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## NON-ENDOCRINE SYMMETRIC ALOPECIA IN DOGS: CLINICAL MANAGEMENT

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This manuscript will cover canine disorders causing symmetrical diffuse alopecia with no direct apparent hormonal influence.

### CANINE RECURRENT FLANK ALOPECIA

Canine recurrent flank alopecia (CRFA, cyclic flank alopecia, seasonal flank alopecia) is a skin disorder of unknown etiology characterized by recurrent episodes of bilateral trunkal hair loss. The high prevalence in some breeds and the familial character of CRFA suggest a genetic influence. The seasonal nature and the presentation in the short photoperiod season annually suggest that photoperiod may be involved in the etiopathogenesis.

#### Clinical Features

CRFA is characterized by a fairly abrupt onset of alopecia, usually bilateral and symmetric, in the flanks; with well-demarcated borders and often markedly hyperpigmented ("geometric alopecia"). In some cases, there is also a mild alopecia of the dorsum of the nose, base of the ears, base of tail and/or perineum. Spontaneous regrowth of a normal pelage occurs in 3 to 8 months, although some individuals have coat color changes in previously affected areas (melanotrichia in Boxers, aurotrichia in Miniature Schnauzers). Approximately 20% of CRFA cases may have only one isolated episode of flank alopecia during their life; however, most dogs will develop recurrent alopecic episodes in the next years. The degree of alopecia is variable, with some dogs developing a virtually identical hair loss (size and duration) year after year, and other dogs developing larger areas and/or longer episodes of hair loss as years go by. CRFA is most commonly seen in Boxers, English bulldog, Airedale Terrier and Schnauzer. Dogs of either sex and of all reproductive status can be affected. The mean age at the onset of the first episode is approximately 4 years. The majority of dogs have an onset of alopecia between November and March in the Northern hemisphere.

#### Diagnosis

Diagnosis is based in clinical signs, ruling out of endocrinopathies (CBC, clinical biochemistry, T4, TSH, HAC-tests) and skin biopsy. Histopathologic findings (such as "witch's feet" or "octopus-like hair follicles") are suggestive of but not pathognomonic of CRFA.

#### Treatment

The unpredictable course of CRFA and the spontaneous regrowth of hair render the evaluation of any therapeutic agent extremely difficult, whether used to prevent CRFA or to shorten an existing episode of alopecia. Oral melatonin, administered at the rate of 3-6 mg q 8 to 12 hours for 1 to 2 months, may be effective in approximately 50% of the case whether given before or shortly after the onset of alopecia. Dogs affected with CRFA appear healthy otherwise, and benign neglect is a valuable therapeutic approach.

## ALOPECIA-X

This is the name several veterinary dermatologists are now using to refer to the following disease(s): hypsomatotropism of the adult dog, growth hormone responsive alopecia, castration-responsive dermatosis, gonadal sex hormone dermatoses, sex hormone/growth hormone dermatosis, adrenal sex hormone imbalance, congenital adrenal hyperplasia-like syndrome, follicular dysplasia of Nordic breeds, Siberian Husky and plush-coated dogs follicular dysplasia.

The etiology of alopecia-X remains obscure. This follicular growth dysfunction may be due to a genetically determined but unidentified hormonal imbalance and/or a change in receptor sensitivity at the hair follicle level.

#### Clinical Features

Alopecia-X occurs in both male and female young adult dogs, regardless of their neuter status. Initially there is loss of primary hairs (with retention of secondary hairs) in the frictional areas (around the neck, tail, caudal-dorsum and caudal thighs). Gradually, all hair is lost in those regions and eventually the trunkal primary hairs are also lost, giving the remaining coat a puppy-like appearance. With time (several months to years) the secondary hairs may become sparse, and hyperpigmentation of the exposed skin and/or color change in the remaining hair coat may be seen. The head and distal legs are usually spared. A tendency to regrow hair at the biopsy site following skin biopsy or other external traumatic stimuli (skin scraping, sunburn, etc.) is a common finding in this syndrome. Breeds more at risk are the plush-coated Nordic breeds and Poodles.

#### Diagnosis

The diagnosis is based on history, physical examination findings, ruling out other diseases (hypothyroidism, HAC, functional gonadal neoplasms, sebaceous adenitis, telogen effluvium and other follicular dysplasias), skin biopsies and response to therapy. Histopathologic examination of skin biopsies reveals non-specific changes consistent with endocrinopathies; however, the presence of excessive trichilemmal keratinisation (flame follicles) observed in many but not all cases is suggestive of this disorder.

#### Treatment

Various medical and surgical treatments have been suggested. Castration is recommended as it often induces regrowth of hair either permanently or for many months. Adrenolytic drugs such as mitotane have also been reported to be efficacious. Although the induction dose recommended (15-20 mg/kg) is lower than for HAC, the side effects and the possible hypoadrenocorticism associated with mitotane should carefully be considered before using it in affected animals. Oral melatonin given at the rate of 3-6 mg/8-12 hours for 3 months may be effective in approximately 30 to 50% of cases. Trilostane has been recently reported to promote hair regrowth in Pomeranians and Miniature Poodles. All of these forms of therapy may be associated with hair regrowth but is not predictable and may be a short-term effect. In any case, benign neglect can be an option since alopecia-X appears to be only a cosmetic disorder.

## COLOR DILUTION ALOPECIA

Color dilution alopecia (CDA), formerly color mutant alopecia, is an uncommon inherited autosomal recessive disorder which causes alopecia in some dogs with diluted (blue or fawn) hair coats. It is most widely recognized and reported in blue Doberman Pinschers, but it also has been reported in several breeds with dilute coat colors such as Dachshund, Great Dane, Whippet, Chow Chow, Yorkshire Terrier and Chihuahua.

### Clinical Features

CDA is manifested by a hypotrichosis involving exclusively hair follicles in the dilute areas. Initial clinical signs usually start between 6 months (light blue), and 2 to 3 years of age (steel blue). The rate of hair loss is variable, but most light-colored dogs are almost completely alopecic by 2 to 3 years of age. These dogs are prone to follicular plugging and secondary recurrent bacterial folliculitis which can aggravate the hair loss and may cause pruritus.

### Diagnosis

Breed predisposition and coat color should suggest such a condition. Trichogram shows hairs with structural abnormalities such as large melanin clumps along the hair shaft causing distortion and fracture of the hair. Histopathologic examination of skin biopsies reveals melanin clumping in epidermal and follicular basal cells and hair bulbs; numerous melanin aggregates in hair shafts; hair follicles in various stages of growth with follicular hyperkeratosis, fractured hair shafts and free clumps of melanin in the follicular lumen, and numerous peribulbar melanophages. With time, all follicular activity ceases and the follicles become dilated and cystic.

### Treatment

Anecdotally, therapy with oral retinoids and fatty acids have been of some benefit in some patients, at least in decreasing scaling and frequency and severity of bacterial folliculitis. Oral antibiotic therapy and gentle topical antibacterial treatment should be used when required. Recently, anecdotal evidence on the efficacy of melatonin has been reported.

## BLACK HAIR FOLLICULAR DYSPLASIA

Black hair follicular dysplasia (BHFD) is a rare disorder of early onset that has been recognized in several bi- or tri-colored breeds such as Saluki, Basset Hound, American Cocker Spaniel and mongrels, but can also be seen in black breeds.

### Clinical Features

Affected dogs are born normal but hair coat changes are noticed in the black hair areas as early as 4 weeks of age. Initially, there is loss of clusters of the black hairs, followed by progressive hair loss until all black hairs are lost (usually by 9 months of age). Excessive scaling occurs in the affected areas. The hair loss is permanent.

### Diagnosis

The early onset, color linked alopecia makes the diagnosis evident in most cases. Demodicosis and dermatophytosis should be part of the differential diagnosis in some clinical presentations. Histologic and ultrastructural studies show changes similar to color dilution alopecia, albeit less pronounced.

### Treatment

No specific treatment has been reported for this genodermatosis.

## CANINE PATTERN ALOPECIA

Canine pattern alopecia (CP A, canine pattern baldness) is a relatively common disorder which may present with several different syndromes.

### Clinical Features

The most common syndrome ("CP A ventral type") is characterized by an acquired alopecia developing at the postauricular regions, along the ventral neck, thorax and abdomen, and on the caudomedial thighs. The hair loss starts around 6 months of age and gradually progresses over the following year, but remains restricted to the described areas. It is seen primarily in Dachshunds, but it is also recognized in several short-coated breeds such as Chihuahuas, Miniature Pinschers, Whippets, Greyhounds, Boston Terriers and Boxers.

The bald thigh syndrome of Greyhounds is characterized by hair loss at the caudolateral aspect of thighs but can extend to the ventral abdomen. This syndrome is most often seen in racing Greyhounds and hair generally regrow (at least at the lateral aspect of thighs) when racing activity is stopped. Most likely, the majority of persistent cases are cases of CP A. However, it is possible that a few cases may be due to, or aggravated by, hypothyroidism, hyperadrenocorticism and alopecia associated with exogenous testosterone administration.

### Diagnosis

The diagnosis is based on the history, the dermatological exam and exclusion of other diagnoses such as alopecia areata, follicular dysplasias and endocrinopathies (hypothyroidism, hyperadrenocorticism). However, the early onset of CPA and breed predisposition makes it quite distinctive from most of these disorders. Histopathological findings are apparently characterized by miniaturization of hair follicles.

### Treatment

This disease is just an aesthetic problem and to date no effective treatment has been reported for this disorder aside from the possible beneficial effect of melatonin and estrogen. Estrogen is indeed potentially effective if the so called "estrogen responsive alopecia" and CP A (ventral type) are the same entity. Because "estrogen responsive alopecia" as described in the literature seems to include cases of CRF A, alopecia-X and, more often CP A (ventral type), the existence of a distinct disorder called «estrogen-responsive alopecia» is unlikely. Nevertheless, because of serious adverse reactions seen with exogenous administration of estrogen, therapeutic trial with this hormone is not recommended for such a benign disease.

In the last few years, melatonin has become a popular treatment for CP A (ventral type). Good to excellent results have been observed in approximately 50 to 70% of dogs. In addition, melatonin has produced good results in a few dogs treated for CP A (bald ear pinnae).

## TELOGEN EFFLUVIUM

This is an uncommon condition in which the hair follicles go into premature rest and is associated with stressful events such as pregnancy, parturition, lactation, severe systemic illness, marked febrile episodes, shock, surgery and various drugs. The cause of hair loss is the synchronous premature progression from the anagen phase to the catagen and later telogen phase.

### Clinical Features

Patchy to diffuse alopecia occur within 2 to 4 months of the stressful event and affect the trunk. Hairs are usually easily epilated.

### Diagnosis

The history of a metabolic stress and excessive epilation are suggestive. The trichogram shows telogen hairs with nonpigmented clubbed root that lacks sheaths.

### Treatment

Specific therapy is not required as hair regrowth occurs completely a few months after the cause of the metabolic stress has been resolved.

## SEBACEOUS ADENITIS

Sebaceous adenitis (SA) is an idiopathic dermatosis whose cause and pathogenesis are unknown. It is characterized by a lymphocytic, granulomatous, or pyogranulomatous inflammation involving the sebaceous glands, with their progressive destruction. The Standard Poodle and the Akita are breeds genetically predisposed to this disease.

### Clinical Features

Various degrees of alopecia and scaling affect the head and trunk. The hair coat becomes dull, dry and brittle and is easily epilated. Hair casts (keratosebaceous material surrounding groups of hair shafts) are typically prominent and constitute a hallmark of this condition.

### Diagnosis

The presence of hair casts in a predisposed breed is usually suggestive of SA. Histology of skin specimens shows variable degrees of sebaceous adenitis with complete absence of the glands in the late stage of the condition.

### Treatment

The prognosis for improvement in coat condition is variable and, rarely, spontaneous remission occurs; dogs are otherwise healthy. Therapy may improve the coat quality but the destruction of the sebaceous glands is generally permanent. Various topical treatments such as antiseborrheic shampoos and propylene glycol, or systemic treatment such as cyclosporine, essential fatty acids, isotretinoin or etretinate are effective. For severe cases oral retinoids (isotretinoin or etretinate) have been recommended.

## CONGENITAL ALOPECIA (CONGENITAL HYPOTRICHOSIS)

This rare condition is characterized by partial or total of non-color-link hair loss present at birth or within the first few weeks of life. It is usually associated with other ectodermal defects such as absence of other epidermal appendages, anomalies of dentition and decreased tear production. The condition has been reported in several breeds including Poodles, Basset Hound, Beagle, Bichon Frisé, French Bulldog, and Rottweiler. The alopecia may involve the entire body or very specific regions but is symmetric in distribution.

Congenital alopecia is a characteristic in some breeds selected for this pattern, such as the American Hairless Dog, Mexican Dog and the Xoloitzcuintli. The Chinese Crested Dog is also affected by a congenital alopecia caused by a follicular dystrophy, which severely impairs hair growth.