

AN OUTBREAK OF *ACTINOMYCES PYOGENES* MANDIBULAR OSTEOMYELITIS IN A HERD OF GOATS, IN MOROGORO

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SUMMARY

A small herd of goats with left mandibular swellings was clinically examined. All goats had poor body condition, enlarged submandibular lymph nodes and had reduced appetite. The swollen areas of the mandibles were hard on pressure, with slight pitting in some areas, whereas some of the goats had discharging sinuses. Other findings included malpositioned jaws and loosening of premolar teeth. Radiography showed destruction of the mandibles, periodontitis and sequestrum formation. Culture results revealed the presence *Actinomyces pyogenes* in the bone lesions of the affected goats. Differential diagnosis of the condition is discussed, to distinguish the disease from Lumpy jaw disease of cattle and sheep, and infectious causes of mandibular swellings in goats. Further studies on the epidemiology of *A. pyogenes* are recommended to investigate the role of animal interactions on the spread of *A. pyogenes* infections. Clinical, radiological, and bacteriological investigations confirmed the presence of osteomyelitis in the mandibles of the affected goats. None of the sheep kept in the same premises was affected.

INTRODUCTION

Osteomyelitis in domestic animals is often secondary to fractures of bones, where it can be localized or spread to form systemic infections (Firth et al., 1987; Blood and Radostits, 1989). Different organisms such as *Escherichia coli*, *Staphylococcus aureus*, *Streptococcus* spp, *Corynebacterium renale* and *Actinomyces pyogenes* have been involved in these infections (Firth et al., 1987; Markel et al., 1986; Altameier et al 1994). Apart from long bones which are

more prone to fractures and consequently osteomyelitis (Hoque, 1997), infections in the head bones have also been recorded. For instance, mandibular osteomyelitis caused by *Actinomyces bovis* has been reported in cattle and sheep (Blood and Radostits, 1989; Hungerford, 1990). This condition has not been documented in goats (Smith and Sherman, 1994). Although jaw abscesses including soft tissues are frequent in goats, the spread of infection to the bones seems to be rare. Generally, bone infections are relatively less common

in goats compared with cattle (Turner, 1984; Lloyd, 1989).

A. pyogenes has been isolated frequently from abscesses of goats, and sheep (Gezon et al., 1991; Alhendi et al., 1993), mastitis, osteomyelitis and different suppurative processes in cattle and other domestic animals (Lloyd, 1989). In the present report mandibular infection caused by *A. pyogenes* in a small herd of goats in Morogoro region, Tanzania is described.

RESULTS

A small herd of sixteen goats and six sheep with signs of loss of body condition and reduced feed intake were examined clinically. Six goats showed poor body condition, and rectal temperatures ranging from 39.5°C to 40.9°C. The most common clinical feature in all the affected animals was swelling of the mandible which extended from the mandibular groove to the mandibular angle (Fig 1). None of the sheep had swellings on the mandible. The swelling in one goat had a discharging sinus, whereas in another animal there was a scar on the swollen area. Swellings appeared only on the left mandible in all the affected goats. The swellings were hard, but upon exerting pressure there was slight pitting in some areas. Three of the goats had malpositioned jaws with the lower jaw twisted to the left. The left submandibular lymph nodes were enlarged in all six affected animals.

One goat had lost the second lower premolar with the remaining premolars being loose. Halitosis was apparent in a goat which had ulcers in the buccal cavity with very loose left lower premolars but the remaining teeth were normal. Loosening and possible shedding of teeth seen in some affected animals has also been reported in other cases of jaw osteomyelitis in animals (Blood and Radostitis, 1989)

Radiography revealed severe destruction of the left mandibular and alveolar bones at the swollen areas. This involved the first, second and third premolars. However, in some animals the lesions involved even the 4th premolar. Periodontitis of the premolar teeth and sequestrum formation were prominent features in severely affected animals. Complete discontinuation of the mandibular wall indicating osteomyelitis was evident in the affected animals, however, the severity of the lesions varied among the animals.

One seriously affected goat was sacrificed for a thorough post-mortem examination. Post-mortem investigations revealed a fragmented mandible at the site of the swelling and pus in the bone marrow cavity which extended to the dental roots. Aseptically collected swabs from the bone marrow of two goats whose swellings were drilled and from the discharging sinus were seeded on blood agar and incubated at 37°C aerobically. Small haemolytic colonies typical of *Actinomyces*

pyogenes were observed after 48 hrs. Gelatine liquefaction and growth in air without carbon dioxide (CO₂) distinguished the organism from *Actinomyces bovis*.

DISCUSSION

The clinical, radiographic and post-mortem findings in the affected revealed the presence of osteomyelitis in the mandibles. Bacteriological evaluation demonstrated *A. pyogenes* which is the most frequently isolated microorganism in cases of bovine osteomyelitis (Firth et al., 1987; Tuner, 1987) and soft tissue abscesses in goats (Gezon et al., 1991). Isolation of *A. pyogenes* in purulent lesions in soft tissues of goats has been reported in both external and internal lesions and rarely in osteomyelitis condition (Tadayon et al., 1980; Gezon et al., 1991). For instance, a review of 141 cases of abscesses in goats that occurred in a period of sixteen years showed only four isolated cases of mandibular osteomyelitis, which were secondary to subcutaneous abscesses (Gezon et al., 1991). In the present case *A. pyogenes* was isolated from the goats with swellings on the mandible but with no evidence of preceding subcutaneous abscesses. This therefore, strongly suggest that *A. pyogenes* can also be a cause of bone infection in goats.

Analysis of anatomic sites of abscesses in goats by Gezon et al. (1991) revealed that the jaws are

more predominant sites for development of abscesses. Due to browsing of shrubs and trees behaviour, jaws of goats are subject to bruises and subsequent introduction of infection to the underlying tissue. Although all lesions were on the left mandible, the sample size is too small to reach a statistical conclusion. Occurrence of disease in goats alone and not in sheep in the study herd might be explained by difference in the thickness of hair coats between goats and sheep. Thin hair coats of goats make the skin more exposed to trauma with a subsequent invasion by bacteria (Tadayon et al., 1980).

The involvement of *A. pyogenes* in causing of mandibular osteomyelitis indicates that the condition needs to be differentiated from that caused by *Actinomyces bovis* in cattle and sheep but rarely in goats, a condition which is also characterised by swellings in the mandible and the maxilla (Hungerford, 1990).

Swellings of the mandibles associated with nutritional disorders and lymphosarcoma have also been documented in goats (Craig, 1986; Yates, 1987). For instance, nutritional mandibular osteodystrophy fibrosa characterised by bilateral mandibular swellings has been reported in young goats fed on *Leucaena leucocephala* (Yates et al., 1987). This condition is manifested by the presence of soft porous mandibles and rotated cheek

teeth, as a result of excess phosphorus in the diet. The involvement of other head bones and the demonstrated neoplastic cells differentiate lymphosarcoma from osteomyelitis due to *A. pyogenes*.

Due to the ubiquitous nature of *A. pyogenes* there is a need to investigate the prevalence of the bacterium in various species of animals for the purpose of devising appropriate disease diagnostic and control measures.

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Figure 1: Swollen left mandible (arrow)