

Equine Allergic Disease and other updates in equine dermatology

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KEY POINTS FOR DISCUSSION

- Atopic dermatitis, food allergy, contact allergy, and insect hypersensitivity
- Related hypersensitivity-induced diseases- urticaria, eosinophilic granuloma, irritant contact dermatitis, Unilateral papular dermatosis
- Diagnostic work-up
- Therapeutic options
- The end of the “Magic Potion” in equine dermatology and medicine and the need for evidence-based diagnostics and therapies

ATOPIC DERMATITIS

Atopic dermatitis (AD) is defined as a genetically predisposed inflammatory and pruritic allergic skin disease with characteristic clinical features associated with IgE antibodies most commonly directed against environmental allergens¹. Given how complex and poorly understood the pathogenesis and causes of AD are in humans and animals, the specifics of this definition are debatable. The disease is multifactorial with immunologic abnormalities, antigenic stimuli, altered physiology and skin barrier function, genetics and microbial organisms playing a role in pathogenesis.

The diagnosis is based on clinical signs and the exclusion of other diagnoses (especially insect hypersensitivity). **Allergy testing is supportive, not diagnostic**². The clinical signs are pruritus most commonly directed at the face, distal legs and trunk. Erythema, papular dermatitis and urticaria are possible primary lesions, while alopecia and pyoderma are classically secondary lesions. Secondary pyoderma in the form of epidermal collarettes and crusting over papules are underdiagnosed and treated in equine atopics. Symptoms can be seasonal (i.e. pollen allergens) or nonseasonal (i.e. house dust mites, molds).

Intradermal allergy testing is the gold standard in identifying allergens for avoidance and possible immunotherapy in humans and animals³⁻⁸. A positive skin test reaction (read at 0 hr, 4 hrs and 24 hrs) indicates the presence of skin sensitizing antibody, mast cells that have degranulated on exposure to antigen, and tissue that has responded to the released inflammatory mediators. False positives and negatives are possible and the **results must be interpreted in conjunction with the clinical history of the patient.**

In-vitro (serum) allergy tests include radioallergosorbent (RAST), enzyme-linked immunosorbent (ELISA), and FcεRIα receptor tests. While the advantages to a general practitioner make in-vitro testing very attractive (no patient risk, convenient, no training needed, less likely to be affected by recent drug use) these tests are not recommended in horses. This is because (1) False positives are common, (2) Reproducibility and reliability of results are poorly documented, and (3) The majority of allergic horses referred to dermatologists have had prior in-vitro tests that have not correlated with the clinical history or resulted in successful avoidance or immunotherapy. In one study, all three types of serologic tests demonstrated poor sensitivity, specificity and predictive value. Studies have also demonstrated poor correlation between intradermal testing and in-vitro testing.^{2,6,9,10}

Clinical management of allergic disease in general and atopic disease in particular is usually a life-long necessity. This seems particularly difficult for equine clients to comprehend, and inevitable loss of symptomatic control is pre-ordained in the author's experience and opinion. There are five general categories of therapy: (1) Avoidance of offending allergens, (2) Symptomatic medications that suppress the immune response and inflammatory mediators, (3) Systemic and topical treatment of secondary infections, (4) Allergen desensitization (immunotherapy) which modifies the immune response, and (5) Topical therapeutics to improve skin barrier function. Combinations of all of the above are ideal but must be individualized to the patient. The goal of all therapy should be the improvement of quality of life with the least amount of systemic corticosteroid use.

FOOD ALLERGY

The diagnosis of food allergy (hypersensitivity or intolerance) is extremely rare in the horse². Whether this is due to an actual low incidence or if we are simply failing to make the diagnosis is unclear. Substantiation of the diagnosis (as in small animal patients) requires a hypoallergenic exclusionary diet trial with resolution of symptoms followed by recurrence upon provocative challenge. Good scientific studies on the subject are as rare as good diagnostic evaluations in private practice because the horse owners are typically unwilling to feed a novel protein diet or to separate a diet into components for individual exclusion or challenge. Compounding the difficulty is the complete lack of value of either intradermal or in-vitro food allergen testing in equines and veterinary medicine in general at the current time. Clinical features of pruritus and dermatitis are similar to environmental allergy. In both small animal and equine dermatology, however, perianal pruritus and dermatitis may be a clinical sign suggestive of dietary allergy or intolerance. Ideally a diet trial excluding items in the individual's current feed should be performed

for at least a month. If the lesions and pruritus resolve, a diagnosis is made by documenting recurrence on challenge with individual items in the regular diet added weekly one at a time.

CONTACT ALLERGY vs CONTACT IRRITANT DERMATITIS

Contact allergy is extremely common in humans and has been well studied in human dermatology. In veterinary immunology most of the scientific study of pathogenesis has taken place in laboratory animals. Naturally occurring contact hypersensitivity in equines is poorly documented.^{2,4,5} From a scientific perspective the failure of our literature is the failure to distinguish between true contact hypersensitivity and primary irritant contact dermatitis. Contact allergy is the result of an immunologic reaction to a hapten, a small lipid soluble molecule which binds to a protein to become a complete antigen inducing sensitization. Primary irritant contact dermatitis is not an immunologic disease and does not require sensitization. Common irritants are usually chemical in nature. This is far more common in horses than contact allergy, and in the author's experience is typically caused by an ingredient in a topical poultice, salve or other concoction religiously applied by the horse's owner or veterinarian (see section on "magic potions"). Closed patch testing is the method for diagnosing contact allergy, but in practice this is rarely done due to the difficulty in applying and securing the substance to the horse (same problem in small animal dermatology). In the author's practice, diagnosis of either allergic or irritant contact reactions takes the same clumsy but practical form- the patient's stall and pasture environment are changed (this is individualized based on presentation and will be discussed in detail in the lecture), and the owners are instructed to stop smearing, spraying, washing and scrubbing the horse with whatever they are currently using really.... Stop it! I don't care what it says on the internet!

INSECT HYPERSENSITIVITY

Insect-bite hypersensitivity is the most common allergic skin disease of the horse and the most common complicating factor in a diagnostic work-up of presumably atopic equine patients presented to dermatologists.² Type I (immediate) and Type IV (delayed) hypersensitivity to salivary antigens of *Culicoides* (gnat) species, *Simulium* (black flies) species, *Stomoxys calcitrans* (stable fly) and *Haematobia irritans* (Horn fly). *Culicoides* are the most important cause. Dorsal insect bite hypersensitivity is the most common clinical presentation with papular dermatitis beginning at the mane, rump and base of the tail. The condition will then extend to involve other body areas. Ventral distribution also can occur. Self-trauma and excoriation result in secondary lesions as in other allergic conditions. While dermatologists use intradermal testing as supportive of the diagnosis, the use of whole-body extracts are not reliable. In the future insect salivary antigens may become commercially available. In the author's experience a combination of clinical assessment and intradermal testing are used. Insect hypersensitivity is the first issue addressed in every single referral case to a dermatologist. Husbandry failures are typically found in most cases. Topical insect control products and protocols are often completely inadequate and need to be adjusted. Changes in housing and barrier protection are also key issues.

URTICARIA AND ANGIOEDEMA

Hives (urticaria) and angioedema are variably pruritic and may be immunologic or non-immunologic in etiology. Urticaria is a common reaction pattern with many potential underlying causes, **not a diagnosis**.² Mast cell degranulation is the main effector. The most commonly reported causes in equines are drugs (esp. penicillin and phenylbutazone), feeds, atopic disease and insect hypersensitivity. Other causes include contactants, pressure, sunlight, cold, heat, exercise and stress. As in humans, definitive identification of the underlying cause(s) is extremely difficult, although the detective work involved can be very rewarding for the clinician if the horse's owner is willing to collaborate in the investigation. Classification of urticaria includes: (1) conventional, (2) papular, giant, exudative, gyrate and linear forms.

EOSINOPHILIC GRANULOMA (EG)

EG is the most common nodular inflammatory disease of equines.² The lesions are most commonly seasonal and usually occur on the back, withers and neck. Neither pruritic or painful, they can be noted in varying numbers. The classic histopathologic feature was formerly inappropriately termed "collagenolytic" but is now more appropriately described as "collagen flame figures."¹ Because they are usually seasonal (spring to summer), atopic disease and insect hypersensitivity are suspected causes. Saddle-rubbing trauma and hypersensitivity to silicone-coated needles have also been implicated. Solitary or few lesions can be treated with sublesional triamcinolone 3-5 mg/lesion or methylprednisolone acetate 5-10 mg/lesion.² Horses with multiple lesions may require systemic glucocorticoids. As the lesions are usually asymptomatic, benign neglect can be appropriate. Lesions often spontaneously resolve or wax and wane. If the EG can be associated with atopic disease, food allergy or insect hypersensitivity, therapy for the underlying disease process is encouraged.

UNILATERAL PAPULAR DERMATOSIS and STERILE EOSINOPHILIC FOLLICULITIS AND FURUNCULOSIS

Unilateral papular dermatosis is a rare reaction pattern that is visually distinctive with tens to hundreds of eosinophilic papules located on only one side of the body.² Suspected to be a hypersensitivity reaction to insect bites or parasites in bedding, the lesions are usually seasonal and recurrent. The lateral thorax is most commonly affected and the disease is steroid responsive. Sterile eosinophilic folliculitis and furunculosis is similar but has a symmetric clinical presentation and has the hair follicles as the foci of eosinophilic inflammation. It is the author's opinion that these diseases as well as the previously discussed eosinophilic granuloma are simply allergic reaction patterns most likely due to insect hypersensitivity. The horse is very similar to the cat with regard to the eosinophilic patterns of allergic inflammation.

DRUGS TO BE DISCUSSED

Zyrtec (cetirizine 10 mg tablets)- 0.2-0.4 mg/kg PO BID¹²

Publications establishing dosage have been released in the past few years. The drug is now generic and OTC and has superior efficacy to other antihistamines in horses anecdotally.

Pentoxifylline (400 mg tablets)- 4-10 mg/kg BID^{13,14}

Used for treatment of vasculitis and contact dermatitis, the author uses this in particular in cases of stubborn pastern dermatitis.

THE END OF THE “MAGIC POTION” ERA

Equine medicine in particular still lives in a pre-20th century mindset with regard to the use of “cure-all” salves for dermatologic diseases. Equine owners and trainers (and sometimes vets) frequently have secret concoctions that are used for everything that ails the horse with skin problems. Horse owners and trainers often have their own special potions that they religiously utilize. These salves are at best mixes of antibiotic, steroid and antifungal agents, and at worst include various caustic substances and unsubstantiated holistic ingredients. Dermatologists commonly find that these topicals hinder diagnoses as well as aggravate the condition for which the patient has been referred. Stopping the use of these products is typically the first thing that is done in beginning a diagnostic work-up on an equine patient. In the current era of evidence-based medicine, the author urges that the choice of topical products be based on the results of a minimum dermatologic data base- i.e skin cytology, cultures, skin scrapes, etc.

RECOMMENDED PURCHASE FOR VETS INTERESTED IN EQUINE DERM

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