

The Diagnostic Challenge of Nasal Dermatitis Including Mucocutaneous Pyoderma

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Background:

There is often clinical as well as histologic overlap in disorders causing nasal dermatitis making diagnosis challenging for both the practitioner and pathologist. Reaching a diagnosis can take a multifaceted clinical and histologic approach, which includes clinical lesion distribution, response to appropriate antibiotic therapy, supportive histopathology, and ruling out selected infectious agents such as dermatophytes via special stain or culture. Obtaining diagnostic biopsy samples for histologic evaluation can be a key to making a diagnosis. However, histologic overlap can remain. An especially problematic condition has been termed, "mucocutaneous pyoderma".

What is mucocutaneous pyoderma and why is it a differential diagnosis for discoid lupus erythematosus or other immune mediated nasal planum disorders?

Definition:

Mucocutaneous pyoderma is a poorly understood condition that is reported to be antibiotic responsive, and clinically consists of erythema, swelling, and adherent crusts around the mucocutaneous junctions and sometimes also affecting the nares and nasal planum. Especially in chronic cases, it is often histologically indistinguishable from immune-mediated conditions of the nasal planum such as discoid lupus erythematosus. In long standing cases, erosion, ulceration, fissures, and depigmentation can develop. German shepherds appear to be predisposed.

Cause and pathogenesis:

The cause and pathogenesis of mucocutaneous pyoderma are unknown, but response to systemic and topical antibiotics has suggested a significant bacterial contribution. However, the response to antibiotics is often slow, and recurrences are common. The pathogenesis may involve a complex persistent immunologic response (to bacterial or another antigen?) that has yet to be fully elucidated.

Helpful approach to diagnosis:

Because mucocutaneous pyoderma has clinical and

histologic overlap with immune mediated nasal dermatitis (particularly discoid lupus erythematosus), treatment with appropriate systemic and topical antibiotics can facilitate diagnosis (this may require culture and sensitivity to evaluate for bacterial resistance to antibiotics). For example, mucocutaneous pyoderma should respond to therapy, thus confirming the diagnosis. Also, secondary bacterial infections that can complicate immune-mediated disorders (e.g. discoid lupus erythematosus and pemphigus foliaceus) are reduced or eliminated, thus improving the quality of biopsy samples and facilitating histologic diagnosis of the non-antibiotic responsive disease process. In some instances, fungal culture or special stains on the biopsy sections also are necessary to help evaluate for acantholytic dermatophyte infections that can mimic pemphigus foliaceus.

The following discussion and table provide tips for increasing the probability of reaching a definitive diagnosis or short list of differential diagnoses via biopsy sampling in cases of canine nasal dermatitis.

Canine nasal (including muzzle) dermatitis: The when, where, what and how to of biopsy sampling

Before considering biopsy sampling, remember that a thorough dermatologic examination (physical examination, skin scrapings, cutaneous cytology, and culture and sensitivity) can make the diagnosis in many instances or rule out some potential differential diagnoses. This examination is particularly helpful in diagnosing infections with

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bacteria, yeast, and dermatophytes or infestations such as demodicosis or scabies.

The clinical and dermatologic examination can also indicate when biopsy examination may be especially important (examples):

- A. Rapidly developing, painful, hemorrhagic lesions on nose (muzzle) and progressing to periocular or pinnal skin (differentiate arthropod sting from autoimmune disease)
- B. Nasal depigmentation (especially in a Husky or Akita) with possible ocular disease (differentiate uveodermatologic syndrome from other de-pigmenting disorders)
- C. Chronic non healing ulcer (differentiate chronic ulcer from ulcerated neoplasm)
- D. If a diagnosis has not been reached with dermatologic examination, and/or lesions remain after apparent appropriate therapy (especially for bacterial infections), biopsy of lesions may be helpful

The information gained from the dermatologic examination can be critically important to the pathologist in interpreting biopsy results, so pertinent facts should be included in the clinical history

Clinical history

We pathologists cannot emphasize enough just how important having a good clinical history is in helping us provide an interpretation (the comment section) of the biopsy evaluation. Often, the more history we have the more information we can provide regarding the disease process. The clinical history lets the pathologists "see" what the animal looks like.

Essentials of a clinical history (clinical photographs can be very helpful):

- Age, breed, sex of animal
- Location of lesions and sample collection sites
- Gross appearance of lesions
- Duration of lesions
- Presence or absence of symmetry and pruritus
- Results of clinical laboratory evaluations
- Current medications
- Response or lack thereof to specific medications

Examples of how a clinical history helps

History of lack of response to an appropriate dose and duration of a cephalosporin in a dog with alopecia and crusty lesions for several months plus the histopathologic evidence of folliculitis indicates that a fungal stain is necessary to look for dermatophytes (if no dermatophytes were seen in the standard H&E stained sections).

History of lack of response to a three week course of antibiotics (based on culture and sensitivity) and a negative fungal culture in a dog with alopecia and crusty lesions, which significantly worsened after the antibiotic therapy, along with the histopathologic evidence of pustules with large numbers of acantholytic cells indicates pemphigus foliaceus is present (and could possibly be drug associated pemphigus).

A history that the major lesions are pustules and crusts, and biopsy samples have no pustules or crusts tells us that the biopsy samples are not representative or a lesion was otherwise missed, so we would have the histology laboratory provide us with deeper levels of the sections to evaluate for pustules/crusts. Rebiopsy may be necessary. Please remember, if you are not certain what samples to collect or have other questions, please telephone the laboratory and speak with a pathologist before collecting biopsy samples.

GENERAL GUIDE TO BIOPSY SAMPLING OF NASAL DERMATITIS

<p>When to biopsy</p>	<p>If ulcers, crusts, or lesions that could represent infection are present, if possible biopsy after use of appropriate antibiotic therapy as this therapy helps eliminate bacterial infections that can mask lesions diagnostic for the underlying disease</p>
<p>What and where to biopsy*</p> <ul style="list-style-type: none"> • If lesions mostly consist of depigmentation (biopsy gray rather than white areas) • If lesions consist of crusts, make sure to collect some of the crusts 	<p>Representative new skin lesions plus collect peeled crust**. Wrap crust in lens paper and place it in fixative with the other samples. Avoid traumatized and secondarily infected lesions. Areas of early depigmentation (gray) are often useful as they indicate active disease.</p>
<p>How to biopsy</p> <ul style="list-style-type: none"> • For most cases use 4 mm biopsy punch instrument • For ulceration 	<p>Use of a 4 mm punch instrument usually provides better samples than incisional samples collected via a scalpel because multiple samples are easier to collect, there usually are fewer surgery-induced artifacts, and samples do not curl/warp in formalin.</p> <p>If ulceration is present it can be useful to collect the margin of an ulcer plus normal skin. An incisional sample is usually required. Make certain not to grasp the affected tissue with a forceps or the sample can be ruined. Gently blot blood from the sample, gently place sample subcutaneous side onto a piece of tongue depressor for about 30 seconds, and then submerge (sample side down) into the fixative. Do not let the sample dehydrate.</p>
<p>How many samples</p>	<p>3 or more, especially if lesions are present in haired skin</p>
<p>What about immunohistochemistry and immunofluorescence,</p> <ul style="list-style-type: none"> • (uses samples fixed in 10% buffered formalin) • (uses samples fixed in Michel's media) <p>Please note: for general diagnostic purposes, immunofluorescence has been replaced by immunohistochemistry so do not use Michel's media.</p>	<p>There are false positive and false negative results with immunostaining making its use for nasal dermatitis in individual animals problematic. However, there may be times immunostaining could prove useful (can be performed on formalin fixed tissues if the samples were in the fixative for less than 48 hours).</p>

*In some diseases where nasal planum is affected, representative lesions also are present in haired skin. In a systemically ill or animal with compromised health, collection of samples from haired skin may help avoid use of general anesthesia (necessary to collect samples from the nasal planum). However, if general anesthesia is used, including samples from nasal planum or paw pads if affected may help provide more definitively diagnostic samples so include them if you can.

**Crust can be especially helpful in identifying acantholytic cells in superficial forms of pemphigus and fungal hyphae in dermatophytosis as examples, so include crusts if crusting is a major part of the disease process.