic myositis:
-From trauma, sever lameness, swelling, heat, pain occur.

4- Eosinophitic myositis:
Inflammation of muscle of mastication in dog.
B- Bone examination:

- Examination of bone by inspection, palpation, and radiological examination.

1- Inspection: recognize the Hardness, contour, shape, and sensitivity (pain).
2- Palpation:
3- Radiological examination → detection of fracture.
1. Degenerative changes: osteopathy or osteoadystrophy:

1) Rickets (calves), osteomalacia (cattle):

- Due to deficiency $\text{Ca}^{+2}$, $p$, vit.D.
- In small animals occur defective calcification while growth is continue.
- Bone is unable to carry body leading to bony curvature & enlargement of proximal & distal extremities of bone.
- Enlargement of costochondral junction potbelly (stunted growth, enlarged abdomen)
As in Actinomycosis in cattle.

- Abscess from tail biting in pigs.
- Infection of castration.
- Docking wounds in Lambs.

Normally ca/p ratio is 2:1 or 1:1 at least.

This diseases occur at equines 2-7 years, 5p:1 ca ratio.

The imbalance in ca/p ratio lead to stimulation of parathyroid tissue at area containing cartilage as septum nasi, sternum, tendon or ligament → cracking when walking.

Treatment: surgical removal of the fibrous tissue.

2- Inflammatory changes = Osteomyelitis

2-osteodystrophy fibrosa: in horse
C- Joint examination :-

- Examination by :-
  1. inspection & palpation : by observing the range of flexion & extension of the joints, sensitivity.
  2. Radiological examination.
  3. Arthrocentesis.

1- Degenerative changes = Arthopathy :-

Enlargement of proximal & distal end of bone → press on joint

2- Inflammation :- Arthritis may occur polyarthritis.
How to differentiate between Rickets, Rheumatic arthritis?

Rickets:
- In youngs
- Bone fractures,
- Ricketsory pot belly.

Rheumatic arthritis:
- In all ages
- Affect all joints
- Swelling of all joints.
1) Inspection of posture, movement of animals:

See the movement of animals or the walk, see if there is lameness, animal unable to stand or set down.

2) Close exam of animal:

- see fracture by palpation.
- Horse falls & gets up → spasmodic colic → fits colic every 15-30 min the rest & starts again.
- Horse falls carefully → flatulent colic → Caecum filled with gases.
- Horse falls without rise → Myoglobin urea paralytica, Azoturea.
3) Lab. diagnosis:-

A) Measuring the serum biochemistry, enzymes, ca, P level, alkaline phosphates enzymes.
B) Measuring CPK (creatine phosphokinase)
   Measuring SGOT (serum glutamic oxaloacetate transaminase)
They become 10 times their normal level at inflammation & degeneration.

4) Radiography: -

To see fracture, bony exostosis → fluorosis.
5) Biopsy:
Muscles from a life animals.

6) Autopsy:
Muscles from a dead muscle.

7) Arthrocentesis:
Aspiration of fluid from the synovial joint.

8) Dead animal:
Bone ashing
Ash / organic matter 1:1 normally.
3:1 in Rickets.
تحت إشراف
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THANK YOU