Culicoides hypersensitivity in horses

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Filippo De Bellis discusses the risk factors and management options for a common skin condition that may have implications for breeding programmes.

The synonyms for this condition include sweet itch, summer itch, Queensland itch and insect bite hypersensitivity.

Incidence and breeds affected

The condition is common in horses and occurs in all parts of the world where horses and Culicoides coexist.

A breed predisposition is documented for the Icelandic horse, but shire horses, Friesian horses and Shetland ponies seem to be over-represented.

Aetiology and pathogenesis

Immunoglobulin E has been demonstrated to mediate typeone hypersensitivity in affected horses and to be important in the pathogenesis of this condition.

Additionally, IgG subclasses and delayed (type four) hypersensitivity can play a role in the disease.

Causative agent and risk factors
*Culicoides* midges are involved and the main offending allergens are likely to be salivary allergens, shared by different *Culicoides* species. In the insect’s salivary glands, more than 10 protein antigens with the ability to bind IgE are present. In Icelandic horses, early induction of tolerance might be an important protecting factor for the disease. Other insects, such as *Simulium* species, *Stomoxys* species and *Haematobia* species, may play a role.

**Clinical features**

Clinical signs are characteristically seasonal, but with chronicity they may become perennial. They consist of pruritus, papules, crusts and exudation, normally involving the mane (Figure 1) and tail (Figure 2).

Lesions on the ventrum are possible, as some *Culicoides* species have a predilection for this site. Horses tend to traumatise these areas, with onset of excoriations, alopecia, lichenification and secondary infections. Severely affected horses may develop a rat tail. The legs and intermandibular space are often involved. Horses may show irritability, restlessness and weight loss. Pruritus is worse in early evenings and early mornings, which are periods of major activity for midges.

Some horses may have concurrent atopy and/or food hypersensitivity, which can greatly complicate the diagnostic workup and therapeutic management.

**Differential diagnosis**

Differential diagnoses include ectoparasitic infestations (lice, chorioptic and psoroptic mange), fly bites, *Oxyuris* infestations, onchocercal dermatitis, besnoitiosis, dermatophilosis, dermatophytosis, equine atopy, contact dermatitis and mane and tail follicular dystrophy.

**Diagnostic approach**

Diagnosis is based on history, clinical signs with characteristic lesion distribution and seasonality, and ruling out other differentials. In the past, several studies have been performed to develop a reliable intradermal test, but consistent results have not been obtained.

In another study it was demonstrated that intradermal testing using *Culicoides* extracts relevant to the locality may be useful to support the clinical diagnosis of *Culicoides* hypersensitivity. ELISA tests are not, at present, considered useful as tools for establishing a diagnosis.

**Histopathology**

Skin biopsies reveal a perivascular eosinophilic and lymphocytic dermatitis. These findings are
common to the majority of equine skin biopsies. In some cases, there may also be eosinophilic vasculitis and focal areas of epidermal damage (necrosis, spongiosis and exocytosis) that are probably the results of the bites. Intraepidermal vesiculopustules may be present at sites of previous insect feeding.

In chronic cases, fibrosis may be marked. The histological changes, although suggestive, are not diagnostic.

**Clinical management**

The most important part of management is bite avoidance. Advisable measures include environmental changes, such as moving the horse to open, windy pastures and paddocks, avoiding standing waters, and stabling from dusk to dawn.

The outside opening of the stall should be screened with very fine mesh. Using a box fan in front of non-screened openings creates a wind stream away from the stall, which may be beneficial. Insect repellents such as permethrin should be used, as well as protective blankets. The other important part of management is skin care and reducing clinical signs. Shampooing, using humectants and moisturisers, and use of topical anti-inflammatory drugs (such as hydrocortisone aceponate spray) may be needed.

Systemic treatment with antihistamines (such as hydroxyzine hydrochloride 0.5mg/kg to 1.0mg/kg twice daily) or oral glucocorticoids (prednisolone 0.5mg/kg to 1.0mg/kg daily until control is achieved, reducing gradually and discontinuing if possible) may also be helpful.

Immunotherapy has so far failed to improve many cases.

**Comparative aspects**

In humans, midge bites ordinarily produce a painful bite with immediate pain and erythema at the site and 2mm to 3mm papulovesicles. This is followed by indurated nodules of up to 1.0cm that persist for many months.

**Additional notes**

Because of the probable inherited predisposition with the disease, affected animals should, therefore, be removed from breeding programmes.

**Selected references**

- Scott D W and Miller W H (2003). Skin immune system and allergic skin diseases. In