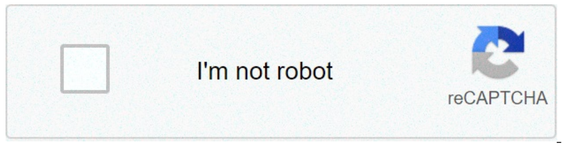


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# Severe pyoderma in dogs

Recurrent Staph Skin Infection in dogs, also commonly referred to as Recurrent Canine Pyoderma, is one of the most frequently seen conditions in veterinarian’s offices. It is also one of the most stubborn conditions to treat. This is why after the initial infection has been treated with an antibiotic and the presenting symptoms have been resolved, the infection returns. “Once the underlying condition is successfully treated…the staph infection may never return.” Staph infection is caused by staphylococcal bacteria, which is normally found in small numbers on the skin of all dogs. While it is generally harmless, sometimes the staphylococcal bacteria can overgrow and result in infection. An initial diagnosis of staph infection does not mean that your dog will suffer from recurrent skin staph infections. In fact, it may be an isolated event attributed to a list of treatable conditions including parasites, fungal infection or even an imbalance of endocrine glands. Once the underlying condition is successfully treated and the appropriate course of antibiotics for the staph infection is completed, the staph infection may never return. However, in many dogs, the underlying cause of the initial bout of skin staph infection cannot be identified or eliminated making them more susceptible to recurrence. This is the case with most environmental and genetic factors including allergies. The circumstances that caused the original skin staph infection still persist and the dog’s immune system is unable to fight off the growth of this bacteria. This becomes a never ending battle that the dog’s immune system cannot handle independently and the infection returns. “While antibiotic resistant infections once were seen only among humans, they are now seen in dogs as well.” Recurrence of staph skin infection in dogs is common, however there are some factors which tend to predispose a dog to this infection. When these risk factors are present, the dog’s immune system has to fight continuously to defend against the growth of the staphylococcal bacteria and any weakness in the immune system will make the dog susceptible to infection. Dog with allergies very frequently suffer from canine pyoderma since they have malfunctioning immune systems. The allergies cause your dog to itch and scratch. The scratching causes self-inflicted breaks in the skin barrier, allowing the bacteria to enter and start infection. In addition, the continual scratching makes the condition even worse, causing even greater damage to the skin. Some breeds have excessive folds and wrinkles in their skin, and they are also more apt to get recurrent pyoderma. These can be normal variation such as in bulldogs and Shar Peis, although sometimes this can be weight related. In these situations, the affected areas of skin are prone to problems that arise from a combination of rubbing, heat and trapped moisture. They provide a warm and moist environment that can lead to the growth of bacteria. Antibacterial cleansing and drying may help but they do nothing to treat the underlying cause. There are several stages to skin infection The infection often begins on the superficial layers of the dog’s skin, with minor skin irritation and small sores typically seen first. However, symptoms can also include pustules, small raised lesions, crusting, round sores, and hair loss. In a deeper form once the infection has set in, the damage to the dogs wellbeing is also more severe and can including bleeding sores and furuncles (boils). Early in the course of allergic disease, many dogs will have few or no lesions, though itch may be severe. This dog’s abdomen is erythematous and very pruritic, though secondary infection has not set in yet.As inflammation and self-trauma persist, there is increasing alopecia and erythema, along with the beginning signs of superficial pyoderma. This dog’s axilla is developing numerous small erythematous papules suggestive of early infection, though overt pustules have not yet developed.As the staphylococcal infection becomes firmly established, pustules begin to appear, as shown on this dog’s abdomen.As the infection progresses, the pustules enlarge and rupture, creating focal crusted lesions and spreading out to form circular “epidermal collarettes.”As the epidermal collarettes heal, they often become hyperpigmented in the center. Note in this dog many circular black “spots” indicating healed former collarettes, some collarettes in the process of healing, and some that appear to be just forming. In this case, we can say that the superficial staphylococcal infection has been present for some time.Images ©University of Wisconsin Absolutely. A recent concern in the veterinary community has been the emergence of methicillin-resistant strains of staphylococcal bacteria that have become resistant to commonly-used antibiotics. Round after round of antibiotics to treat the infection can lead to bacterial mutation, and multiple antibiotic resistance. While antibiotic resistant infections once were seen only among humans, they are now seen in dogs as well. At the time of diagnosis, treatment generally begins with an appropriate antibiotic. The length of treatment depends on the severity of the infection. If the infection has been treated previously, the antibiotic should be based on a culture and susceptibility test to insure that the it has not become resistant to more commonly used antibiotics. Minimizing Recurrence: In order to minimize recurrent outbreaks and avoid prolonged exposure to antibiotics, concurrent treatment with immunotherapies such as Staphage Lysate (SPL)® may be recommended. Adjunctive Treatments: Some additional steps may be recommended as well. Hypoallergenic shampoos and hydrating conditioners to wash out the allergens and dirt and moisturize the skin, relieving itching may be used to make the dog feel better. Topicals may be also used as anti-infectives, however often require frequent application. Caution should be used as these treatments may destroy good skin bacteria along with staph. Fill out the form and we’ll contact your veterinarian about Staphage Lysate! Less commonly seen than superficial pyoderma, deep pyoderma breaks through hair follicles to involve the deep layers of the skin, resulting in furunculosis and cellulitis. Due to damage to blood vessels in the dermis, bloody discharge or haemorrhagic crusts are common with a risk of haematogenous spread and bacteraemia.  It may be preceded by superficial pyoderma that has not been managed effectively, but can also be manifested as local lesions, for example with callus pyoderma, chin pyoderma, interdigital nodules, and in a multifocal or generalised distribution. It can be seen with any underlying trigger or acquired immunodeficiency, but is commonly associated with demodicosis. Clinical features Lesions are variable and include serosanguinous to purulent fistulous tracts, haemorrhagic bullae, nodules and varying degrees of erythema and swelling, and may be painful. The presence of blood provides an important diagnostic clue to differentiate between deep and superficial pyodermas.  Pyodermas are almost invariably associated with underlying primary factors that need to be identified and treated for successful resolution. Lesions most often involve the trunk, pressure points (callus pyoderma, Figure 1), chin, nose and feet (interdigital pyoderma, Figures 2 and 3).  Post-grooming furunculosis, frequently involving Pseudomonas spp., is a newly recognised deep pyoderma that develops within a few days of shampooing and grooming.  In general, however, the most important causative bacterium, and also the most commonly isolated in deep pyoderma cases, is Staphylococcus pseudintermedius. Other species include S. schleiferi, S. aureus and occasionally gram-negative staphylococcal infections and anaerobic bacteria. Methicillin resistance is possible in all staphylococcal infections. Its increasing occurrence worldwide mandates culture and antibiotic sensitivity; if identified, rigorous hygiene measures and owner education are essential. FIGURE 1 Callus pyoderma of the elbow in a two-year-old Great Dane. Although the dog had soft bedding, it chose to spend time lying on a metal fire escape during the day FIGURE 2 Deep pedal pyoderma in a 13-year-old Shih-Tzu dog. There is blood and pus suggesting deep pyoderma. Erythema is suggestive of demodicosis, which was the underlying factor in this case German Shepherd pyoderma is a poorly understood form of deep pyoderma, with likely genetic and immunological predispositions in German Shepherd dogs or their crosses (Figure 4). Treatment is often unrewarding, with relapse after cessation of treatment a common problem.  Predisposing factors include (after Hnilica and Patterson, 2017):  Demodicosis, especially with pedal and facial pyoderma Allergic skin diseasesScabiesEndocrinopathy (eg hypothyroidism, hyperadrenocorticism) Immunosuppressive therapy (particularly with glucocorticoids) Autoimmune and immune-mediated diseases, especially if there has been treatment with immunosuppressive drugs Trauma (eg callus pyodermas) and faulty conformation in some cases of pedal pyoderma Any chronic skin disease where the integrity of the skin defence mechanism is compromisedDifferential diagnosis  Demodicosis (an important common underlying cause; hair plucks, skin scrapes and in chronic cases biopsy are all advised) Allergic skin diseases Calcinosis cutis (lesions in chronic cases become secondarily infected, manifesting as deep pyoderma)Dermatophytosis (especially in chronic cases with secondary infection) Atypical bacterial infections such as actinomycosis or nocardiosis Autoimmune diseases Neoplasia FIGURE 3 Deep pedal pyoderma lesions in a 12-year-old male Bulldog associated with an underlying hypothyroidism (courtesy of Anette Loeffler, RVC dermatology service) Consider the history and clinical signs. There may be a history of superficial pyoderma that has not been effectively treated with subsequent deterioration and development of deep pyoderma. Rule out differential diseases. All cases will benefit from hair plucks, tape strips and skin scrapes.  Cytological examination is advisable in all cases. A suppurative to pyogranulomatous inflammation is a typical finding with phagocytosis of bacterial cocci and/or rods. Culture and antimicrobial sensitivity is necessary in all cases. The primary pathogen is usually S. pseudintermedius but other bacteria may be found. Cytological examination with culture and antimicrobial sensitivity are best considered together to facilitate an accurate diagnosis. Disinfection of the outer part of a draining lesion followed by deep swabbing will reduce the risk of contaminant organisms. Where no discharging lesions are present, deep tissue may need to be obtained for culture by biopsy (the outermost part of the sample needs to be discarded before submitting in sterile saline). Histopathological examination will reveal a deep suppurative/pyogranulomatous folliculitis, furunculosis, cellulitis and panniculitis. Intralesional bacteria may be difficult to find.  Clinical management  Deep pyoderma cases are challenging. Time spent with owners is essential before treatment and investigations are undertaken as the diseases are serious, require lengthy treatments and incur considerable expense. Systemic therapy should only be administered based on culture and sensitivity and an evaluation of a cytological specimen. While guidelines specific for the treatment of deep pyoderma are still lacking, general recommendations of good antimicrobial stewardship should be followed (Beco et al., 2013). Antimicrobial therapy should be given at the full registered dose, and the dog should be weighed to ensure accurate dosing. A minimum of six to eight weeks of treatment is recommended, in general two weeks following clinical resolution. Close monitoring is critical and best done under veterinary supervision at all times, including cytological evaluation as clinical “cure” precedes absence of bacterial invasion. FIGURE 4 Generalised severe deep pyoderma in a two-year-old German Shepherd dog. The dog did not respond to long-term antibacterial therapy Topical therapy can be instigated; in conjunction with systemic therapy, it will reduce surface contamination and support healing. Products should have proven antibacterial efficacy, such as those based on chlorhexidine. Underlying causes need to be investigated and treated. Topical therapy can be continued while these investigations are ongoing, and may be useful to prevent recurrence if no underlying cause is found.  When dealing with pyoderma cases, hand hygiene is very important and thorough disinfection of tables and instruments between cases is essential to avoid transmission of resistant and potentially zoonotic pathogens. This is especially important with multi-resistant pyodermas.  Multi-drug resistant pyodermas, like methicillin resistant S. pseudintermedius (MRSP), present a particular (and very difficult) challenge; in many cases, there will be no licensed antimicrobial agent possible. In this situation, specialist advice is recommended. References Beco, L., Guaguère, E., Lorente Méndez, C., Noli, C.,Nuttall, T. and Vroom, M. 2013 Veterinary Record, 172, 156-160. Hnilica, K. and Patterson, A. 2017 Small animal dermatology: a color atlas and therapeutic guide, 4th ed. Miller, W., Griffin, C. and Campbell, K. 2013 Muller and Kirk’s small animal dermatology, 7th ed. David Grant, MBE, BVetMed, CertSAD, FRCVS, graduated from the RVC in 1968 and received his FRCVS in 1978. David was hospital director at RSPCA Harmsworth for 25 years and now writes and lectures internationally, mainly in dermatology. *Wag! may collect a share of sales or other compensation from the links on this page. Items are sold by the retailer, not Wag!.Page 2*Wag! may collect a share of sales or other compensation from the links on this page. Items are sold by the retailer, not Wag!. Has your dog been scratching themselves? Does their skin look red? Do they have pimples or an odor to their skin? They could have a condition known as dog pyoderma or puppy pyoderma in puppies — a common skin condition that plagues dogs of all shapes, sizes and ages. If you're concerned that pyoderma could be wreaking havoc on your dog's skin, read on to learn common causes and treatments for the infection. What Is Pyoderma in Dogs? Pyoderma is a superficial bacterial infection that affects hair follicles and the surrounding skin. If you break it down, "pyo" means pus, and "derma" means skin. Pyoderma in dogs usually has an underlying cause, such as: A foreign body, like grass seed, getting under the skin A trauma or bite wound An allergy or hypersensitivity to fleas, food or environmental factors Mites A hormonal disorder, like Cushing's syndrome, hypothyroidism or autoimmune disorders Administration of immune-suppressing drugs, like chemotherapy or steroids Poor nutrition What Are the Signs of Pyoderma in Dogs? Pyoderma can present in a variety of ways. It can be limited to one area, or it may cover your dog's skin. Some areas of the body, such as skin folds, chins, lips, vulvar folds and the skin in between the toes are more likely to be affected. Sometimes pyoderma is extremely itchy, such as in cases of flea allergy dermatitis; other times, it doesn't seem to make a dog itchy at all. Signs of pyoderma to look out for include: Red bumps Pustules Flaking skin Hair loss Skin discoloration Excessive shedding Redness Puppies can get a special kind of pyoderma called puppy pyoderma. Your dog may have puppy pyoderma if you see red bumps in the armpits, groin and/or on the abdomen. These red bumps can scab over and scale. Puppy pyoderma can make your dog slightly itchy, but pups with puppy pyoderma are usually otherwise in good health. What Is the Treatment of Pyoderma in Dogs? Treatment of pyoderma is usually aimed at resolving the bacterial infection and addressing the underlying cause, if applicable. Pyoderma in dogs is directly treated with antimicrobial therapy — either oral antibiotics or topical antibacterial medication, shampoo or spray applied to the affected area. Pyoderma is usually caused by Staphylococcus bacteria (or Staph). Unless your dog has a drug-resistant species, Staph infections are usually easily cleared up. If your vet suspects pyoderma, then they will take a sample from the skin and put it under the microscope to look for bacteria and other organisms, such as mites. They may also order a fungal culture or a black light test to rule out ringworm. The greater challenge with pyoderma in dogs is determining the underlying cause of the infection, which you and your vet will need to work together to figure out. There may be some trial and error involved; your vet may ask to take some blood, skin or urine samples from your dog. Does Nutrition Play a Role in Treating or Preventing Pyoderma? Nutrition and your dog's food plays a large role in treating and preventing pyoderma. If your dog's body detects malnutrition, then it will push all resources to the vital organs; as a result, skin and coat quality will suffer and show signs of pyoderma. Dogs with ingredient sensitivities or food allergies may also develop pyoderma after eating something that causes a reaction. If a dog has gastrointestinal issues, then they can also be predisposed to skin problems including pyoderma. If your vet suspects a food allergy, then in addition to treating the skin infection, they may recommend feeding your dog a food with novel protein or a hydrolyzed dog food to see if the skin problem abates. If your dog doesn't have food allergies but has pyoderma secondary to other health concerns, like a hormonal disorder, then it might be a good idea to feed your dog a food that's specially formulated for dogs with sensitive skin. It's important to make sure your dog receives the best nutrition possible, targeted at the specific cause of pyoderma, which your vet can help you choose. Pyoderma is a pain, but with a little knowledge and care, it can be resolved. If your dog develops pyoderma, especially more than once, understand that you're dealing with an underlying issue that needs resolution. If you notice any of the signs of the infection, call your vet so that you can work together to get your pup back to feeling like their best self. Dr. Sarah Wooten Dr. Sarah Wooten graduated from UC Davis School of Veterinary Medicine in 2002. A member of the American Society of Veterinary Journalists, Dr. Wooten divides her professional time between small animal practice in Greeley, Colorado, public speaking on associate issues, leadership, and client communication, and writing. She enjoys camping with her family, skiing, SCUBA, and participating in triathlons.