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Popular Article

Actinomycosis

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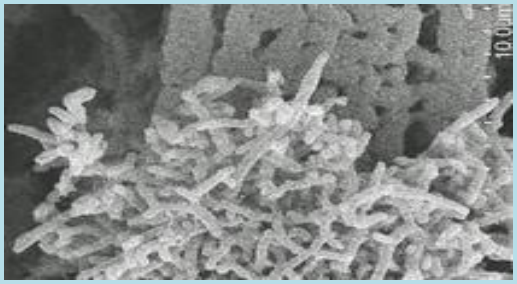
Introduction

Actinomycosis also known as lumpy jaw. This is a chronic bacterial infectious disease occurs in dairy animals which causes swelling of lower jaw or around the mandibular region. This condition affects the feed intake of the animals characterized by rarefying osteomyelitis of the bone of skull in cattle.

Aetiology

Actinomycosis is caused by ***Actinomyces bovis.*** In addition to this organism, association of bacteria like ***Corynebacterium pyogenes*** and ***Staphylococcus*** are also seen. ***Actinomyces bovis*** is a gram-positive, rod-shaped bacterium of the genus Actinomyces.



Epidemiology

Actinomycosis is sporadic but common in cattle. Occasional cases occur in pigs and horses and rarely in goats. Although actinomycosis occurs only sporadically, it is of importance because of its wide spread occurrence and poor response to treatment. It is recorded from most countries of the world. *Actinomyces bovis* is a common inhabitant of the bovine mouth and infection is presumed to occur through wounds to the buccal mucosa caused by sharp pieces of feed or foreign material. Infection may also occur through dental alveoli, and may account for the more common occurrence of the disease in young cattle when the teeth are erupting Infection of the alimentary tract wall is probably related to laceration by sharp foreign bodies.

Transmission

Actinomycosis generally affects cattle between 2 to 5 years and it is a sporadic disease and animal to animal transmission occurs rarely. The organisms remain as resident population and may establish the infection through abrasion, injury or wounds. The abrasion of buccal mucosa induced by coarse feed or surface material while chewing may set up infection. Transmission of infection through dental alveoli at the time of eruption is noted. The alimentary canal of normal cattle may harbour organisms and from where the organisms may invade the sub-epithelial tissues through injury by surface object.

Pathogenesis

In the jawbone a rarefying osteomyelitis is produced. The lesion is characteristically granulomatous both in this site and where visceral involvement occurs. The effects on the animal are purely physical. Involvement of the jaw causes interference with prehension and mastication, and when the alimentary tract is involved, there is physical interference with ruminal movement and digestion, both resulting in partial starvation. Rarely, localization occurs in other organs, caused apparently by hematogenous spread from these primary lesions.

Clinical finding

The lesions appear initially as a hard, painless, circumscribed protuberance usually at the level of central molar teeth of the mandible or maxilla. The invasion damages the bony tissues and, in some cattle, large granulomatous mass appears on the surface of the jaw followed by development of sinus tracts. Due to extensive involvement of the mandible and maxilla, the process of mastication is affected and thus there is impairment of digestion resulting to loss of general health. Abscess may extend and may produce sinus to the skin surface where from, the purulent discharges are drained. Examination of oral cavity may exhibit loose teeth or missing teeth. There is foul breath from the mouth known as halitosis. Loose teeth induce hypersalivation and dysphagia. The adjacent bones may be affected in long standing cases. The adjacent lymph nodes are not affected and the disease does not spread through lymphatic channel.

Lumpy jaw in a cow. Classic mandibular lesion of suppurative and proliferative osteomyelitis caused by *Actinomyces bovis*.

Clinical pathology

Smears of the discharging pus stained with Gram's stain provide an effective simple method of confining the diagnosis. Gram-positive filaments of the organism are most readily found in the center of the crushed granules.

Diagnosis

Presumptive diagnosis is often based on clinical signs. The diagnosis can be confirmed by culture of the organism from the lesion; however, this requires anaerobic conditions and is frequently negative. A Gram stain of purulent material will reveal gram-positive, club-shaped rods and filaments (sulphur granules). Radiology of the head is also useful; the primary radiographic lesion consists of multiple, centrally radiolucent areas of osteomyelitis surrounded by periosteal new bone and fibrous tissue. As a last resort, a biopsy sample can be taken with a trephine and submitted for histopathology.

Differential Diagnosis

Abscesses of the cheek muscles and throat region are quite common when spiny grass-awns occur in the diet. They are characterized by their movability and localization in soft tissues compared to the immovability of an actinomycotic lesion. Pus may be thin, fetid, or caseous depending on the duration of the abscess, prompt recovery follows opening and drainage. Foreign bodies or accumulation of dry feed jammed between the teeth and cheek commonly cause a clinical picture which resembles that associated with actinomycosis and the inside of the mouth should be inspected if the enlargement has occurred suddenly. The syndrome of indigestion caused by visceral actinomycotic lesions resembles that caused by chronic peritonitis

Necropsy finding

Rarefaction of the bone and the presence of loculi and sinuses containing thin, whey-like pus with small, gritty granules is usual. An extensive fibrous tissue reaction around the lesion is constant, and there may be contiguous spread to surrounding soft tissues. The presence of 'club' colonies containing the typical, thread-like bacteria is characteristic of the disease. These formations may be seen on microscopic examination of smears made from crushed granules in pus or on histological examination of section. Granulomatous lesions containing pockets of pus may be found in the esophageal groove, the lower esophagus and the anterior wall of the reticulum. Spread from these lesions may cause a chronic, local peritonitis. There may be evidence of deranged digestion with the

rumen contents sloppier than usual, an empty abomasum and a mild abomasitis and enteritis. Involvement of local lymph nodes does not occur, irrespective of the site of the primary lesion.

- **Diffuse granulomas in maxilla and formation of green yellow pus.**
- **"Sulphur granules" are found in the pus.**

Treatment

- The goal of treatment is to kill the bacteria and stop the spread of the lesion.
- Sodium iodide is the treatment of choice in ruminant actinomycosis. Sodium iodide (70 mg/kg of a 10%–20% solution, IV) is given once and repeated several times at 7-10-day intervals.
- If signs of iodine toxicity develop (e.g., dandruff, diarrhoea, anorexia, coughing, and excessive lacrimation), iodine administration should be discontinued or treatments given at longer intervals. Sodium iodide has been shown to be safe for use in pregnant cows and presents little risk of causing abortion.
- Concurrent administration of antimicrobials, including penicillin, or oxytetracycline, is recommended.
- Surgery to debride large mandibular lesions has also been described in conjunction with iodine and antimicrobial therapy.

Prevention and Control

There is no vaccine against this disease. Isolation of infected animals and their treatment are to be rendered. Removal of contaminated materials and disposal of animals with discharging foci may be made. This condition should be consulted with qualified veterinarian for antibiotic treatment. *A.bovis* is part of the normal oral flora in ruminants, control focuses on avoiding coarse, stemmy feeds or feeds with plant that might damage the mucosal epithelium.