

Clinical management of bovine actinomycosis in a Holstein Friesian cow: A case study

*Pramod Kumar, Anandamoy Kundu

Rashtriya Gokul Mission, Piprakothi, East Champaran, Dr. Rajendra Prasad Central Agricultural University, Pusa, Bihar, India

*Corresponding email: pramod.kumar@rpcau.ac.in

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Article Authors

Pramod Kumar,
Anandamoy Kundu

Corresponding Author Email

pramod.kumar@rpcau.ac.in

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ABSTRACT

Actinomycosis in cattle is an infectious and chronic disease. Its etiology is *Actinomyces bovis* bacteria. This disease is also known as "lumpy jaw" due to characteristic granulomatous swelling in jaw of affected cow. It primarily affects the mandible, maxilla, and other bony tissues in the head, leading to localized, progressive abscesses and osteomyelitis. Horse, swine, and occasionally sheep, goats, and humans may be affected by this disease. The disease is sporadically seen in cattle above the age of 4 years. This disease has been reported from various parts of the India. The incidence of Actinomycosis in cattle is higher where animals are fed with straw, coarse feeds, sticks, thorns, or wire etc. These feeds injure the buccal mucosa and there by predisposing the cow to infection. The disease causes substantial economic loss to dairy farmers. Its successful treatment in cattle can be done by parenteral administration of Penicillin in combination with Streptomycin and oral administration of Potassium Iodide.

KEYWORDS

Actinomyces Bovis, Sulfur Granules, Granulomatous Swelling, Osteomyelitis

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Bovine Actinomycosis in cattle is an infectious and chronic disease caused by bacteria *Actinomyces bovis* in cattle and is characterized by lumpy, often suppurating tumors, draining sinuses that discharge "sulfur granules" (Victoria *et al.*, 1993). This disease is characterized by presence of pus in the mandibular or maxillary region or the affected sinuses containing sulfur granules having bacterial clumps (Hyland *et al.*, 1993). This disease is also known as "lumpy jaw" due to characteristic granulomatous swelling in jaw of affected cow and was first time described by LeBlanc in 1826 (Joyce, T M, 1938). It is a gram-positive, branching, filamentous, anaerobic bacteria. It primarily affects the mandible, maxilla and other bony tissues in the head, leading to chronic, localized, progressive

abscesses and osteomyelitis (Radostits *et al.*, 2007). Usually, its pathogens reside in oral and nasopharyngeal membranes. It is important to note that *Actinomyces bovis* bacteria is of public health concern, as it is of zoonotic importance and has got human health significance. It causes skin lesions, abscesses, bronchopneumonia, and granulomas in humans. The sternum, ribs, and the spinal column is also affected in humans (Ruhräh J. VIII, 1899). In this disease rarefaction of the bone and loculi and sinuses containing thin whey-like pus with small gritty granules occurs. The supportive osteomyelitis of the mandible, referred to as "Lumpy Jaw," is commonly seen and is characteristic of the disease.

Bovine Actinomycosis or lumpy jaw disease in cattle has been reported from many states of India, (Ray, 1978 and Choudhary, S. S., 2016). The incidence of Actinomycosis in cattle is higher where cattle are fed with straw, coarse feeds, sticks, thorns etc. These sharp and coarse feeds injure the oral mucosa and predisposing the cow to actinomycosis infection. Its successful treatment in cattle can be done by oral administration of Potassium Iodide along with parenteral administration of Penicillin or in combination with Streptomycin. Daily dressing of localized wound with Povidine Iodine or any iodine solution gives better prognosis.

Case History and Observation

A five years old Holstein Friesian crossbred cow was reported to Rashtriya Gokul Mission, Piprakothi, with a history of off feed since two weeks and huge ventral swelling and lumps hanging in mandible region. In mandibular region hard, painful, diffused swelling with perforation at many places was observed. Pus was oozing out from external wounds. The cow was reported seven month pregnant. Clinical examination of the animal revealed the involvement of mandible and hard growth involving bones in mandible. Difficulty in mastication due to wound rendered cow off feed. The other physical parameters like rectal temperature, pulse, and respiratory rates were 103.4 0°F, 82 beats/min and 75 breaths/min, respectively.

Diagnosis of Actinomycosis in Cattle

It's complicated to diagnose the Actinomycosis cases as it creates much confusion with other diseases in cattle. The routine diagnostic procedures for confirmation of actinomycosis are:

- History and season of feeding coarse fodder and straw to the cattle.
- By clinical signs and symptoms in suspected animals.
- It involves hard tissue, and it feels hard and fibrous on palpation with or without open wounds.
- Sulfur-like granules reveal pleomorphic gram-positive club-shaped rods and filamentous radiating rays from the centre of the granules upon Gram staining.
- These are referred to as 'Club colonies' and are the main diagnostic characteristics.

- Routine culture for *Actinomycosis bovis* from granules or infected tissues.
- Serological tests like AGPT (Agar Gel Precipitation Test) and the FAT (Fluorescent Antibody test) are helpful in diagnosis and confirmation.



Fig 1. Actinomycosis disease affected Holstein Friesian cow



Fig 2. Actinomycosis disease affected Holstein Friesian cow

On the basis of physical examination and reported history cow was suspected as actinomycosis. Immediate clinical intervention was indicated. The site of lesions was cleaned. Fluid was collected using sterilized syringes. The fluid was immediately transferred into sterilized tubes for investigation of the causative organism. Microscopic examination of the smears prepared from the collected fluid revealed gram positive bacteria with branching filaments. Both the clinical and microscopic examinations confirm the presence of *Actinomyces bovis* infection in reported cow.



Fig 3. Recovering cow, on fifth days of treatment

Treatment and Discussion

Actinomyces bovis found sensitive to Penicillin, Streptomycin, Tetracycline, Bacitracin, Cloxacillin and Co-trimoxazole. Dicrystin- DS has also recorded sensitive (Gopal Krishna Murthy and Dorairajan, 2008). Abscess was drained and close wounds were also opened and pus was drained. Wounds were packed using iodine-soaked gauze. The affected animal was treated with injection Dicrystin-S, IM (Strepto-penicillin, Zenex AH India Pvt. Ltd.) along with Streptomycin Sulphate @ 10 mg / kg body weight, daily along with Potassium Iodide, 10 gram, oral, and daily for 7 to 10 days.

Inj. Melonex (Intas Pharma, Meloxicam), IM @0.2 mg/kg body weight and Inj. Anistamin, IM (Intas Pharma, Chlorpheniramine maleate) for five days. Tissu Aid bolus (Zenex Animal Health) two bolus oral, morning evening for four days. Daily dressing of localized wound with Skin Heal Spray (Indian Herbs) was done. Treatment of Bovine Actinomycosis with Streptomycin and Potassium Iodide @ 6-10 gm/day orally for 7-10 days (Radostits *et al.*, 2000) has also been found effective. Oral administration of Potassium Iodide in combination with Penicillin and Streptomycin or Oxytetracycline has also been found effective in treatment of actinomycosis in cows (Pal *et al.*, 1994 and Hussain 2006). Penicillin is the drug of choice for all clinical forms of actinomycosis in humans (Dwivedi *et al.*, 2018). This case was respond well for parental antibiotic treatment and symptomatically recovered. Prompts diagnosis and correct line of treatment always give better prognosis in this case.

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