TO THE POINT CLASS LECTURES

SYSTEMIC MEDICINE - I (MED 404) FINAL- 3

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Candidiasis

Candidiasis is a localized mucocutaneous disease, which is distributed worldwide in a variety of animals, caused by species of yeast-like fungus, *Candida* , most commonly *C albicans* .

C albicans is a normal inhabitant of the nasopharynx, GI tract, and external genitalia of many species of animals and is opportunistic in causing disease. Factors associated with candidal infections are disruption of mucosal integrity; indwelling, intravenous, or urinary catheters; administration of antibiotics; and immunosuppressive drugs or diseases.

Systemic candidiasis has also been described in cattle, calves, sheep, and foals secondary to prolonged antibiotic or corticosteroid therapy.

Clinical Findings and Lesions
Signs are variable and nonspecific and may be associated more with the primary or predisposing conditions than with the candidiasis itself. Calves with forestomach candidiasis have watery diarrhea, anorexia, and dehydration, with gradual progression to prostration and death.

Gross lesions of the skin and mucosae are generally single or multiple, raised, circular, white masses covered with scabs.

Diagnosis
Diagnosis can be made by examination of scrapings or biopsy specimens from mucocutaneous lesions. *C albicans* are ovoid, budding yeast cells (2-4 µm in diameter) with thin walls, or they occur in chains.
Filamentous, regular, true hyphae also may be visible. The fungal cells generally are limited to epithelial tissue and rarely extend deeper.

Treatment
Nystatin ointment or topical application of amphotericin B or 1% iodine solution may be useful in the treatment of oral or cutaneous candidiasis. Fluconazole, 5 mg/kg, PO, SID for 4-6 wk, was also used to successfully treat disseminated candidiasis in foals.

Ringworm

Trichophyton verrucosum is the usual cause of ringworm in cattle. Dermatophytosis is most commonly recognized in calves, in which nonpruritic periocular lesions are most characteristic, although generalized skin disease may develop.

Cows and heifers are reported to develop lesions on the chest and limbs most often, and bulls in the dewlap and intermaxillary skin. Ringworm as a herd health problem is more common in the winter.

Lesions

Lesions are characteristically discrete, scaling patches of hair loss with gray-white crust formation, but some become thickly crusted with suppuration

Treatment
Many topical treatments have been reported to be successful in cattle, but because spontaneous recovery is common, claims of efficacy are difficult to substantiate. Thick crusts should be removed gently with a brush, and the material burned or disinfected with hypochlorite solution.
Agents reported to be of use include washes or sprays of 4% lime sulfur, 0.5% sodium hypochlorite (1:10 household bleach), 0.5% chlorhexidine, 1% povidone-iodine, natamycin, and enilconazole. Individual lesions can be treated with miconazole or clotrimazole lotions.

Rinderpest

Note: Notes are attached provided by class teacher for this disease. Consult please

Bovine Malignant Catarrhal Fever (BMCF)

Note: Notes are attached provided by class teacher for this disease. Consult please

Lectures Delivered by Dr. Ali

Control of Parasites

Parasite:
Any living organism which has to depend on another organism.

Types of parasites:
Parasites are divided into two types:

i) Internal parasites : helminths, protozoans etc.
ii) External parasites : arthropodes etc.

Control of Internal Parasites

There are three strategies:

i) Preventive
ii) Evasive
iii) Diluting

Preventive
We can use clean pastures and chemoprophylaxis.
Chemoprophylaxis can be applied:

i) on pastures to kill free living stages of parasites
ii) like Dewormers to kill all parasitic stages in the host.

Evasive
In this strategy, allow pasture to contaminate with parasites and shift flock to another pasture that must be parasite free.

Diluting

Susceptible animals are grazed with non-susceptible animals along with the usuage of low doses of antiparasitic drugs.
For example, we can graze cattle with sheep and goat. young animals must be grazed with the adult animals (called cow-calf system)

Control of External Parasites

There are certain contributing factors which enhance the infestation of ectoparasites.

a) Cracks and crevices and use of wood in buildings
b) Close confinement
c) Anything which put cattle in frequent contact with other infested cattle.
d) Harsh weather condition

Tick Control in Dairy Animals

Commonly found species of ticks: Hyalomma, Boophilus, Rephicephalus
Tick control strategy gives stress on the following points:

1) Housing in tick-free building: No cracks and crevices because these act as hidden and breeding places for ticks. Do caulking of cracks and crevices.
2) No heaps of dung and stacks of bricks near the housing of animal. These are served as breeding places of ticks.
3 Slow burning of farm wastes especially against the wall of unoccupied paddock (confinement for animal housing).
4) Separate housing of cattle and buffalo then there will be no transmission of ticks from one specie to other. Cattle are more susceptible but buffaloes are quite resistant to ticks infestation.
5) Quarantine: when animals are introduced in the existing herd from the market, then they normally keep separate 2-3 weeks from the other animals.
6) Pasture spelling and rotational grazing: Do division of pasture in different parts and then follow rotational grazing on the same pasture. If multiple pastures are available then simply follow rotational grazing. It helps in the break of life cycle of parasites.
7) Manual removal of ticks: As being a veterinarian, use forceps to remove the tick. Hold the tick, rotate it anti-clock wise and pull it.
   Crimean Congo Haemorrhagic Fever (CCHF) is a viral disease which is transferred from animal to human via ticks (Hyalomma spp.)
8) Clearance of vegetation: Normally ticks are attached with the blades of grass. But on the other hand, clearance of vegetation invites soil erosion which is undesirable.
9) Use of acaricides: “Acaricides: agent which are used to kill the ticks and mites”. These can be used to control pathogenic stages on animals and free living stages in the environment.

Application of Acaricides

a) Dipping: inexpensive, desirable where large number of cattle are raised.
   (Antidot: Atropine sulphate: @ dose rate 0.2-2 mg/kg)
b) Washing: Simply give bath to the animals.
c) Spraying: only feasible for less number of animals.

d) Pour-ons: It is the most effective but expensive and laborious.
A straight line drawn on vertebral column and drug pour on this line.
e) Ear tags: usually appreciable for control of face flies, horn flies & spinous ticks.
f) Injections: ivermectin @ dose rate: 200 µg/kg b. wt. 1% solution is available

10) Tick vaccine: There are two types of vaccines for ticks: i) Crude vaccine ii) Genetic engineering vaccine. But not still used effectively.
11) Targeting Endosymbionts: Target the microorganism and agents in the animal's body which are required by the ticks. It is not successful.
12) Biological control: "use of one living organism for the control of other living organism".
    a) Birds: include chicken, ox-packer
    b) Shrews: mammal like a mouse but has a long nose.
    c) Spiders
    d) Plants: "Stylosanthes spp. (it is a tropical leguminous plant)
13) Use of organic plant oils.
14) Breeding of cattle for tick resistance.

Ketosis

A condition in which there is accumulation of ketone bodies in the blood. It is accompanied with hypoglycemia.
Ketone bodies: acetoacetate, ß-hydroxybutyrate, acetone and isopropanol

How it Occur?

Normally metabolism of dietary carbohydrate is required to maintain glucose level in the blood. Dietry carbohydrates metabolized into short fatty acids include acetate (70%) butyrate (10%), and propionate (20%). Post calving in high yielding cattle, milk production reaches to peak level in 4-6 weeks but peak dry matter intake reaches after 10-12 weeks.

Due to which, a negative energy balance develops. As a result non-esterified fatty acids go in the liver and promote ketogenesis. Normally ketone bodies formation occurs: i) in the rumen from butyrate ii) from mobilization of fat.

Types of ketosis

There are two types of ketosis:
i) **Type I ketosis**:
Spontaneous ketosis in which there is increased rate of ketogenesis.
ii) **Type II ketosis:**
Gluconeogenesis pathway not works properly. Ketone bodies production rate is normal but there is increased rate of fatty acids results into fatty liver.

Types of Bovine Ketosis

a) **Primary ketosis**: also known as production ketosis.
b) **Secondary ketosis**: in which feed intake is affected by some other disease.
c) **Elementary ketosis**: Due to high butyrate contents in the silage palatability of silage decreased. Succulent fodders promote ketogenesis.
d) **Starvation ketosis**: Gluconeogeneis decreased and ketogenesis occurs.
e) **Ketosis due to specific minerals**: Cobalt and Phosphorus deficiency, then there will be decreased TDN intake. Due to deficiency there will be failure to metabolize propoinic acid to TCA cycle.

Impact on economics

- Loss of production
- Loss of body condition
- Investment of feed lost
- Death of the animals

Clinical Findings:

Wasting form:

- Mild o moderate decrease in animal appetite and milk production.
- Body weight loss and animals gives wooden appearance.
- Constipation and ultimately abdominal pain.
- Arched back (typical appearance) called Hang Dog appearance.
- Depression
- All physical parameters (pulse, respiration and temperature) will be normal.
- Sweat smell in the breath of the animal
- Spontaneous recovery also possible.

Nervous Form:

- Walking in circles
- Straddling – crossing of legs
- Apparent blindness
- Aimless movement of animal
- Vigrous licking of animal to inanimate objects.

Diagnosis

It can be made on number of tests:

a) **Glucose test**:
Normal Level: 50 mg/dL
Ketosis: Decreased upto 20-40 mg/dL

b) **Check blood for ketone bodies** (b-hydroxybutyratic acid)
Normal level: <1000 µmol/ L
Ketosis: > 14,000 µmol/ L (Subclinical)
Up to 25,000 µmol/ L (Clinical)

c) **Cowside test**:
Use milk and urine for detection of ketones. Reagent: sodium nitroprusside
Reagent + ketones --> specific color
Intensity of color tells us about the severity of disease
Milk strips are also available commercially for detection of b-hydroxybutyric acid.

Treatment

Replacement therapy of glucose

Glucose (50%): 50 ml [SC, IP]. SC: irritant to animal and make animal restless. IP may result into peritonitis. Therefore,

Give glucose and glucose precursors (change into pyruvate & ultimately into glucose).
Glycerol / glycerine : 250 ml / day
Propylene glycol : 300-700 g/day

Hormonal Therapy:

Glucocorticoids: these will convert muscle proteins into glucose, thus glucose source must be administered as early as possible.
Insuline: when glucose is also administered.
Anabolic steroids

Control

Care is better than cure.
In food scarcity, we have to provide supplementary feed with adequate amount of carbohydrate such as high quality hay, cereals and fungal free-silage.
After calving: increase energy supplements in animal diet.
Prophylactic Substances:

i) Propylene glycol
ii) Glycerol
iii) Propoinic acid (110 g/day)
iv) Ionophores (change bacterial flora in rumen) – Monensin ® tablets are available.
It will decrease flora of gram +ve bacteria and iprotozoans but increase flora of gram –ve bacteria in the rumen. As a result, there will be increase production of propionate abut decrease production of acetate and butyrate.
v) Niacin: act as anti-lipolytic (decrease breakdown of lipids/fats)

Commercially available Formulation

Glucosa ® : contains Glycerol, Calcium propionate, niacin, cobalt sulphate etc. [Rs. 250/-]
It can be used for prevention and control of ketosis, Heat stress and to Increase the Milk production. Dose in Cattle/Buffalo: 300-400g/day.

Diagnosis of Ketosis

Ross Modification of Rother's Test

Reagent: Sodium nitroprusside
Ammonium sulphate
Ammonium hydroxide

For Urine Sample

Procedure:

- Make 100 g mixture by taking 1 g of Na-nitroprusside in 99 g of ammonium sulphate.
- Take 1 gm of this mixture and dissolve in 5 ml of urine.
- Add 1 ml ammonium hydroxide

Results:

- Red color – indicate less no. of ketone bodies
- Purple color – indicate high concentration of ketone bodies.

For Milk Sample

Procedure:

- Make 100 g mixture by taking 2 g Na-nitroprusside in 98 g of ammonium sulphate.
- Take 2.5 g of this mixture and dissolve in 5 ml of milk sample.
- Add 1 ml of ammonium hydroxide.

Results:

+ ve test : Faint light pink color
-ve test: No color

---------- **END OF FINAL COURSE**

This set will be considered complete with external 15 pages as attached with it.

BEST OF LUCK !!!