

# 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
- Bacterial infection of the skin (pyoderma) can be located in the top surface of the skin (known as the “epidermis”) and the hair follicles, in which case it is called a “superficial pyoderma” or can be located in the lower layers of the skin (known as the “dermis”), causing nodular abscesses in the skin (condition known as “furunculosis”) and draining tracts, in which case it is called a “deep pyoderma”

### SIGNALMENT/DESCRIPTION of ANIMAL

#### Species

- Dogs and cats
- Dogs—very common
- Cats—uncommon

#### Breed Predispositions

- Breeds with short coats, skin folds, or pressure calluses
- German shepherd dogs develop a severe, deep bacterial skin infection (pyoderma) that only partially may respond to antibiotics and frequently relapses

#### Mean Age and Range

- Age of onset usually related to underlying cause

### SIGNS/OBSERVED CHANGES in the ANIMAL

- 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, causing nodular abscesses and draining tracts)—often affects the chin, bridge of the nose, pressure points, and feet; may be generalized
- 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”)
- Large blood-filled sacs or blisters (known as “hemorrhagic bullae”)
- 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”)
- Target lesions
- Loss of hair (alopecia), moth-eaten hair coat
- 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”)
- Abscess
- Nodular abscesses in the skin (furunculosis)
- Inflammation of the skin characterized by redness, swelling, and tenderness (known as “cellulitis”)

### CAUSES

- *Staphylococcus 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

- Allergy—flea-bite allergy; atopy (disease in which the animal is sensitized [or “allergic”] to substances found in the environment [such as pollen] that normally would not cause any health problems); food allergy; contact allergy (allergic reaction that develops following contact between the skin and the offending substance to which the animal is sensitized)
- Parasites—especially *Demodex* (cause of demodectic mange)
- Fungal infection—dermatophyte (a fungus living on the skin, hair, or nails)
- Hormonal disease—inadequate production of thyroid hormone (known as “hypothyroidism”); excessive production of steroids by the adrenal glands (known as “hyperadrenocorticism” or “Cushing’s disease”); sex-hormone imbalance

- Decreased ability to develop a normal immune response (known as “immune incompetency”)—steroids; young animals
- 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
- Trauma—pressure points; grooming; scratching; rooting behavior; irritants
- Foreign body—foxtail; grass awn

## TREATMENT

### HEALTH CARE

- Usually outpatient, except for severe, generalized deep bacterial infections of the skin (pyoderma, in which infection is located in the lower layers of the skin, causing nodular abscesses and draining tracts)
- Severe, generalized, deep bacterial infections of the skin (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 infections of the skin (pyoderma); remove crusted discharge; encourage drainage of pus

### ACTIVITY

- No restriction

### DIET

- Hypoallergenic diet, if bacterial infection of the skin (pyoderma) is secondary to food allergy; otherwise a high-quality, well-balanced food
- Avoid high-protein, poor-quality “bargain” diets and excessive supplementation

### SURGERY

- Skin-fold bacterial infections of the skin (pyoderma) require surgical correction 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 intermedius* bacterial isolates—usually susceptible to cephalosporins, cloxacillin, oxacillin, methicillin, amoxicillin-clavulanate, erythromycin, 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, causing nodular abscesses and draining tracts)—base antibiotic therapy on culture and sensitivity testing
- Multiple organisms with different antibiotic sensitivities—choose antibiotic on basis of 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

## FOLLOW-UP CARE

### PATIENT MONITORING

- Administer antibiotics for a minimum of 2 weeks beyond clinical cure; this is usually about 1 month for superficial pyoderma (infection located in the top surface of the skin), and 2 to 3+ months for deep pyoderma (infection located in the lower layers of the skin, causing nodular abscesses and draining tracts)

### PREVENTIONS AND AVOIDANCE

- Routine bathing with benzoyl peroxide or chlorhexidine shampoos—may help prevent recurrences
- Some cases that continue to relapse may be managed with long-term/low-dose antibiotics, as directed by your pet’s veterinarian
- Padded bedding—may ease pressure point-related bacterial infection of the skin (“pressure-point pyoderma”)
- Topical (applied to the skin directly) benzoyl peroxide gel or mupirocin ointment may be helpful additional therapies

### **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 can be located in the lower layers of the skin (dermis), causing nodular abscesses in the skin (furunculosis) and draining tracts, 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

