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BACTERIAL PYODERMA

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A large number of our patients with dermatologic conditions also develop secondary infections of the skin. Every lesional, itchy animal should be evaluated for secondary bacterial and Malassezia skin and ear infections, using standard procedures (i.e. impression smears, tape preparations).

Clinical Presentations:
Surface pyoderma – acute, moist, pyotraumatic dermatitis (Hot spot); fold pyoderma, mucocutaneous pyoderma
Superficial pyoderma (folliculitis) – papules; pustules; focal areas of erythema with variable crusts and alopecia; epidermal collarettes (superficial spreading pyoderma), mucocutaneous pyoderma.
Deep pyoderma – focal areas of skin thickening, inflammation, crusting, serosanguinous or purulent exudates; draining tracts

Diagnosis:
1. Largely a clinical diagnosis (especially for superficial pyoderma) – i.e. when one sees focal areas of inflammation and crusting and has ruled out other differentials (based on history, PE and such diagnostics as skin scrapings for demodex etc.) – based on the percentages, the problem is most likely a bacterial pyoderma
2. Cytology – impression smears, scotch tape preps, swabs – of most value to rule out other problems (most commonly Malassezia); bacterial numbers may be relatively small with an active bacterial pyoderma. Note: the deeper the pyoderma, the fewer bacteria one tend to see on cytologic examination.
3. Response to appropriate antibiotic therapy

Cytologic examination of skin lesions are performed to determine the type of inflammation (pustules, papules, crusts, erosions, ulceration, draining tracks etc.), neoplastic or other cell infiltrate; the presence of acantholytic keratinocytes, yeast, bacteria etc.
Equipment needed includes glass slides, cover slips, stain and a microscope.
The various techniques can be used for cytological examination, including impression smears, swabs,
scrapings, acetate tape preparations and a fine needle aspiration.

All samples can be stained with modified Wright’s stain (diff quick). Samples from waxy or moist areas, ear swabs, or when yeast is suspected are to be heat fixed prior to staining.

Cytologies are evaluated for the presence of rods or cocci, yeast, filamentous bacteria and inflammatory cells. Diplococci suggest the presence of staphalococcus species. Notation is made of the presence of intracellular bacteria as these are more likely to be contributing to the pathogenesis of the inflammatory condition. Interpretation of yeast numbers is controversial in that individuals may develop a hypersensitivity to Malassezia in which case relatively small numbers may be problematic. Therefore if 1-2 Malassezia per hpf are seen and clinical signs suggest yeast infection, trial treatment should be performed.

Impression smears:

This sampling technique is mainly used for fluid-containing lesions. The edge of the slide (papules, crusts, erosions, ulceration, draining tract, etc.) or the tip of the needle (pustule cytology) is used to remove overlying crusts or open pustules; the slide is then pressed directly against the lesion. Apply pressure to the back of the slide to facilitate a good impression smear. While applying pressure, place your index finger on the under side of the slide to prevent the slide from breaking. Once the collected sample dries, Diff-Quick (modified Wright’s stain) is used before the sample is examined microscopically.

Swabs:

This technique is most often used for samples taken from draining tracts, ear canals, or interdigital webs. The cotton tip is moistened with saline, rubbed over the skin surface and rolled onto a glass slide.

Scrapings:

These are used to sample underneath crusts and peeling stratum corneum. Also, nails with brownish discoloration are scraped in order to find possible yeast organisms. The collected material is then gently wiped on the glass slide, heat fixed, stained and examined.

Acetate tape preparation:

Clear Scotch tape can be used for dry surface areas or areas hard to sample such as interdigital webs. Acetate tapes are only to be used when yeast infections are suspected as the background material on the Scotch tape makes bacterial evaluation difficult, especially cocci. A piece of tape a little shorter than the length of the glass slide is pressed firmly on the surface of the lesion and stripped off. This procedure is repeated about three times for the same general area. The tape is then placed on a glass slide containing a drop of Diff Quick (blue stain). A paper towel is placed over the tape and pressure is applied to remove excess stain. The slide is then examined under oil immersion.

Bacterial culture and susceptibility testing:

Bacterial c & s should be considered in any skin lesion (pustules, abscess, cellulitis, superficial or deep pyoderma, or acral lick dermatitis) for which bacteria are considered a differential diagnosis but response to appropriate antibiotic therapy is lacking. Ideally, samples should be collected from unbroken pustules by needle aspirates or by biopsy. Every attempt should be made to minimize surface contamination of sample.
Without prior preparation, unbroken pustules are lanced with a scalpel blade and purulent material is harvested for culture. When taking biopsies for culture, the sample is harvested with a smaller punch (4mm dia) the superficial surface is trimmed away with a sharp scalpel blade to minimize surface contamination and the tissue is placed in transport media.

Therapy:
1. Systemic antibiotics – good (80 – 85% efficacy lincomycin), better (85 – 95% efficacy; Clavamox, fluoroquinolones, clindamycin); best (98%+; cephalosporins)
2. Topical antibiotics
   1. Shampoos – chlorhexidine, benzoyl peroxide, ethyl lactate
   2. Conditioners – residual chlorhexidine
   3. For focal use:
      a. Neomycin containing products
      b. Gentamicin containing products
      c. Mupirocin – good penetration in to tissues

Duration of Therapy (systemic antibiotics):
1. For focal, superficial, acute or infrequently recurrent bacterial pyoderma – 3 weeks (standard for most infections is 3 weeks)
2. For generalized, chronic or deep pyoderma (even if focal deep pyoderma, like a lick granuloma) – treat for 2-3 weeks beyond complete remission!

RECURRENT PYODERMA
Causes:
1. Inadequate duration of therapy – recall, for any severe, generalized or deep pyoderma – treat for 2-3 weeks beyond resolution.
2. Pruritic underlying causes : Allergies (i.e. atopy, food sensitivity, flea bite hypersensitivity; these are the most common underlying diseases predisposing to recurrent bacterial infection)
   a. Atopy – can reduce the incidence of recurrent bacterial infections by better controlling the allergy. There is, however, a small subset of dogs that will be prone to recurrence of pyoderma even with good allergy control. These patients are managed as noted below for patients with “idiopathic, suspect immunoinsufficiency” – i.e. pulse antibiotic therapy or immunomodulators.
   b. Food sensitivities – may require longer restrictive diet to define (8-12 weeks); must control infections early on in the diet trial with appropriate systemic antibiotics.
3. Nonpruritic predisposing causes:
   a. endocrinopathies (hypothyroidism, hyperadrenocorticism, diabetes mellitus)
   b. Demodicosis
   c. Severe nutritional deficiencies; catabolic disease; catabolic drugs;
   d. Neoplasia
   e. Systemic Lupus erythematosus
   f. Congenital immunoinsufficiencies
Therapy of recurrent pyoderma:
1. In all cases, work at control of underlying “trigger” factors
2. Make sure infection has been treated long enough
3. Adjunctive topical therapy including the use of mupirocin (Bactoderm) BID for focal lesions (especially useful to treat recurrent focal lesions). Shampoos to be considered include: benzoyl peroxide (most efficacious but drying), chlorhexidine or ethyl lactate shampoos (less drying). Consider following up with a germicidal conditioner.
4. Other alternatives:
   a. Pulse antibiotic therapy – cephalaxin appears to be the most effective for this purpose (least likely to have resistance problems develop; least likely to develop untoward side effects). In our clinic, we most commonly pulse for 2-3 days (full dosages) of each week, whether there is evidence of bacterial infection or not. Others pulse for one week on, one week off for a couple of months, then one week on, two weeks off etc. Usually unable to get down to any less than one week per month. After 6-12 months of remission, can try to discontinue and assess.
   b. Staphage lysate - The is a staphylococcal bacterin that is given at a dosage of 1 cc SubQ once per week or 0.5 cc twice weekly for 4-6 months. If no significant recurrence, decrease to every two weeks, then three weeks etc. Works best to keep pyoderma from recurring. Should be used with antibiotics initially to get pyoderma into remission. Success: 40 - 70%. Side effects rare: vomiting, diarrhea, depression, shaking, injection site reactions
   c. Oral interferon – used at low dosages PO (1000 units once daily) – appears to be most effective in treating atopic patients prone to recurrent bacterial pyoderma.

Clinically lesions consistent with pyoderma cannot be differentiated from dermatophytosis or demodicosis. Both differential disease should always be included on the differential list and appropriate diagnostic procedures should be chosen whenever a pyoderma is on the differential list.