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Eosinophilic dermatitis in dogs and cats

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Introduction:

Eosinophils are white blood cells involved in many skin processes in dogs and cats. Responding to various stimuli, eosinophils move from the circulation to tissues, where they can carry out various activities: pro-inflammatory (by means of cytokines, lipid mediators and free radicals release, among others), antigen-presenting cells and/or effector cells causing tissue damage (own or parasitic) by means of cytotoxic granular proteins and inflammatory lipid mediator release.

Dermis, epidermis and/or annexes eosinophilic infiltration is observed in various skin diseases of dogs and cats. This is a characteristic finding of allergic or parasitic diseases, but it is also observed in viral diseases, drug reactions or immunomediated diseases of unknown etiology. Then, eosinophilic dermatitis of dogs and cats not caused by ectoparasite infestation or allergic dermatitis are described (atopic dermatitis, food allergy or flea bite allergy).

Feline eosinophilic dermatitis:

Clinically, feline eosinophilic dermatitis is characterized by the formation of papules, plaques, ulcers and/or presence of pruritus.

- **Feline eosinophilic granuloma complex (FEGC)**

This is the most usual eosinophilic dermatosis in cats. FEGC is used to define a group of clinicopathological characteristic signs. Clinical signs of FEGC have historically been classified as an eosinophilic plaque (EP), eosinophilic granulome (indolent, linear) (EG), and indolent ulcer (IU). This is a confused terminology to define clinical lesions, since clinical (plaque, ulcer) and histopathological (granulome, eosinophilic) terminology is used indistinctly. The three clinical presentations have the same histopathological characteristics, so that this is the same pathological entity. The FEGC, in general, is histopathologically characterized by the presence of a severe eosinophilic infiltrate in the dermis, which may be associated to the presence of “flame figure” that are accumulations of eosinophilic amorphous-granular material of variable dimensions.

Although the etiopathogeny of the FEGC is still unknown, it could be associated to hypersensitivity reaction in genetically predisposed animals. According to the clinicopathological appearance of lesions, an allergic cause could be suspected (Th2 mediated delayed hypersensitivity) with presence of an allergen, probably persistent, which origin could be arthropods or other allergens of environmental or food origin. However, in general the cause is not found and it is diagnosed as “idiopathic” FEGC.
Main differential diagnostic: infectious (fungal, bacterial, viral) or neoplastic (squamous cells carcinoma, mast cells tumor, lymphoma) conditions, traumatism (indolent ulcer), insects bite hypersensitivity.

Treatment: specific allergen immunotherapy, glucocorticoids, antihistaminic agents (cetirizine or oxatomide) and/or cyclosporine A.

- **Mosquitoes bite hypersensitivity**
  This a little frequent dermatitis, of seasonal occurrence (coincides with the presence of mosquitoes) and variable pruritus, and can affect cats of any age, breed or sex. It affects areas of the body surface with dark and scant coat, where mosquitoes can more easily reach the skin surface. These areas are typically the bridge of the nose, the pinna and the pre-aural area. Foot pads can also be affected, and more rarely the skin surrounding the teats. It is characterized by the appearance of wheals that develop first to pruritic papules and then to ulcer-crust lesions, and which can be accompanied by edema (especially in the bridge of the nose and foot pads).

  Main differential diagnostic: herpesvirus dermatitis, other allergic dermatitis (flea bite, other ectoparasites, environmental or food allergens), dermatophytosis, pemphigus foliaceus, plasma cell pododermatitis.

  Treatment: if possible, the patient should be kept inside, especially at nightfall and daybreak. If this is not possible, the patient can be treated with systemic glucocorticoids to obtain lesions remission, and then maintain the minimum effective dose to prevent relapses during the mosquitoes season. In very specific cases and when it is strictly necessary, topical pyrethroids can be applied (without piperonyl butoxide) diluted in water in the affected areas. The use of pyrethroids in cats must be extremely careful, since these products may be very toxic in this species.

- **Feline herpesvirus dermatitis**
  This an ulcerative dermatitis, usually facial, caused by feline herpesvirus 1 (FHV-1). In general, the FHV-1 infection is associated to upper airways and ocular problems. In fact, patients with this dermatitis have a quite recent history of rhinotracheitis, conjunctivitis and/or keratitis. Lesions are usually located in the bridge of the nose and the periocular area, but more rarely can be located in trunk or foot pads. Since this is an epitheliotropic virus able to cause necrosis of epidermis, ulcers may be clinically observed. Before the ulcerative stage, erythema and/or skin edema/thickening can occur.

  Main differential diagnostic: mosquitoes bite hypersensitivity, squamous cells carcinoma, allergic dermatitis (if there is pruritus), other viral infections (poxvirus), fungal or bacterial and other causes of disease of upper airways in cats (calicivirus, *Bordetella*, *Chlamydia*, *Mycoplasma*...)

  Treatment: control of the secondary bacterial infection if necessary, famciclovir per oral route, lysine per oral route, interferon alpha per oral route or interferon omega intralocular or systemic.

- **Hypereosinophilic syndrome**
  The feline hypereosinophilic syndrome is a rare systemic disease characterized by eosinophilia and multiorgan infiltration of mature eosinophils. Unlike the human
hypereosinophilic syndrome, in which the skin is almost always affected, cats with this syndrome rarely present skin lesions. Usually, hair loss, anorexia, diarrhea, pyrexia and vomits are observed, and if skin lesions are present, these can be erythematous macules, wheals, papules, edema in distal limbs and excoriations secondary to severe pruritus.

**Differential diagnostic:** allergic dermatitis/gastroenteritis, parasitic infestations, drug reactions, eosinophilic leukemia.

**Treatment:** there is no effective treatment and the prognosis is very variable. High doses of glucocorticoids together with hydroxycarbamide have been tested but there is only one documented case in which hypereosinophilia was controlled for more than 28 months with this treatment. In human beings, treatments of choice are glucocorticoids, hydroxyurea, interferon alpha, imatinib and, in refractory cases, alemtuzumab or mepolizumab.

**Protocol of feline eosinophilic dermatitis diagnostic:**

- Skin scrapings, therapeutic tests with systemic endectocides; hair, wax and scales microscopic examination to rule out the presence of mites or other parasites. Depending on the case, fungal culture should be performed. Hemogram to detect potential periphery eosinophilia.
- Imprint cytology from ulcerated lesions and/or by fine needle from papules and/or plaques. Eosinophils, more or less degenerated neutrophils and intra and/or extracellular bacteria can be observed, especially in ulcerated lesions.
- Skin biopsies for histopathological examination (essential to achieve the diagnostic and to rule out other diseases from the differential diagnostic, as infectious or neoplastic diseases). Depending on the case, bacterial/fungal cultures (from tissue samples), immunohistochemistry or PCR (to detect FHV-1) and/or serology (for the diagnostic of FeLV, FIV or Poxvirus infections) can be performed.
- Diagnostic protocol of allergic dermatitis when for refractive FEGC or controlled with a strict control of ectoparasites, including food restriction tests and eventual treatment with allergen-specific immunotherapy. It must be taken into account that some cases of FEGC heal spontaneously and/or do not relapse following the treatment.

Canine eosinophilic dermatitis:

- **Facial eosinophilic folliculitis and furunculosis**

This is an acute and self-limiting condition characterized by papules-plaques with variable ulceration and bleeding in the head area (typically in the bridge of the nose and periocular area) and occasionally in other areas of the body surface. Rarely, it is pruritic, but it uses to be very painful. It is suspected to be hypersensitivity to arthropods bites. The most cases present periphery eosinophilia.

**Main differential diagnostic:** bacterial or fungal infections, demodicosis, other immunomediated conditions.

**Treatment:** if necessary, glucocorticoids to accelerate the healing. If the arthropod is identified, try to prevent the contact with the animal.
- **Canine eosinophilic granuloma**
  This is characterized by the presence of papules/plaques or nodules in skin, oral mucose membrane or external auditory canal. Marked breed predisposition in the oral form (Siberian Husky, Cavalier King Charles Spaniel and German Shepherd), and it is more frequent in young animals of large breeds. Like the FEGC, an underlying allergic condition is also suspected in the canine form, maybe to arthropods allergens, but reactions to foreign bodies or traumatisms have also been hypothesized.

  **Main differential diagnostic:** reaction to foreign body, infectious or sterile granulomas or pyogranulomas, and neoplasias.

  **Treatment:** surgical exeresis and/or glucocorticoids.

- **Canine eosinophilic dermatitis**
  This is a skin condition of little frequent in canine dermatology with breed predisposition in Labrador Retriever. It has been associated to gastrointestinal disorders, drug reactions and allergic conditions. Patients use to present erythematous macules, wheals and edematous papules in pinna, face, ventral abdomen and thorax. Moderate pruritus and generalized lymphadenopathy are frequent. There is breed predisposition in Labrador Retriever. 75% of the documented cases were associated to gastrointestinal disorders, including vomits and/or diarrhea immediately before or during the occurrence of skin lesions. Analyses frequently reveal hypoalbuminemia but not eosinophilia.

  **Main differential diagnostic:** it depends on the lesions but multiform erythema, infectious or sterile parasitic papular dermatosis and vasculitis are usually included.

  **Treatment:** It depends on the underlying cause. When drug reaction is suspected, the treatment is suspended and the need (usually present) of glucocorticoids is assessed in each case.

- **Sterile eosinophilic pustulosis**
  This is a very rare disease of unknown etiopathogeny that presents with very pruritic pustular dermatitis and periphery eosinophilia. Lesions use to be located in ventral abdomen, but can also be generalized.

  Main differential diagnostic: other infectious (bacterial, dermatophytosis) or sterile (e.g. pemphigous foliaceus) pustular dermatitis.

**Protocol of canine eosinophilic dermatitis diagnostic:**
- Review the clinical history to detect potential drug reaction.
- Skin scrapings and microscopic examinations of hair to detect mites or other parasites. Depending on the case, fungal culture to rule out dermatophytosis or other mycosis can be performed. Hemogram to detect potential periphery eosinophilia and, depending on the case, biochemistry (presence of hypoalbuminemia? Alterations compatible with diseases that could cause vasculitis?)
- Imprint cytology from ulcerated lesions and/or by fine needle from papules and/or plaques. Eosinophils, more or less degenerated neutrophils and intra and/or extracellular bacteria can be observed, especially in ulcerated lesions.
- Skin biopsies for histopathological examination.

Recommended reading:


Scott DW, Miller WHJr, Griffin CE (Eds). Muller & Kirk’s Small Animal Dermatolgy. 6a edición. WB Saunders Company 2001.

