Case Report

Sarcoptes scabiei infestation of a donkey in the UK

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Summary

Sarcoptes scabiei infestation was identified as the cause of pruritic dermatitis in a donkey in the UK. Treatment with i.m. doramectin and topical selenium sulphide was successful in eliminating clinical signs. Foxes were identified as the possible source of infestation. Sarcoptic mange should be considered as a potential differential diagnosis for pruritic dermatitis in equids in the UK.

Introduction

Sarcoptes scabiei mites parasitise a wide range of mammalian hosts. Although strains of these mites may be physiologically adapted to one or more hosts, they do not show strict species specificity (Lapage 1956; Abu-Samra et al. 1985; Scott and Miller 2003). Thus cross infestation among animals and transfer from animals to man is not uncommon (Macdonald 1922). Transmission is by direct or indirect contact (Scott and Miller 2003). Sarcoptes mites tunnel into the skin, feeding on tissue fluids and laying eggs in burrows in the epidermis (Lapage 1956; Urquhart et al. 1996). The immune response induced by the mites and their products results in signs of intense pruritus and self-inflicted trauma. Skin changes may include alopecia, extensive crust and scale formation, lichenification and secondary bacterial infection (Fadok and Mullowney 1983; Scott and Miller 2003).

In the UK, infestation of horses with Sarcoptes scabiei, so called ‘horse mange’, was a significant problem during the 19th and early 20th centuries (Nugent Harris 1919; Macdonald 1922). The condition was on the World Organisation for Animal Health (OIE) list B of notifiable diseases of socioeconomic and public health importance but was not carried forward to the single list of notifiable equine diseases created in 2005. It is now considered rare or eradicated from most of Western Europe and North America (Bourdeau 2003) but remains an infrequently reported problem in equids in North Africa (Gabaj et al. 1992; Osman et al. 2006). It is generally believed to have been eradicated from the UK, there having been no reported cases since 1947 according to Bates (2003). In a report of an isolated case of sarcoptic mange in a horse from Sweden, foxes were identified as the possible source of infestation (Christensson et al. 1984).

This report details the identification of Sarcoptes scabiei infestation of an elderly donkey in England and successful treatment with injectable doramectin and topical selenium sulphide shampoo. Foxes were identified as the likely source of infestation in this case.

Case details

History

A 35-year-old donkey presented in early winter with a 3 week history of marked pruritus. The owners had used a proprietary louse powder preparation on this donkey and its field companions on 2 occasions. The donkey continued to show worsening signs of pruritus and self-inflicted trauma in the face of this treatment. Two other donkeys in close contact showed no clinical signs. On further questioning, the owners reported having found a dead emaciated fox in their hay store approximately 4 weeks prior to the development of signs of pruritus in the donkey. The fox was described as having little hair and being covered in scabs.

Clinical findings

Physical examination

On examination, the donkey was in good general body condition with a condition score of 3 out of 5 (Body Condition Score Chart UK. The Donkey Sanctuary). The donkey was noted to be restless and observed to rub its head, withers and shoulders repeatedly against the fencing.

Skin lesions comprised irregular patches of alopecia and erythema with marked scale and crust formation over parts of the head, neck, right shoulder and girth areas. The
skin of the limbs was unaffected. The donkey showed a marked ‘itch-scratch’ reflex, with neck extension and movement of the lips, when gentle contact was applied to the shoulder and girth areas (Bourdeau 2003) (Fig 1). Gross examination of the haircoat did not reveal the presence of any lice.

Topical washing of affected areas with an antibacterial and antifungal shampoo (Malaseb) to be followed by treatment with a permethrin based antiparasitic agent (Coopers fly repellent plus) was recommended.

One week later, the donkey was re-examined following the owners’ report of worsening pruritus and self-trauma accompanied by reduced feed consumption. Superficial erosions were now present on the head, withers and shoulder areas. There was further extension of the irregular areas of alopecia with marked crusting and lichenification of the skin over the shoulder region (Fig 2). The haircoat at the periphery of the lesions was matted and easily removed to reveal moist erythematous skin. Several painful papules and pustules were present over the cranial thorax.

Diagnostic procedures

Differential diagnoses considered were pediculosis, fly bite dermatitis, mite infestation, dermatophyte infection and allergic dermatitis including insect hypersensitivity or atopy. Dermatophilosis was also considered but is not usually pruritic. Secondary bacterial infection following self trauma was considered likely.

Hair pluck samples and crusts were collected from the periphery of the lesions for microscopic examination and fungal culture. A swab was taken from a pustule and placed in charcoal transport medium for bacterial culture and antimicrobial susceptibility testing.

In the laboratory, a portion of the thick crust was crushed in 10% potassium hydroxide solution and left at room temperature for approximately 30 min to allow the scab to soften and clear. When examined under the microscope using low power (x100), mites were clearly visible and easily identified by their round shape and short legs as Sarcoptes scabiei (Fig 3). Confirmatory features were the suckers supported on long unjointed stalks on the first and second pairs of legs and the presence of a terminal anus (Sloss and Kemp 1978; Bowman et al. 2003). Chorioptes spp. mites, commonly encountered in horses, have longer legs with suckers supported by short stalks.

A second portion of the scab was used to make a mineral oil preparation in order to ascertain whether live mites were present. None were found. A deep skin scrape was taken from the donkey the following day using a scalpel blade coated in mineral oil. This revealed the presence of many live mites. Mite eggs and faeces were also apparent.
A heavy pure growth of Staphylococcus aureus was cultured from the swab. This was susceptible in vitro to all antibiotics tested including trimethoprim/sulphadimethoxazole. Fungal culture of the hair pluck sample on dermatophyte test medium was negative for Dermatophylium congelosis. A portion of the scab was stained using Rapidiff II stain and found to be negative for Dermatophylium congelosis.

A blood sample was taken to indicate whether there was any underlying systemic disease. The red blood cell count was moderately low at 3.7 x 10^12/l (reference range 4.0–7.3 x 10^12/l). The white blood cell count was elevated at 18.4 x 10^9/l (rr 6.1–16.1 x 10^9/l) with an increased percentage of neutrophils (74%) and eosinophils (5%). The fibrinogen concentration was elevated at 11.4 g/l (rr 2.0–4.0 g/l). Other parameters including liver enzymes, triglyceride and glucose levels were found to be within normal limits.

**Treatment and outcome**

The donkeys were kept in isolation with no contact with other equids or farm animal species. The owners were advised that this isolation must be strictly maintained.

No skin lesions or pruritus were reported by the owners who had been handling and treating the donkey. Following diagnosis, disposable gloves were worn by all persons handling the donkeys.

The affected donkey and 2 in-contact donkeys were given 1% doramectin (Dectomax®) at a dose rate of 0.2 mg/kg bwt by i.m. injection in the gluteal musculature. Selenium sulphide shampoo (Seleen®) was used on affected areas on a single occasion to assist with removal of crust and scale. The shampoo was pre-diluted in accordance with the manufacturer’s instructions and a slow release from lipid stores, giving it sustained activity. Systemic treatment for secondary staphylococcal folliculitis was also instituted due to the risk of transmission of the mites. Surface living Chorioptes mites are the most common cause of equine mange around the world, although doramectin treatment had been instituted due to the risk of transmission of the mites.

**Discussion**

Sarcoptic mange, caused by the burrowing Sarcoptes scabiei mite, is rarely recognised in horses and donkeys. Skin lesions have been reported to originate on the head and neck with rapid caudal and ventral spread (Fadok and Mullowney 1983; Scott and Miller 2003). A similar pattern was seen in this case. Clinical signs included intense pruritus, alopecia, marked crustating and scaling and lichenification of affected areas. Surface living Chorioptes mites are the most common cause of equine mange around the world (Curtis 1999; Osman et al. 2006), usually affecting the legs of horses with heavy feathering (Peris 1995; Curtis 1999; Littlewood 1999). Psoroptic mange has also been reported as an unusual cause of body mange in donkeys and horses (Mukhtar et al. 1987; Osman et al. 2006).

In the UK there is no product licensed for the treatment of equine mange infestations. Different antiparasitic agents of the avermectin/milbemycin group of drugs have been used off-label to varying effect. Oral dosing with ivermectin paste or moxidectin gel has been recommended in the treatment of chorioptic mange (Littlewood et al. 1995; Osman et al. 2006) but mites were not completely eliminated from all treated subjects. A single subcutaneous injection of ivermectin was found to be effective in the treatment of donkeys experimentally infested with a goat strain of S. scabiei (Abu-Samra et al. 1985) and naturally infested with psoroptic mange mites (Mukhtar et al. 1987).

Doramectin is licensed in the UK for the treatment of Chorioptes and Sarcoptes infestation in ruminants. Efficacy of a single dose of injectable doramectin in the treatment of S. scabiei infestation in cattle (Logan et al. 1993) and pigs (Cargill et al. 1996) has been demonstrated. Treatment of Chorioptes infested horses with injectable doramectin has been studied (Rendle et al. 2007). Two injections given subcutaneously at 14 day intervals were shown to produce significant reductions in signs of pruritus and mite numbers. Doramectin is highly lipophilic and slowly released from lipid stores, giving it sustained activity. Injectable doramectin would be expected to have greater efficacy against the burrowing Sarcoptes mite, which feeds on tissue fluids, than the surface browsing Chorioptes mite. Repeated administration of doramectin by the i.m. route was shown to be safe in a small study of healthy donkeys (Serl et al. 2006). The possibility of drug toxicity in debilitated animals or those with low body condition scores must be considered and an accurate estimate of bodyweight made. No adverse effects were seen following the use of injectable doramectin in the 3 donkeys in this report.

A variety of unlicensed topical treatments have also been recommended in the treatment of chorioptic mange and sarcoptic mange in the horse, including lime...
The large number of Sarcoptes mites found on skin scrapes from the donkey was surprising, since most animals infested with S. scabiei carry few mites, making them difficult to demonstrate (Scott and Miller 2003). The possibility of immunocompromise in this aged donkey was considered. No evidence was found to support this, although it could not be ruled out on the basis of the tests performed. In dogs and man, a severe form of infestation known as crusted or ‘Norwegian’ scabies is described in association with immunocompromise (Paterson et al. 1995; Tran et al. 2002). In these individuals extensive thick crusts are seen but pruritus is mild or absent. In the donkey in this report, however, the extreme pruritus seen was in proportion to the large number of mites present (Scott and Miller 2003). Eosinophilia, as recorded in this case, has previously been reported in association with mite infestation (Bourdeau 2003). It is important that scabies infection is recognised and treated promptly and effectively since widespread lesions can result in severe serum exudation, secondary bacterial infections, emaciation and weakness (Fadok and Mollowney 1983). This report serves to highlight the possibility of finding sarcoptic mange as a rare cause of pruritic dermatitis in equids in the UK. It may be that such infestation becomes more commonplace again due to the reduced availability of insecticides licensed for use in the horse. Use of injectable doramectin and topical selenium sulphide shampoo in this donkey, following the principles of the prescribing cascade, was effective in the treatment of Sarcoptes scabiei infestation.

Manufacturers’ addresses

1 Dechra Veterinary Products, Harlescott, Shropshire, UK.
2 Schering-Plough Animal Health, Welwyn Garden City, Hertfordshire, UK.
3 E&O Laboratories, Bonnybridge, Stirlingshire, UK.
4 L P Chemicals Ltd, Winsford, Cheshire, UK.
5 Pfizer, Sandwich, Kent, UK.
6 CEVA Animal Health, Chesham, Buckinghamshire, UK.
7 Norbrook Laboratories, Carlisle, Cumbria, UK.
8 Alstoe Animal Health, Sheriff Hutton, Yorkshire, UK.

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