

■ ■ BOVINE TB

Suspected transmission of *Mycobacterium bovis* between alpacas

Tuberculosis (TB) caused by *Mycobacterium bovis* is a recognised disease of South American camelids kept in Britain (Barlow and others 1999, Twomey and others 2007). Most cases are associated with spillover of infection from local animal reservoirs, possibly wildlife or cattle, as determined by molecular typing and comparison of isolates recovered from South American camelids and other species (Barlow and others 1999; VLA, unpublished data). To our knowledge, natural transmission of *M bovis* between South American camelids has not yet been described or documented. We report here the first British case of suspected alpaca-to-alpaca transmission associated with movement of animals to a breeding herd.

Four adult female alpacas from a herd in Devon (A) had visited a breeding herd in south-east England (B) from October to December 2008. The owner noticed clinical signs in two of these, including lethargy, weight loss and occasional coughing, four and eight weeks after returning to herd A, respectively. The disease was progressive and, despite treatment under veterinary supervision, both alpacas eventually died in May 2009.

At postmortem examination, both animals were in poor body condition, weighing 41 and 62 kg. They both showed extensive caseous necrosis of the lungs and thoracic lymph nodes. Additionally, pulmonary cavitation and a few calcified lesions of approximately 1 mm diameter in both kidneys were identified in one alpaca. Acid-fast bacilli were demonstrated on Ziehl-Neelsen staining of fresh tissue smears, and typical granulomatous lesions of TB with acid-fast bacilli were demonstrated by histopathology. *M bovis* with spoligotype pattern SB0134 (VLA type 35) was subsequently isolated. This was unexpected as *M bovis* spoligotype SB0274 (VLA type 11) is more commonly isolated from TB cases in this geographic area. Strains with spoligotype pattern SB0134 represent fewer than 0.1 per cent of cattle isolates in Devon, with none originating from the vicinity of herd A.

After searching the VLA TB database for South American camelid submissions, only one other isolate of *M bovis* spoligotype SB0134 was recorded, also in an alpaca. This animal originated from a herd (C) situated in an area of Shropshire where strains of spoligotype SB0134 are frequently recovered from tuberculous cattle. In February 2009, this alpaca developed weight loss and respiratory disease over three weeks and died despite treatment under veterinary supervision. A postmortem examination was carried out by

the attending veterinary surgeon and caseous necrosis suggestive of TB was seen in the lungs. Further testing of affected lung tissue confirmed the diagnosis by demonstrating acid-fast bacilli in Ziehl-Neelsen-stained smears, typical histopathology and positive mycobacterial culture.

This confirmed case from herd C had not been moved off the premises for at least 16 months. However, another alpaca from herd C had visited herd B in September 2008 and remained there until December 2008 when it developed respiratory disease and died. Although a postmortem examination was not carried out to confirm TB, the clinical signs were consistent with this disease. It is therefore possible that this herd C alpaca transmitted mycobacterial infection to some of the herd A animals temporarily resident in herd B. The pattern of animal movements and isolation of *M bovis* spoligotype SB0134 from herds in different counties strongly suggests alpaca-to-alpaca transmission. Strains with this spoligotype have not been isolated from the vicinity of herd B, which is an area of low TB incidence, and transmission from a local reservoir in south-east England is therefore unlikely. Furthermore, there had been no other animal movements between herd A and other premises to provide an alternative explanation for transfer of strains with this spoligotype.

In accordance with existing Defra policy, herds A and C are now under movement restrictions pending the outcome of two successive intradermal comparative post-axillary tuberculin tests on all of the remaining animals, carried out at 90-day intervals. The first of these has already been completed for both herds with no reactors identified. Restrictions will be lifted if no reactors are detected at the second herd tests, provided that there is no indication of TB based on clinical or pathological evidence. Following a veterinary risk assessment, herd B was also placed under precautionary movement restriction, but this has now been lifted following tuberculin skin testing of the herd with no reactors identified.

The predominant distribution of tuberculous lesions in the lungs and associated thoracic lymph nodes is similar to most TB cases diagnosed in British South American camelids (Barlow and others 1999, Twomey and others 2007; VLA, unpublished data). Because of this heavy concentration of thoracic mycobacterial infection, the respiratory route is the most likely means of transmission between animals in close contact. This effect may well be enhanced when some of the lesions show pulmonary cavitation. The identification of histologically confirmed mycobacterial granulomas in the kidneys of one alpaca from herd A also raises the possibility of transmission via infected urine.

Movement of South American camelids between premises is reported to be common in Britain (Barnett and others 2008). The biosecurity risk associated with alpaca movements has already been highlighted, with documented cases of bovine viral diarrhoea virus infection and sarcoptic mange occurring as a direct result (Barnett and others 2008, Twomey and others 2009). These new TB cases provide evidence of the risk of spreading *M bovis* infection through uncontrolled movements of South American camelids between holdings, particularly those situated in recognised endemic TB regions. Herd owners should be encouraged to seek veterinary advice regarding appropriate biosecurity measures when animal movements are necessary. If private skin testing is being considered, permission to do so must be sought from, and test results reported to, Animal Health.

As previously advised, TB should be considered in South American camelids showing clinical signs of progressive weight loss and respiratory disease (Barlow and others 1999, Twomey and others 2007). The detection of suspect tuberculous lesions during postmortem examination of South American camelids must be notified to Animal Health. The protracted disease course, particularly in herd A, illustrates the potential for further spread. The zoonotic risk to human contacts is also a serious consideration to those handling potentially infected animals.

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