BACTERIAL DERMATITIS IN THE CAT

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Feline bacterial skin diseases present with a variety of clinical presentations. Draining lesions, crusting dermatitis, and papular eruptions are but a few of them. Because these clinical entities overlap with parasitic, metabolic, nutritional, allergic, fungal, and autoimmune diseases, achieving a diagnosis can be difficult. In many cases, the bacterial skin disease may manifest itself as a secondary complication due to trauma or immune compromise. A thorough history followed by a rational diagnostic plan will help to sort through the many variables to arrive at a definitive diagnosis. The purpose of this presentation is to review historical clues and diagnostic techniques appropriate to define the bacterial etiology. Individual organisms responsible for inducing feline bacterial dermatitis will be reviewed including the etiology, differential diagnoses, and current treatment options.

A thorough history is an essential starting point in any medical situation. Signalment and sex status should not be overlooked. Male (intact) cats have a propensity for hunting and fighting and are at a greater risk for certain bacterial diseases. Age can sometimes be helpful in limiting (or expanding) the list of differential diagnoses. The herd health status including the other pets (or people) in the environment may be suggestive of a contagious etiology. The presence of fleas or historical exposure to fleas can be a complicating or primary factor in the dissemination of certain infections (e.g., Plague). It is also important to consider the nutritional status of your patients as diet can be a predisposing factor. If the patient is not a regular at your clinic, FeLV/FIV status, vaccination history, and antiparasitic history should be evaluated. Much of this information can quickly be evaluated with a well-prepared questionnaire.

The initial description of the lesion or possibly insighting trauma as observed by the owner will provide useful information. Although the owner may lack the medical terminology we are used to, they can often relay a fairly accurate account of the progression of the clinical findings. If draining lesions are present, the owner should be asked to describe the initial character of the discharge with respect to color, odor, and presence or absence of tissue grains. In many of these cases, the disease is prolonged and the current clinical findings may be very different than the initial presentation. I believe that the owner should be asked what they think the cause of the problem is. More times than not their perceptions are valid. At other times they are amusing and provide a source of humor in lecture situations.

Some of these bacterial diseases are very difficult to diagnose. As such, there may be a significant history with respect to previous diagnostic procedures and treatment outcomes. The client can provide useful experiences relating which medications worked better than others. It is also important to consider dosages, duration of therapy, and owner compliance. Antibiotic resistance due to inappropriate antibiotic selection is a fact of life. When it is apparent that a definitive diagnosis was not made by previous colleagues, it is essential to look for potential causes of failure. Clients quickly lose faith in a clinician who seems to be repeating procedures that did not yield a diagnosis previously. For this reason it is essential to understand the biology of the pathogens on the list of differential diagnoses to correctly select the appropriate culture techniques and come up with an answer.

Examination gloves should be worn whenever the chief complaint entails feline skin disease. Feline dermatophyte and intermediate fungal infections (e.g., Sporotrichosis) can be highly zoonotic. Depending on the bacterial etiology, the zoonotic risk is variable. Even though an organism such as Nocardia sp. is ubiquitous in the environment, the potential amount of organisms within the exudate can be overwhelming, putting ourselves at risk. Clients do not seem to mind that you are wearing gloves. In fact it should be viewed as a positive aspect because you are not transferring other diseases to their pet.

During the physical examination, careful attention should be paid to the coat. A small foci of alopecia may indicate the entry of a foreign body or potential site of abscess rupture. Gentle palpation of the skin may reveal fluctuant pockets that may be potential sampling sites for biopsy or culture. Resist the temptation to rupture these pockets until the appropriate sampling equipment is available. When exudation is present, take a moment to document the color, odor, and character of the
material. The presence of tissue granules is helpful in limiting the list of differential diagnoses. It is also important to palpate the lymph nodes adjacent to the skin lesions to assess dissemination.

Depending on the clinical and historical findings, a minimum amount of diagnostic procedures are almost always necessary. FeLV/FIV status is essential information. Direct impression skin samples or aspirate cytology assessment is very valuable. The cytologic findings can help limit the list of differential diagnoses and provide a tentative diagnosis while cultures or biopsy samples are pending. In most instances a modified Wright's stain (e.g. Diff-Quik®) will suffice. The identification of the morphologic shape of the bacteria, the types of inflammatory cells present and the identification of intracellular pathogens can be assessed. In highly cellular exudate the use of a Gram's stain will help to identify organisms and will provide additional diagnostic information. Occasionally, the use of an acid fast stain is helpful, but the infrequency of its use does not justify the in house expense. This can be performed by your microbiology lab at the time of sample inoculation. It is important to perform cytology on any sample submitted for culture.

Biopsy and histopathology may provide a definitive diagnosis or help to limit the list of differential diagnoses. Many times the results will suggest additional diagnostic procedures to greater define the disease etiology. Veterinarians can become frustrated with their pathologist because the exact cause of the disease may not be defined. By providing a good history and by selecting representative sites of the disease process you can get the most out of histopathology. It also helps to offer a working list of differential diagnoses.

When addressing chronic feline skin disease, additional ancillary tests may be needed. A CBC and serum chemistry profile will be indicated whenever there is systemic illness present. Radiographs are sometimes useful to identify foreign bodies that are radio-opaque such as bullets or tooth fragments. Unfortunately most plant material will not be identified. Occasionally the use of fistula Grams are sought to define the boundaries of a draining tract. Electron microscopy can be useful to identify mycoplasma or L-form bacteria. Special preparation of fresh tissue is superior to tissue prepared for histopathology. Contact your local laboratory for their preferred handling techniques. Although it is expensive, (about $100) electron microscopy can be the deciding factor in differentiating a septic versus sterile disease process.

Whenever chronic draining lesions are present, both anaerobic and aerobic bacterial cultures should be performed. Micro tip culturettes will aid in obtaining a sample from deep within a draining tract. Aseptically prepared skin over a fluctuant pocket will provide an area to collect aspirated samples for culture submission. Additionally, a stab incision can be made to allow the insertion of sterile swabs into the pocket. Many times the best sample is to culture the skin itself. The skin should be aseptically prepared for punch or incisional biopsy. The samples should be sent in sterile Petri dishes or within culturette containers. The addition of sterile saline to the sample is discouraged due to the likelihood of encouraging contaminant overgrowth. If anaerobic cultures are desired from the tissue samples, they must be submitted very rapidly if an accurate diagnosis is to be achieved. Tissue samples should be macerated to aid in recovering bacteria trapped within fibrous connective tissue or tissue grains. Usually this must be requested at the time of submission. To increase your chances of an accurate and rapid diagnosis, inform the laboratory of your differential diagnoses. If Nocardia sp.or atypical mycobacterium are suspected, appropriate agar can be selected that is not routinely inoculated for most submitted specimens. Contact your lab for recommendations on submission of samples for anaerobic or fungal cultures. Many labs require additional samples if these procedures are requested.

A routine cat bite abscess is probably the most common cause of a draining lesion in cats. Anaerobic bacteria are present in the majority of abscesses (Fusobacterium sp., Bacteroides sp., Clostridium perfringens, and Peptostreptococcus sp.)and can be responsible for the odor that is sometimes present. Many aerobic bacteria including Staphylococcus sp., Streptococcus and Pasteurella multocida can be present as well. Clinical findings can include draining lesions, fluctuant pockets, or sometimes only acute pain. Diagnosis is based on history and clinical findings. The treatment is usually easy and rewarding. Appropriate drainage and flushing with copious amounts of sterile saline are essential. Various disinfectants can also be added to the lavage solution. A focal area of alopecia or hemorrhagic skin may help to identify the initial puncture site or a location for drainage. Systemic therapy with an antibiotic that has a good spectrum for anaerobic bacteria is usually indicated for 14
days. Good empirical choices would include Penicillin G, Amoxicillin +/- clavulanate, Metronidazole, or Clindamycin. If a lack of response to therapy is seen, then appropriate cultures and evaluation of immune suppressive diseases should be sought. A poor response to therapy may be seen if mycoplasma or other highly resistant organisms are present.

Bacterial folliculitis or furunculosis is a relatively uncommon entity in feline dermatology and is usually seen in older animals. Papules may be present but more typically, crusted papules, crusts, or scaling is identified. Pustules are rarely seen in feline folliculitis. Bacterial folliculitis can be primary but is usually associated as a secondary phenomenon. Predisposing factors can include ectoparasites such as fleas or demodex, allergic dermatitis and trauma associated with pruritus, and nutritional or metabolic disorders. The diagnosis of bacterial folliculitis can be made on clinical findings, evaluation of cytologic preparations, and or histopathology. Phagocytosed bacteria should be present within inflammatory cells.

Because Staphylococcus sp. is most commonly found, empirical antibiotic therapy should target this pathogen. Good choices would include Amoxicillin clavulanate, Lincomycin and cephalosporin drugs. Therapy is usually rewarding, however an underlying cause for the folliculitis should be sought.

*Nocardia* sp. are aerobic, Gram positive, branching bacteria that sometimes stain with acid fast stain. They are ubiquitous within the environment and are opportunistic pathogens. Clinical findings are not unique. Chronic abscesses, cellulitis, draining tracts, nodular dermatitis, or hemorrhagic vesicles may be seen. Localized lymphadenopathy may be present. The exudate may contain granules (tissue grains) that are actually colonies of the organism. Diagnosis is based on bacterial culture. Histopathology may be suggestive of Nocardia infection, but organisms are rarely identified even with special stain techniques. Isolation of Nocardia can be difficult due to the fastidious nature of the organism. Swab samples of the exudation and tissue grains, as well as tissue samples should be submitted. It is wise to inform the laboratory that Nocardia is a differential diagnosis as other more rapidly growing bacteria can be discounted as to their importance. Achieving a diagnosis of Nocardia can be difficult and the treatment can be just as frustrating. It is difficult to perform sensitivity testing on Nocardia and in vitro results do not necessarily correlate with in vivo efficacy. Good empirical drug choices include trimethoprim sulfadiazine, Amikacin, and Minocycline. Additional drugs to consider include Marbofloxacin, Amoxicillin clavulanate, clarithromycin and Inipenem. Because of the difficulty in treating this pathogen, multiple drugs should be used concurrently. The prognosis is guarded for a cure and it may take months to achieve clinical remission.

*Actinomyces* sp. are Gram positive, anaerobic, filamentous bacteria. They do not stain for acid fastness like Nocardia can. Foxtails are a common cause of infections with this organism but Actinomyces may also be found within the oral cavity of animals. The clinical findings are non specific and may include abscesses and draining or ulcerated lesions. Tissue grains may be present within the exudate. The definitive diagnosis is made on anaerobic isolation of this organism and by ruling out other potential causes. Appropriate samples include aspirated exudate or swab collected samples sent in anaerobic culture. Because anaerobic bacteria can be difficult to isolate, the laboratory should be notified of your differential diagnosis and samples should be processed immediately. Treatment is usually aided by surgical debridement. Good empirical antibiotics include the penicillins and their derivatives, although other agents that have a good spectrum against anaerobes may be selected. The prognosis is guarded as relapses are common.

Opportunistic mycobacterium are aerobic, Gram positive, facultative pathogens found within the soil. They are not obligate pathogens as other true mycobacterium. Some commonly encountered species are: *M. smegmatis, M. fortuitum,* and *M. cheloneae.* These bacteria are positive for acid fast stain due to the high lipid content in the cell wall. Clinical findings can include chronic granulomatous lesions or draining, non-healing wounds. Tissue grains are not present. A definitive diagnosis can be difficult due to the slow growing nature of these bacteria and the paucity of organism usually encountered. Informing the laboratory of your differential diagnosis will allow for the selection of an appropriate mycobacterium agar that will greatly enhance the likelihood of successful isolation. Histopathology will often yield a diagnosis, even in the face of negative cultures. Therapy is usually based on empirical antibiotic selection. However, some labs will perform sensitivity testing on atypical mycobacterium. High doses of fluorinated quinolone drugs administered for several months has been successful in some cases. Baytril has been shown to cause blindness in cats in higher dosages so an alternative drug should
be selected. Clofazamine (Lamprene®), a human anti-mycobacterium drug has been helpful in a few cases but is not approved for use in cats. Reversible staining of the skin and tissues may be seen during treatment. The use of concurrent corticosteroid therapy is controversial, although anecdotal reports of improvement have been noted. Aggressive surgical debridement in conjunction with antibacterial agents (many) may also be helpful. A guarded prognosis for cure is warranted.

Classic tuberculosis is an uncommon disease. Clinical findings can include soft fluctuant nodules, plaques, granulomatous lesions and ulceration. Affected patients are usually clinically ill with fever, inappetence, and lethargy. These bacteria are obligate intracellular pathogens and provide zoonotic risk to handlers. Diagnosis is based on isolation of the organisms. Because of the slow growing nature of mycobacterium, isolation and identification can take several weeks, even with appropriate culture media. Histopathology is often helpful because many acid fast rod bacteria can be identified within macrophages of the infected tissues. Treatment protocols developed for human beings and canine patients can be attempted. Euthanasia is usually considered due to the poor prognosis and potential zoonotic risk. When M avium complex is identified, the zoonotic risk is debatable as this is a soil borne pathogen. A combination of doxycycline with clofazamine has been reported to be effective for localized M avium.

L-form bacteria are potentially any bacteria that are partially or completely devoid of a cell wall. Clinical findings can include abscessation and draining lesions, often over joints. Fever, anorexia, and systemic illness are usually present. A common presentation is a bite wound abscess that is poorly responsive to routine therapy. A definitive diagnosis may be difficult to achieve because these bacteria do not grow in culture media very well. Electron microscopy of infected tissue may reveal the presence of L-form bacteria. In many cases, the rapid response to treatment with tetracycline drugs, along with an appropriate history will lead to a presumptive diagnosis. Mycoplasma bacteria are an important differential diagnosis.