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Severe urticaria in a horse after consumption of horseweed (*Conyza canadensis* (L.) Cronquist) – A case study

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CASE REPORT

ABSTRACT

Our paper presents a case study of a Welsh pony mare with grazing-induced severe urticaria. The main clinical signs were eye swelling, depression and extensive urticaria. Physical examination revealed no other abnormalities. Botanical sampling revealed horseweed (*Conyza canadensis*) as the most abundant species and a potential allergen plant due to sesquiterpene lactones (SQL). Differential diagnosis strongly suggested that the clinical signs were the result of a hypersensitivity reaction to this plant. Former studies brought controversial data about the toxic or allergic potential of horseweed especially for equids thus our paper is the first interpretation of horseweed induced urticaria.

KEYWORDS

horseweed, horse, environmental allergies, urticaria, SQL

INTRODUCTION

Allergic diseases have an increasing importance both in human and veterinary medicine. While in humans the most prominent clinical sign is rhinitis or conjunctivitis, animals have different reactions for the same allergens (Jensen-Jarolim et al., 2015). Urticaria is one of the main manifestations of allergy in horses (Marsella, 2013). This can be linked to an immunological response and is traditionally considered a Type I hypersensitivity to an allergen, leading to mast cell degranulation and the release of histamine and other pro-inflammatory mediators. However, Type II and Type III hypersensitivities have also been described (Hennino et al., 2006; Lloyd et al., 2003). Common immunological causes include insect-bite hypersensitivity (IBH), atopic dermatitis, food allergies, environmental allergens, vasculitis (e.g. caused by equine viral arteritis or equine influenza), bacterial (e.g. *S. zooepidemicus)*, viral (e.g. horse-pox), fungal, parasitic (e.g. *Trypanosoma equiperdum)* and protozoal infections, snakebite and medications like penicillin, tetracycline, sulphonamides, phenylbutazone, flunixin, ivermectin, moxidectin, and vitamin B complex (Birkmann et al., 2024; Reed et al., 2018). Mast cell degranulation can also occur independently of hypersensitivity, triggered by factors such as exercise, physical pressure (dermatographism), thermal stimuli or psychogenic stress. In equine medicine, there are limited documented cases of such urticaria (Marsella et al., 2023). Cholinergic pruritus, a variant of cholinergic urticaria and sweat-induced urticaria have both been reported in horses (Logas et al., 1992; Lorch et al., 2013). Former studies also revealed that horses can be strongly sensitized by plant allergens (Wilkołek et al., 2020). Individuals can show reactions to contact with tree, grass or weed pollens as well (Mueller et al., 2016). There are seasonal and geographical differences regarding to plant allergens, but pollen-based allergy is more consistent during the summer season (Marsella et al., 2023). Common plants causing allergy in humans were summarized previously (Esch et al., 2001), but there's still a lack of information regarding each animal species, especially horses.

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CASE HISTORY

A 34-year-old Welsh pony mare was referred for veterinary evaluation in Pest County, Hungary, in July 2023, due to severe urticaria. According to the owner's report, the mare had been moved to a different grazing area (approximately 20 × 40 m) with an older mare the day prior. The evening before the referral, when the mare returned to her stall, mild swelling in both eyelids was noticed, which the owners initially attributed to minor eye inflammation.

On the morning of the following day, the mare appeared bright, alert and maintained a good appetite. The eye swelling had decreased overnight. The horse was allowed out for grazing to the same paddock. However, by the afternoon, the pony developed extensive urticaria, affecting her entire body, including the legs, trunk, neck, head and both eyelids, as well as the muzzle (Figs 1 and 2). The pony appeared slightly depressed but retained her appetite. There were no signs of abdominal pain, and defecation remained normal. The owner requested a veterinary visit due to the worsening clinical signs.

The mare has no known history of allergies or similar reactions. There has been no administration of any medication in the last two months, and there were no changes to her feeding regimen, aside from the recent move to a different pasture. Neither fertilizers, nor herbicides or insecticides were used prior to the grazing season.

The companion horse, an elderly mare (32 years old) with no chewing ability due to missing teeth, was fed hay pellets and showed no signs of clinical illness. As she was unable to graze, she did not consume the allergenic plant.



Fig. 1. Swollen eyelids of the affected mare



Fig. 2. Extensive urticaria of the affected mare

CLINICAL FINDINGS

The physical examination revealed no other abnormalities. Despite the severity of the skin lesions, the pony showed no signs of discomfort, and its general condition remained stable, with normal eating, drinking and defecating behaviours. The mucous membranes were light pink and moist and the capillary refill time was less than 2 s. The conjunctiva appeared normal in colour, although both eyelids were swollen. A detailed ophthalmic examination was not performed; only a basic physical examination was conducted. Vital parameters were within the normal range (pulse: 40 beats*minute^{-1}, respiratory rate: 10 breaths*minute^{-1}, temperature: 37.6 °C). Auscultation of the thorax and abdomen revealed normal respiratory sounds and borborygmi in all quadrants. There were no indications of systemic disease, such as fever or respiratory difficulties. Further diagnostic testing, including allergen-specific IgE assays, intradermal testing, and haematological and biochemical blood work, was not performed due to the owner's financial constraints.

TREATMENT

The pony was promptly treated with intravenous short-acting dexamethasone (Cortexonavet 2 mg*mL^{-1}, laboratorios syva s.a.u.) at a dose of 0.1 mg*kg^{-1} to address the allergic response. Within a few hours, the urticaria began to subside, and the eyelid swelling also started to reduce.

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OUTCOME AND FOLLOW UP

By the following day, the urticaria had completely resolved and the pony returned to its normal activities; however, she was not allowed back to this specific grazing area. The dexamethasone treatment was continued orally for an additional two days to ensure resolution of the allergic reaction. The pony showed no further clinical signs and there was no recurrence of the allergic reaction during the 1.5 years of follow-up.

DIAGNOSIS

After the horse was removed from the pasture, the authors carried out a botanical sampling of the field for species potentially cause urticaria. Sampling was followed the method of Braun-Blanquet (1951). Ten 2 × 2 meter quadrats were used and species abundancy was recorded. Instead of grasses, the most abundant plant was *Conyza canadensis* (L.) Cronq. (syn: *Erigeron canadensis* (L.)) called horseweed or fleabane belonging to the Asteraceae family (Fig. 3). The average cover ranged between 5 and 25%. Horseweed is by now a cosmopolitan weed with a North American origin (Weaver, 2001). The plant height is 50–100 cm, the leaves are alternate, with small flower heads in a loosely spreading inflorescence (Fig. 4). The flowering period is between June and September (Nawaz et al., 2019). There is controversial information about its toxic or allergic effect. Haragan (1991) mentions that horseweed can irritate the nostrils and throats of grazing animals while Stubbendieck et al. (2018) highlight that skin and mucosal irritation is also possible particularly in horses. Furthermore, plants can be the cause of equine urticaria (Diesel, 2014) and recurring urticaria (Fadok, 2013), but no previous case studies have been published in scientific literature before. We evaluated all the possible evidence to confirm horseweed allergy and exclude other causes of urticaria in this case.



Fig. 3. Sample of the pasture with a high abundance of horseweed



Fig. 4. Morphology of horseweed shoot (a) and flower heads (b)

DISCUSSION

A differential diagnosis considered several possibilities, including the earlier mentioned causes of urticaria in horses. Insect bites are considered to be the most common triggers for allergic skin reactions in horses worldwide. Some horses may develop hives as a clinical sign of Insect Bite Hypersensitivity (IBH), however, it is an extremely pruritic condition (Marsella et al., 2023). The clinical signs typically appear in younger or middle-aged horses and the disease progresses over time (Marsella et al., 2023). Given the pony's age, the absence of pruritus and the relatively rapid onset of clinical signs with no history of similar clinical signs or recurrence, this diagnosis is unlikely. An insect sting can cause localized urticaria or swelling, but the widespread nature of the reaction and bilateral eye involvement made this less likely. Additionally, the pony had swollen eyelids on the first day of exposure, and possibly, further exposure on the second day exacerbated the signs. Atopic dermatitis can be accompanied by generalized urticaria, which is not always associated with pruritus (Marsella et al., 2023). However, the rapid relief of clinical signs and absence of recurrence ruled out this condition. Erythema multiforme, a rare immune-mediated skin disease in horses can resemble urticaria and is triggered by antigenic stimuli such as drugs and vaccines. The primary clinical signs include an acute, symmetrical urticarial eruption, typically affecting the neck and dorsal region of the body. This condition is usually self-limiting in horses and resolves within 1–3 months (Marsella et al., 2023; Oryan et al., 2010). Several medications or vaccine administrations can also cause the acute onset of urticaria in horses. However, the absence of systemic signs and any history of exposure to medications or vaccines ruled out many other conditions. Food has been reported to be a trigger for urticaria in horses, but this has not been thoroughly investigated. Reports have linked dermatological manifestations in horses to food with oats, pasture plants, peanut hay, garlic supplements and concentrated feeds implicated as possible triggers for urticaria (Marsella et al., 2023). There were no changes in the pony's diet except for the new pasture that contained a large

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amount of horseweed and no other potentially toxic plants were identified therein. The pony did not receive hay while out on pasture and was only provided hay in the stable during the evening. As a result, during grazing hours, the pony may have ingested the plant in question due to the absence of alternative forage. The rapid onset of clinical signs after grazing on *E. canadensis*, along with the clinical presentation, strongly suggested a hypersensitivity reaction to this plant. In humans, species of the Asteraceae (syn. Compositae) family are the second most common to trigger dermatitis (Iyer et al., 2015) with sesquiterpene lactones (SQL) as their major toxic compounds (Rozas-Muñoz et al., 2012). 3,000 different compounds were described already and almost 50% are potential allergens (Denisow-Pietrzyk et al., 2019), however the effects on animals have not studied before. Clinical signs of SQLs in humans can vary from generalized eczema, allergic dermatitis or even urticaria (Paulsen 2017; Schempp et al., 2002). Chemical analysis revealed that *C. canadensis* is rich in SQL compounds such as germacrene D, β-caryophylle, nerolidol, β-elemene (Lis et al., 2003), (E)-β-farnesene, spathulenol (Ayaz et al., 2017), but the monoterpenoids, such as β-pinene and limonene (Aragão et al., 2019) are also relevant and limonene was reported to cause irritancy in animals (Karlberg and Dooms-Goossens, 1997). These studies revealed that horseweed has a high proportion of irritant SQL allergens and many Asteraceae species such as tansy (*Tanacetum vulgare*), feverfew (*Tanacetum parthenium*), mugwort (*Artemisia vulgaris*), yarrow (*Achillea collina*) and ragweed (*Ambrosia artemisifolia*) have very similar SQL profiles (Denisow-Pietrzyk et al., 2019). Some studies (Amorim et al., 2013; Allan et al., 2019) even suggest that SQL compounds can be toxic for farm animals including horses, but there's still no available case study which may bring a direct evidence. Even though it seems uncommon that an animal would eat plants with possible toxic effects, it's the most frequent way of phytotoxicosis. Animals sometimes eat poisonous plants if grasses are senescent (Cook et al., 2009), especially during the summer. Another explanation for the pony, that it has a different 'grazing personality'. As described already, individuals can have a different attitude other than the collective behaviour of the herd (Moreno Garcia et al., 2020). It depends on many factors, such as the environment, genetics, social environment and emotional state (Creamer and Horback 2024). This also suggests that individuals can consume plants that may not otherwise be a part of their general feed.

As former studies were only based on human research, authors assume that similar clinical signs can be possible in animals as well, but there is still a lack of research on the topic. Our results are somewhat speculative as an allergen-specific IgE test would be the valid evidence for clinical signs. However, based on the differential diagnosis and the formerly published studies, all the pros and cons were weighed and other causes of urticaria were excluded. Even with the lack of clinical evidence, the authors assume that the most plausible explanation of the clinical signs was the presence and consumption of horseweed.

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