Proceedings of the 33rd World Small Animal Veterinary Congress

Dublin, Ireland - 2008

Next WSAVA Congress:

Reprinted in IVIS with the permission of the Congress Organizers
Canine recurrent pyoderma - finding the causes & successful management
Peter J. Ihrke VMD, Diplomate ACVD
School of Veterinary Medicine, University of California, Davis, California, U.S.A.

Introduction and general information
Pyoderma
Pyoderma is second only to flea allergy dermatitis in North America, among the most common diseases seen in small animal practice worldwide.

Recurrent pyoderma
Refers to bacterial infections that respond completely to appropriate systemic and topical antibacterial therapy leaving the dog apparently normal between episodes of infection. Many dogs with pyoderma respond appropriately to initial therapy and pyoderma does not reoccur. An unknown percentage of dogs with pyoderma recrudesce after apparent recovery. Recurrent superficial pyoderma is much more common than recurrent deep pyoderma, many apparent cases of recurrent deep pyoderma are cases where complete cure was never achieved. Idiopathic recurrent pyoderma - appropriate diagnostic tests have failed to reveal an underlying cause.

Underlying causes of recurrent pyoderma
DeBoer has produced the most logical subdivisions. This listing has been adapted from his classification.
1. Persistent underlying skin disease
2. Bacterial hypersensitivity
3. Immunodeficiency
4. Resistant strains of Staphylococcus intermedius (or other Staphylococci - S. schleiferi, S. aureus)
5. Non-staphylococcal pyoderma

Bacterial hypersensitivity
The concept of ‘bacterial hypersensitivity’ remains controversial. It is likely that some of the severe, self-perpetuating inflammation and pruritus seen with pyoderma is due to hypersensitivity to bacterial products. Fadok has speculated that hypersensitivity to super-antigens may play a role in severe inflammation seen with some canine pyoderma. Morales, Schultz & DeBoer substantiated an association between anti-staphylococcal antibodies and pyoderma subgroups.

Immunodeficiency
Despite its attractiveness as a concept, immunodeficiency is a rare cause of recurrent pyoderma.

Resistant strains of Staphylococcus spp.
Multi-resistant strains of S. intermedius are uncommon but over-diagnosed. S. intermedius maintains a propensity not to develop resistance to cephalosporins, beta lactamase-resistant penicillins and fluoroquinolones. There has been little change in antibiotic susceptibility patterns in much of the world over the past two decades until recently.

Newer data on Staphylococcal infections
Staphylococcal infections in domestic animals have become more problematic during the past 5 years. For many years, veterinarians concentrated on managing infections caused by S. intermedius in dogs, cats, horses. S. schleiferi (coagulase positive or negative) was viewed as an uncommon pathogen of dogs and humans. S. aureus was relegated to discussions about humans. Currently, S. aureus is being identified with increasing frequency as a pathogen in domestic animals and as a cause of skin disease.

Methicillin resistance (MR) is being recognized with increased frequency in veterinary medicine and will have substantial impact on how we manage staphylococcal skin disease in the future. Methicillin resistance is reported in S. aureus (hospital or community acquired HA-MRSA & CA-MRSA), S. intermedius (MRSI), & S. schleiferi (MRSS).

Empirical treatment of staphylococcal infection has been the norm in dogs. Only refractory cases have been cultured routinely. This may have lead to lack of identification of MR. In human medicine, the use of fluoroquinolones may initiate enhanced MR in S. aureus. In work done in Philadelphia by Morris, MR in S. intermedius is increasing. The most reliable antibiotics against MRSI in this work were chloramphenicol and potentiated sulfonamides.

MR in staphylococci causing skin disease in domestic animals is still uncommon. However, this may be changing. Large urban centers with multiple medical schools may experience more antimicrobial pressure. This may be reflected in the data of Morris in Philadelphia. A similar phenomenon may be occurring in other urban centers globally.

We may be reaching the day when bacterial culture and sensitivity should be recommended for pyoderma that have not responded to appropriate initial empirical therapy.

Why are ‘resistant’ strains overdiagnosed?
1. Skin perfusion - less than ideal for establishing adequate dosages of antibiotics, in comparison to other body tissues
2. Dosages of antibiotics - largely empirical until recent years
3. Deep pyoderma - sequestered foci of infection, foreign body granulomatous response, antibiotic inactivation by inflammatory products compromise effective antibiotic dosing
4. Antibiotics where dosing can safely be increased in deep pyoderma - cephalosporins, fluoroquinolones, oxacillin, clavulanic acid-potentiated amoxicillin.

Non-staphylococcal pyoderma
This is uncommon to rare as a primary event. Culture of organisms other than S. intermedius commonly indicates secondary invaders or environmental contamination of the culture. Occasionally, infections are caused by Pseudomonas, Proteus, Escherichia coli, Enterobacter. Post-grooming furunculosis is associated with diluted, contaminated shampoos (self-serve dog washing facilities), follicular trauma? P. aeruginosa may be most common.

Persistant underlying skin disease
This is the most commonly documented cause of canine recurrent pyoderma. Diseases include non-parasitic allergic diseases (topic dermatitis, food allergy), parasitic allergic diseases (flea allergy, scabies, cheyletiellosis), demodicosis, endocrine diseases (hypothyroidism, hyperglucocorticoidism (primary or iatrogenic), diseases of cornification - (seborrhea), other infectious skin diseases, genodermatoses (especially hereditary dermatoses involving defects in hair follicles), occult neoplasia (solar-induced squamous cell carcinoma & other tumors), and immunodeficiency - (congenital, acquired).

Pruritus and recurrent pyoderma
The presence or absence of pruritus is a key feature in differentiating persistent underlying skin diseases. Common pruritic, persistent underlying skin diseases are atopic dermatitis, food allergy, flea allergy dermatitis, cheyletiellosis, sarcotic acariasis, and primary cornification defects.

Approach to recurrent pyoderma
1. Aggressively pursue the diagnosis of possible persistent underlying skin diseases
2. Manage the underlying skin diseases - long-term, consistent (in our clinic, canine atopic dermatitis is the most commonly diagnosed underlying skin disease.)
3. Manage the episode of recurrent pyoderma and prevent episodes or diminish frequency of recurrence.

Goals of long-term management
1. Establish realistic owner expectations
2. Successfully treat pyoderma, maintaining therapy for long enough to ensure cure
   • superficial pyoderma - minimum of 3 weeks, at least 1 week beyond clinical cure
   • deep pyoderma - minimum of 6 weeks, at least 2 weeks beyond apparent cure.

Prevent or diminish frequency of recurrence - an overview
Topical antibacterial shampoo therapy should be used adjunctively in all recurrent pyoderma, continue indefinitely in idiopathic cases.
Immunomodulatory therapy using adjunctive, killed bacterial preparations or non-bacterial immunostimulants is attempted in dogs with confirmed or suspected defects of the immune system or in dogs with idiopathic recurrent pyoderma. Extended regimens of antibiotic therapy are a last resort.

Topical antibacterial shampoo therapy
• Rationale - decrease surface bacteria, limit re-colonization, diminish frequency of recurrence?
• Active agents - chlorhexidine, benzoyl peroxide, benzoyl peroxide and sulfur, triclosan, ethyl lactate
• Frequency - 2x / week, 15 minutes contact time
• Improvement in patient attitude and owner encouragement

Immunomodulatory therapy
• Rationale - stimulate immune surveillance, alter response to bacterial allergen, diminish recurrence, (controversial)
• Staphage Lysate\(^\text{\textsuperscript{8}}\) - SPL - (Delmont Laboratories, Swarthmore, Pennsylvania, USA) - S. aureus, serotypes I & III, protein A

Extended antibiotic regimens
• Diminish recurrence by preventing re-infection
• Dosing - 3 consecutive days/week (full daily dose)
• Antibiotic choices - cephalaxin, cefpodoxime, enrofloxacin, marbofloxacin, other fluoroquinolones, clavulanate-potentiated amoxicillin, oxacillin
• Extended antibiotic regimens - consider as a last resort

Extended antibiotic regimens - antibiotic choices
Underlined antibiotics are viewed as good choices for extended regimens
1. Narrow spectrum antibiotics:
   a) Isoxazolyl penicillins - oxacillin, cloxacillin, dicloxacillin, nafcillin
   b) Macrolide group - erythromycin, tylosin
   c) Lincomamide group - lincomycin, clindamycin
2. Broad spectrum antibiotics

Proceedings of the 33rd World Small Animal Veterinary Congress 2008 - Dublin, Ireland
a) Trimethoprim & ormetoprim-potentiated sulfonamides
b) Aminopenicillin & B-lactamase inhibitor - clavulanic acid-potentiated amoxicillin

3. First generation (group 2) oral cephalosporins - (cephalexin, cefadroxil, cephradine)
4. Third generation (group 5) oral cephalosporins - (cefepoxime)
5. Fluoroquinolones - enrofloxacin, marbofloxacin

Compliance
Client education increases compliance - extended regimens with once a day dosing may lead to greater compliance.

Treatment failure in recurrent pyoderma
- Underlying causes - not identified or cannot be managed
- Inadequate duration of curative antibiotic therapy before switching to extended regimens
- Inadequate owner compliance
- Antibiotic resistance

References