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Outbreak of caseous lymphadenitis in an organized goat farm

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Abstract
The present investigation was carried out in an organized goat farm with more than 500 Tellicherry and 100 Osmanabadi breedable does at Kancheepuram district, Tamil Nadu during 2013. Out of these 43 animals were found with swollen lymph nodes in the head (parotid and submandibular) and neck, shoulder (prescapular), flank (prefemoral) and udder (supramammary). Infected lymph nodes grow to become larger abscesses ranging in size from a grapefruit to an egg. The contents are thick green/yellow cheese-like pus; in short-haired goats these swollen glands are obvious and clearly visible. This infection was recorded widely in goats between the ages of one week kid to an adult stage goat. From the clinical sign and the contagious nature, it was tentatively diagnosed as Caseous Lymphadenitis (CLA). The consistency of the swollen mass was hard, non movable in the beginning stage, when it got open white creamy purulent discharge was noticed. Samples were collected by collecting aseptically from the lesion and cultured in the culture medium. Laboratory culture results confirm the causative organism as *Corynebacterium pseudotuberculosis*.

Keywords: Lymph node, *Corynebacterium*, cheesy gland, caseous lymphadenitis

Introduction
Pseudotuberculosis (lymphadenitis caseosa – Caseous Lymphadenitis) is chronic bacterial infections illness of sheep and goats. It appears sporadically, sometimes enzootic. It is manifested by local inflammation on the place when bacteria are being entered. After being entered, bacteria penetrate into lymph nodes developing abscess –lymphadenitis caseosa [1]. It is possible the dissemination of bacteria through blood, consequently with abscess development in lung, liver and kidneys. The cause of this disease is *Corynebacterium pseudotuberculosis*.

Pseudotuberculosis is contagious illness that spread by cohabitation and by transmission of cause through skin wounds. In goats the wounds are localized mostly on the head, neck and sternum that is characteristic in goats that browse -extensive breeding. Infection can be widen in two ways. Abscessing of primary lesions the large number of bacteria is released in environment. Bacteria can survive several months in ground, straw or on the surface of various stuffs as are wood troughs etc. Possible way for entry of bacteria in the body is through the injured skin, mucous membrane, traumatic skin lesions after fight, the ear lesions after marking or tattooing, skin lesions during shearing, browsing lesions of mouth and gums lesions during falling out of teeth. Also, organism can enter through *per os* route, when exist the primary contamination of feeding stuffs, water and troughs [2]. It is possible the dissemination of bacteria through blood consequently with abscess development in lung, liver and kidneys.

This microorganism is facultative intracellular pathogen, presented in pleomorfic form as coccus or bacill, sized 0.5-0.6 μm to 1.0-3.0 μm [3, 4, 5]. It does not produce capsula and it is not movable, it has fimbriae. This bacterium is facultative anaerobic and it growths the best at 37 °C, ph 7.0-7.2 [5].

There are very many diseases affecting the goats that are kept under intensive production system but the one disease which usually goes unnoticed and highly economic important is being Caseous lymphadenitis. Caseous lymphadenitis is a contagious bacterial infection of the lymph nodes of sheep and goats. Caseous lymphadenitis commonly referred to as CL. It is caused by the bacterium *Corynebacterium pseudotuberculosis* and is manifested by abscesses of the lymph nodes and occasionally of the internal organs. Caseous lymphadenitis is spread

through contact with an infected animal, contaminated environment and fomites. Once in the environment, this bacterium can survive for long periods of time and continuously reinfect animals.

Cause

Corynebacterium pseudotuberculosis. This bacterial organism occurs in abscesses as well as in the gut and faeces of the goat.

Mode of transmission

Infected animals, with or without clinical symptoms; these animals contaminate the soil, water, feed, pastures and facilities with nasal secretions, feces and pus from abscesses that drain spontaneously. Direct or indirect contact or through wounds that come into contact with pus from the abscesses of sick animals. Materials that are used in the management of the animals, such as during castration, identification with ear tags or by tattooing, contact with an uncauterized umbilical stump, and drainage of abscesses, can transmit the agent. Vectors such as insects (flies) should be considered in the transmission of the disease, since *C. pseudotuberculosis* has been isolated from the bodies of domestic flies (mechanical vector) and from fly intestines and feces (biological vector).

Materials and Methods

The goats suffering with Caseous lymphadenitis infection were subjected to standard microbiological investigation procedures. The pus samples from 43 affected goats were collected aseptically from the swollen lymph nodes. The collected pus samples were subjected to further bacteriological isolation and identification procedures. Lymph node content is incubated anaerobic for 48 hours, at 37 °C, in the medium with 5% of sheep blood and in MacConkey medium and the grown colonies were examined by microscope.

Results and Discussion

Results of the present study reveal the causative agent as *Corynebacterium pseudotuberculosis* (Fig 2) and it affects the wide ranged age group of goats. Affected animals usually showed swollen lymph nodes with caseous discharge with deterioration of health condition. In our observation all the superficial lymph nodes were got affected with this organisms (Fig 1). Abscessation involving other soft tissues has also been reported. In internal form of CLA infection, vital organs are more likely to develop abscessation than any other organs [6]. The entry to the host is mainly through non– intact skin such as open wounds and abrasions [7] and also mucous membrane. However, other routes have been described in detail by several authors [8, 9]. In the present study, therapy for CLA with antibiotics was mostly without success, This might be due to the bacteria stay alive even after application, protected inside the abscess that is rounded with thick capsule [10-12]. These abscesses can be developed in lung, kidneys, liver and spleen that is characteristic of CLA [10]. Many treated cases showed no improvement in the health condition rather only wound got healed as a response to antibiotic therapy.

Fig 1: Swollen Superficial lymph nodes at different areas

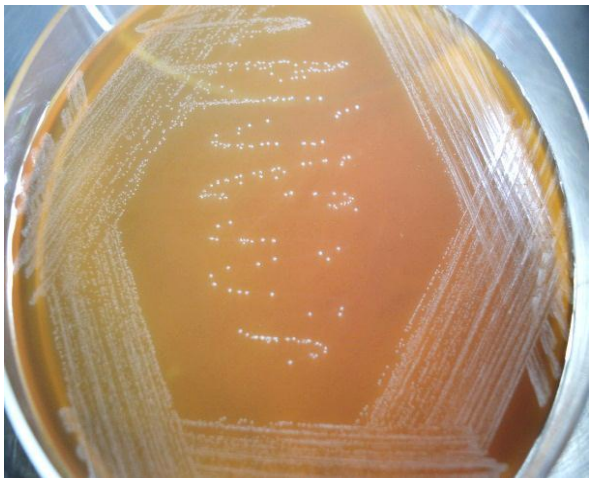

Fig 2: Appearance of *Corynebacterium pseudotuberculosis* in the blood agar

Control and Eradication

Eradication is very difficult and involves initial culling of all animals showing clinical signs followed by culling of all remaining animals that test positive using an Enzyme-Linked Immuno Sorbent Assay.

- Isolation of all infected animals before abscesses gets ruptured.
- Immunization of animals against *Corynebacterium*
- Periodical serological monitoring of outbreak
- In recurrent cases culling will be the advisable option.
- Purchase of flock from CL-free flocks or herds and
- Remove the lambs/kids born to infected animals immediately after birth.
- Infected animals should be sheared last.
- Shear from youngest to oldest, since older animals are more likely to be infected.
- Immediately disinfect any equipment or any areas that get contaminated with pus.
- Decrease stock density in holding pens after shearing.
- Dip the animals that are healthy in condition first followed by the suspected and positive animals at last.

Treatment

External form treatment involves identification of affected animals prior to abscess rupture and isolation of these animals well away from the main herd or flock. Treatment may involve culling of affected animals if the disease is rare in the flock or herd. Lance the abscess, flush the abscess cavity with an antiseptic solution, and pack the cavity with gauze or other bandage material to minimize contamination of the farm environment with the infected material [13, 14]. Surgical removal of infected lymph nodes is another treatment option. Treatment of abscesses caused by *C. pseudotuberculosis* involved drainage and lavage of the abscess in combination with antimicrobial therapy including penicillin, doxycycline, trimethoprim–sulfonamide or a combination of these [13]. Injection of a particular antibiotic directly into the infected lymph node has shown promise as a treatment. Treatment of the internal form of caseous lymphadenitis requires long-term antibiotic treatment. Achieving a complete cure can be very difficult [15].

Conclusion

Recurrence of the disease even after removal of abscess is more likely to occur. In addition, presences of internal abscesses are also a major constraint for effective therapy [14]. It is better to cull all the affected animals or complete depopulation of present stock from intensive farm. Replace with newer livestock after following proper bio control measures. Thus, CL can be managed to a successful conclusion if the proper management steps and vigilance are maintained.

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