

Bacterial Infection of the Skin

(Pyoderma)

Basics

OVERVIEW

- “Pyoderma” is the medical term for bacterial infection of the skin
- Skin lesions are characterized by the presence of pus
- “Superficial pyoderma”—involves the top surface of the skin (known as the “epidermis”) and the hair follicles
- “Deep pyoderma”—involves the lower layers of the skin (known as the “dermis”) and possibly the tissues under the skin (known as the “subcutis”)

SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs—very common
- Cats—uncommon

Breed Predispositions

- Dogs—breeds with short coats, especially those with excessive skin folds
- German shepherd dogs develop a severe, deep bacterial skin infection (deep pyoderma) that only partially responds to antibiotics and may relapse frequently

Mean Age and Range

- Age of onset is usually directly related to the underlying cause

SIGNS/OBSERVED CHANGES IN THE PET

- Superficial pyoderma (infection located in the top surface of the skin)—usually involves the trunk; extent of lesions may be hidden by the hair coat
- Deep pyoderma (infection located in the lower layers of the skin)—often affects the chin, bridge of the nose, pressure points, and feet; may be generalized and associated with signs of generalized illness (such as fever and/or pain)
- Sudden (acute) or gradual onset
- Variable itchiness (known as “pruritus”)—underlying cause of the bacterial skin infection (pyoderma) may cause itchiness or the staphylococcal infection itself may cause itchiness
- Small, raised skin lesions (known as “papules”)
- Small, raised skin lesions containing pus (known as “pustules”)



- Dried discharge on the surface of the skin lesions (known as “crusts”)
- Circular patterns of hair loss (known as “alopecia”) bordered by scales (accumulations of surface skin cells, such as seen in dandruff) or surface peeling of the skin (the pattern is known as “epidermal collarettes”)
- Circular areas of reddened skin (known as “erythema”) or darkly pigmented skin (known as “hyperpigmentation”)
- Loss of hair (alopecia), moth-eaten hair coat
- Large blood-filled sacs or blisters (known as “hemorrhagic bullae”)
- Accumulations of surface skin cells, such as seen in dandruff (known as “scales”)
- Thickening and hardening of the skin, usually associated with hyperpigmentation (known as “lichenification”)
- Target lesions
- Abscess
- Nodular abscesses in the skin (known as “furunculosis”)
- Inflammation of the skin characterized by redness, swelling, and tenderness (known as “cellulitis”)

CAUSES

- *Staphylococcus pseud intermedius*—most frequent
- *Pasteurella multocida*—an important disease-causing bacteria in cats
- Deep pyoderma (infection located in the lower layers of the skin, causing nodular abscesses and draining tracts)—may be complicated by gram-negative organisms (such as *E. coli*, *Proteus*, *Pseudomonas*)
- Rarely caused by higher bacteria (such as *Actinomyces*, *Nocardia*, *Mycobacteria*, *Actinobacillus*)

RISK FACTORS

- Allergic diseases—flea-bite allergic dermatitis; atopy (disease in which the pet is sensitized [or “allergic”] to substances found in the environment [such as pollen] that normally would not cause any health problems); food allergic dermatitis; contact allergic dermatitis (allergic reaction that develops following contact between the skin and the offending substance to which the pet is sensitized)
- Parasites—especially *Demodex* (cause of demodectic mange)
- Fungal infection—dermatophytosis, caused by a fungus living on the skin, hair, or nails (*Micorsporum canis*, *Micorsporum gypseum*, or *Tricophyton mentagrophytes*)
- Hormonal disease—inadequate production of thyroid hormone (known as “hypothyroidism”); excessive production of steroids by the adrenal glands (known as “hyperadrenocorticism” or “Cushing's syndrome”); sex-hormone imbalance
- Decreased ability to develop a normal immune response (known as “immunesuppression”)—steroids; young pets
- Excessively oily or dry scaling of the skin (known as “seborrhea”)—acne; condition seen in miniature schnauzers in which the hair follicles become filled with oil and skin cells that become infected (known as “schnauzer comedo syndrome”)
- Conformation—short coat; skin folds; redundant skin in between the toes
- Trauma—pressure points; grooming; scratching; rooting behavior; irritants
- Foreign body—foxtail; grass awn

Treatment

HEALTH CARE

- Usually outpatient, except for severe, generalized deep bacterial infection of the skin (deep pyoderma, in which infection is located in the lower layers of the skin)
- Severe, generalized, deep bacterial infection of the skin (deep pyoderma)—may require intravenous fluids, antibiotics administered by injection, and daily whirlpool baths
- Benzoyl peroxide or chlorhexidine shampoos—remove surface debris
- Whirlpool baths—deep bacterial infection of the skin (deep pyoderma); remove crusted discharge; encourage drainage of pus; decrease inflammation and improve tissue oxygenation

ACTIVITY

- No restriction

DIET

- Novel protein or hydrolysate diet, if bacterial infection of the skin (pyoderma) is secondary to food allergy; otherwise a high-quality, well-balanced diet
- “Novel protein diet” uses a novel protein source (that is, feeding a protein to which the pet has never been exposed) or hydrolyzed protein diet (where the protein source has been processed to break down the protein into smaller units, less likely to cause an allergic response) as a dietary trial or as part of the pet’s treatment
- “Hydrolysate diet” uses proteins that have been broken down to small units that are too small to stimulate the immune response
- Avoid high-protein, poor-quality “bargain” diets and excessive supplementation

SURGERY

- Skin-fold bacterial infections of the skin (pyodermas) may require surgical correction of the skin folds to prevent recurrence

Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive.

- *Staphylococcus pseudintermedius* bacterial isolates—usually susceptible to cephalosporins, cloxacillin, oxacillin, methicillin, amoxicillin-clavulanate, erythromycin, clindamycin, and chloramphenicol; somewhat less responsive to lincomycin and trimethoprim-sulfonamide; frequently resistant to amoxicillin, ampicillin, penicillin, tetracycline, and sulfonamides
- Amoxicillin-clavulanate (type of antibiotic)—most isolates of *Staphylococcus* and *Pasteurella multocida* are susceptible; generally effective for skin infections in cats
- Superficial pyoderma (infection located in the top surface of the skin)—initially may be treated with one of the previously listed antibiotics, with antibiotic selection based on the veterinarian’s experience treating pyoderma (rather than based on results of bacterial culture and sensitivity testing)
- Recurrent, resistant, or deep pyoderma (infection located in the lower layers of the skin)—choose antibiotic therapy based upon bacterial culture and sensitivity testing
- Multiple organisms with different antibiotic sensitivities—choose antibiotic on basis of the staphylococcal susceptibility
- Vaccines containing *Staphylococcus* have been used in dogs with recurrent skin infections or with infections that respond poorly to treatment; examples include Staphage Lysate SPL®, Staphoid A-B, or autogenous bacterins—may improve antibiotic efficacy and decrease recurrence in a small percentage of cases, depending upon whether or not an underlying cause can be identified and managed successfully

Follow-Up Care

PATIENT MONITORING

- Administer antibiotics for a minimum of 7–10 days beyond clinical cure; antibiotic treatment is approximately 3–4 weeks for superficial pyoderma (infection located in the top surface of the skin), and 6–10 weeks for deep pyoderma (infection located in the lower layers of the skin)
- Follow-up examinations during treatment to monitor improvement and resolution of skin infection

PREVENTIONS AND AVOIDANCE

- Routine bathing with benzoyl peroxide or chlorhexidine shampoos—may help prevent recurrences
- Padded bedding—may ease pressure point-related bacterial infection of the skin (“pressure-point pyodermas”); also consider for pets with poor wound healing
- Topical (applied to the skin directly) benzoyl peroxide gel or mupirocin 2% ointment may be helpful additional therapies Topical chlorhexidine may also be helpful used daily
- Identification and management of the underlying cause is crucial to prevent recurrence

POSSIBLE COMPLICATIONS

- Presence of bacteria in the blood (known as “bacteremia”) and generalized disease caused by the spread of bacteria in the blood (known as “septicemia” or “blood poisoning”)

EXPECTED COURSE AND PROGNOSIS

- Likely to recur or not be responsive to medical treatment, if underlying cause is not identified and managed effectively

Key Points

- “Pyoderma” is the medical term for bacterial infection of the skin
- Skin lesions are characterized by the presence of pus
- Bacterial infection of the skin (pyoderma) can be located in the top surface of the skin (epidermis) and the hair follicles, in which case it is called a “superficial pyoderma,” or it can be located in the lower layers of the skin (dermis), in which case it is called a “deep pyoderma”
- **Likely to recur or not be responsive to medical treatment if underlying cause is not identified and managed effectively**