Caseous Lymphadenitis in a Goat: A Case Report


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Abstract
Corynebacterium pseudotuberculosis is the causative agent of caseous lymphadenitis (CLA), a common disease in small ruminant populations across the globe. The following report describes two cases of a 3 year old Boer cross does showing large mass beneath the jaw, on the ventral side of the mandible with strong pain reaction to touch of the affected region. The consistency of the mass was non-movable, solid and hard on deep palpation. The mass was lanced and purulent discharges were evacuated. Phenotypic and biochemical identification methods allocated the isolates in C. pseudotuberculosis biovar ovis. The vast majority of the isolates was able to produce phospholipase D and was susceptible to most of the antimicrobial compounds tested. Furthermore, the isolates were compared with C. pseudotuberculosis isolated from other states with different geographical locations and showed high similarity index, suggesting the prevalence of dominant clones and a potential dissemination across the country.

Key words: Boer cross does, Caseous lymphadenitis, Corynebacterium pseudotuberculosis, Bacterial identification, abscess.

Introduction
Despite growing awareness of the global implications of CLA in terms of food safety, its effect on the health, economic and social wellbeing is much frequently overlooked in many countries across the globe.

In Malaysia, the production of animals has recently undergone dramatic transformations in intensity, scale and geographic concentration. The small ruminant industry in the country was among the first sector in which rapid consolidation and vertical coordination occurred as this process has altered herd owners from low-level enterprises to a high-throughput agribusiness on an industrial model. However, the disease yet
remains a major zoonosis with significant economic consequences in small ruminant industries (Williamson 2001). *Corynebacterium pseudotuberculosis*, a gram-positive bacterium which is a facultative, coccoid bacillus with intercellular internalization (Pugh 2002) is the causative agent. The disease is characterized by abscess formation in the skin, internal and external lymph nodes and internal organs. It causes loss through decreased meat yield, damaged wool and leather, decreased reproductive efficiency, culling of affected animals and increased morbidity and mortality rates (Williamson 2001). CLA can become endemic in a herd or flock and once established it is difficult to eradicate due to its poor response to therapeutics, ability to persist in the environment and difficulties in detecting clinically infected animals (Williamson 2001; Dorella et al 2006; Soares et al 2013). It is also easily spread amongst animals due to direct contact with superficial wounds or draining abscesses (Soares et al 2013). Nowadays, the most common treatment for CLA is abscess drainage followed by disinfection with an iodine solution and antibiotic therapy. In this report we describe the characterization of *C. paratuberculosis* clinical isolates from caseous lymphadenitis lesions in the Boer cross does showing large mass beneath the jaw, Selangor region, Peninsular Malaysia.

**Case Presentation**

Our data refers to CLA cases from two farms with different geographical locations in Selangor state, Peninsular Malaysia, where purulent lymphadenitis cases were detected (Figure 1). Both farms practiced extensive management system with total number of animals ranging 500-800 and 300-600 animals respectively. Farms only reared Boer cross goats, nevertheless animals were kept in close range with other species. In addition, there was no commercial relationship between farms. Based on the profile history of the two farms, CLA was detected previously in goats of more than a year of age. Lesions were observed mainly in the ventral part of the mandibular lymph node, but were also found in other locations with special reference prescapular lymph nodes that enlarged bilaterally. The area was aseptically prepared and a small incision about 1cm was made at the ventral part of the mass where the purulent exudate allowed to be drained out. Samples were collected under aseptic condition, plated on blood Agar and incubated an aerobically at 37°C for 24 h. Isolates were initially checked for Gram staining, morphology and production of cytochrome c oxidase. Identification was performed using biochemical identification galleries (12136A, API Coryne®, bioMérieux, Basingstoke, UK) according to the manufacturer’s instructions. Subsequently, in order to distinguish between *C. pseudotuberculosis* biovar equi and biovar ovis, the ability to reduce nitrates was also evaluated (Soares et al 2013). Isolates were identified as *C. pseudotuberculosis* by Api Coryne®, all of which were nitrate reductase negative, hence identified as *C. pseudotuberculosis* biovar ovis. Although other microorganisms have already been related
to lymphadenitis in several animals, such as *Actinomyces hyovaginalis* in goats, sheeps and pigs (Schumacher et al 2009; Foster et al 2012), *Francisella tularensis* in humans (Markoc et al 2014), *Staphylococcus aureus sp. anaerobius* in lambs (Møller et al 2000) and *C. ulcerans* in wild boars and roe deer (Contzen et al 2011; Eisenberg et al 2014), *C. pseudotuberculosis* the main bacterial species responsible for CLA.

**Treatment**

Meanwhile treatment was initiated with Flunixin Meglumin (50 mg/kg IV once a day for three days) and Oxytetracycline (one single 20 mg/kg IM injection). Diluted chlorhexidine and NaCl were used to lavage the cavity of the mass.

**Results and Discussion**

Results from this study confirm that *C. pseudotuberculosis* is the main bacterial species responsible for CLA development in sheep and goats in Peninsular Malaysia. The organism is spread from animal to animal.

**Figure 1** Caseous lymphadenitis lesions in Boer cross doe from a farm located in Selangor region, Peninsular Malaysia: **A)** Boer cross doe with BCS of 3/5; **B)** Mandibular abscess; **C)** Abscess purulent content; **D)** Blood Agar culture showing colonies of Corynebacterium pseudotuberculosis.

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animal primarily through contact with material from subcutaneous abscess or fomite contaminated with abscess materials. In many instants, the abscess of the external form present at the point of entry into the skin or in a nearby lymph node. In internal form of CLA infection, vital organs are more likely to develop abscess and thereby pose a great risk in terms of environmental contamination (Abdinasir et al 2012).

The microbe can survive several months in the soil and environment, remaining a source of infection (Washington Animal Diseases Diagnostic Lab 2014). CLA is a disease of major economic and zoonotic importance. Thus, a strategy for its control in small ruminants is essential in endemic areas. The initial aim of the strategy is based on the reduction of infection in the animal population to such a level that the impact of the disease on human health as well as on animal health and production is minimized (Kaplan 1966). Subsequent steps can include eradication from a region by test and slaughter and measures to prevent reintroduction of the disease. This necessitates a committed effort from the government as well as herd owners. Crucial factors of the success of any eradication programme are the implementation of an active surveillance system with adequate laboratory support and the understanding and sharing of objective for eradication by the decision makers, farmers and all stakeholders.

References
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