

CLINICAL SIGNS OF TRANSMISSIBLE SPONGIFORM ENCEPHALOPATHIES IN GOATS

Warning: This document links directly to video clips ranging in size from 954 kb to 4.3 Mb. The latter could take over 15 minutes to download using a standard modem connection. For more information about the content and the size of the video clips please see the [TSE video clips page](#).

As for scrapie in sheep, the recent advances in strain characterisation have resulted in the classification of caprine TSE into classical scrapie, atypical scrapie [1,2] and BSE [3,4]. In comparison to scrapie in sheep, the disease in goats is relatively rare.

Classical scrapie

Scrapie is a disease of adult goats of 2 years of age and above. The clinical duration ranges from 2 weeks to several months. The major clinical signs of classical scrapie in goats are abnormalities in behaviour, sensation, which includes pruritus, and movement [5-16].

Behavioural abnormalities

Behavioural changes are usually the first signs noticed and may include separation from the herd, disorientation, aggressiveness, hyperexcitability or listlessness, teeth grinding, a fixed facial expression or abnormal bleating. Goats used for milk production may be difficult to milk. Other reported signs are cannibalism and pica [15].

Sensory abnormalities

Hypersensitivity to normal external stimuli and hyperexcitability may be present and more pronounced than in sheep. Signs of pruritus may not always be obvious but include rubbing against fixed objects and scratching with the horns or limbs; which may result in alopecia (most often at the rear and back of the animal, see fig. 1) and skin lesions. Some goats may display a nibble response to scratching of the back or abdomen [5,13]. Impaired vision has also been observed [9,11,12].



Fig 1.
Bilateral symmetrical loss of hair next to the tail, which is marked red (see arrows), in a goat with scrapie

Abnormalities of movement

Goats with scrapie may display incoordination, such as ataxia, hypermetria or paresis, affecting particularly the hind limbs. They may also stand with a wide-based posture. Progressive incoordination will eventually lead to tetraparesis and recumbency. A head tremor ([see video](#)) or general muscle tremors may be present.

General signs

Unspecific clinical signs are loss of bodily condition leading to emaciation as the disease progresses and decreased appetite. Some animals may salivate or regurgitate ruminal contents [12,13,16]. Milk yield may be reduced [6] or increased [16].

Other signs

Collapsing or fainting episodes may occur occasionally [16,17]. Although the pathological findings in the brain (vacuolation, accumulation of disease-specific prion protein) are generally bilateral symmetrical, in rare cases the neurological signs may be suggestive of a unilateral lesion or more severe lesion at one side of the brain, characterised by circling to one side [18]. A naturally infected goat examined in detail at VLA over 3 weeks developed a tendency to drift to the left ([see video](#)) as well as circling to the left when blindfolded¹, which was suggestive of a more unilateral disease.

¹ For additional video material of the neurological examination of this animal please contact tseeucri@vla.defra.gsi.gov.uk

This may be confused with diseases in goats that usually present with similar unilateral signs, such as listeriosis.

Atypical scrapie

The clinical presentation of atypical scrapie is currently unknown. Atypical scrapie has been diagnosed in a 12-year-old goat found dead [1]. Disease-specific prion protein in this case was detected in more rostral structures of the brain, in particular the thalamus. Lesions in this area may affect the level of consciousness and locomotor activity through connections to cerebellum and cerebral cortex, which may result in behavioural changes and ataxia.

BSE

Information on the clinical signs in naturally infected goats is limited. Neurological signs and pruritus were observed in a goat with suspected BSE [4]. In experimentally (intracerebrally or orally) infected goats, ataxia was the main clinical sign; infrequent signs were trembling, lethargy and weight loss whilst pruritus was absent [19,20].

Differential diagnosis

Other neurological diseases (listeriosis [21], caprine arthritis-encephalitis (CAE) [22], renal [23] or hepatic encephalopathy [24]) may produce scrapie-like nervous signs but can be distinguished by analysis of blood (renal or hepatic disease), cerebrospinal fluid (pleocytosis in listeriosis) or by the presence of other signs usually not seen in scrapie (lameness, enlarged joints and mastitis in CAE - also mainly younger animals affected by nervous form, facial paralysis in listeriosis). Depending on the localisation, tumours and abscesses in the brain often cause obvious unilateral nervous signs (head tilt, circling) [25,26] but do not cause pruritus.

Conditions that cause specific signs associated with scrapie, such as pruritus (e.g. sarcoptic mange [27,28]) or loss of condition (e.g. paratuberculosis/ Johne's disease [29,30] or caseous lymphadenitis [31,32]) can be excluded because of the absence of neurological signs.

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