

MEDICAL MANAGEMENT AND PUBLIC HEALTH CONSIDERATIONS FOR METHICILLIN-RESISTANT STAPHYLOCOCCAL SKIN INFECTIONS

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Background: The Problem

- Staphylococcal skin infections can be stubbornly recurrent in some dogs. Unfortunately, many years of treating recurrent pyoderma with repeated courses of antibiotics has led to the recent and increasing appearance of multi-drug-resistant staphylococci.
- In some areas of the United States, more than 50% of skin cultures performed at dermatology specialty practices are methicillin-resistant staphylococci (MRS). These strains include the methicillin-resistant *Staphylococcus pseudintermedius* species (canine infections, referred to as “MRSP”) or methicillin-resistant *Staphylococcus aureus* species (human infections, referred to as “MRSA” and, fortunately, much less common).
 - Veterinarians should endeavor to use correct terminology when discussing these infections with clients; incorrectly referring to a canine MRSP infection as “MRSA” may be alarming to the client.
- If laboratory testing indicates the presence of MRS, the isolate will be *clinically resistant to all penicillins and cephalosporins*. In addition, some MRS will also be resistant to other antibiotic classes, such as fluoroquinolones or clindamycin.

What’s the Practical Significance?

- If you treat a dog with staphylococcal pyoderma with a beta-lactam antibiotic (cephalosporin or amoxi/clav) and there is limited or no response, *culture and susceptibility testing is now mandatory*. If you do identify an MRS organism, you should obtain a staph speciation test to determine if the organism is a human or veterinary strain.
- Fortunately, many veterinary strains of MRS are still susceptible to routine antibiotics such as trimethoprim-sulfamethoxazole, clindamycin, or a fluoroquinolone such as enrofloxacin or marbofloxacin. However, it is important to note that it is impossible to predict with any certainty which antibiotics are indicated without performing a susceptibility test. Empirical “antibiotic hopping” is hazardous, as with each cycle of treatment, multiple drug resistance becomes more likely.
- If you have a patient with MRSP (i.e., the canine strain) in your hospital, you need not have the dog under full isolation conditions, but you should isolate the patient to the extent you can and eliminate traffic from this patient to other dogs in the clinic, especially waiting room, surgery, and critical care areas. Especially important to practice good hygiene measures.

- If the organism is a methicillin-resistant, human-origin *S. aureus* (MRSA), the owner should be notified of this fact so they can discuss the situation with their own health care provider, and gloves should be worn when examining the patient. If hospitalized, consider full isolation. This patient is a potential human health hazard and should be considered so until all lesions have completely resolved. The concern here is that without proper precautions, the MRSA could colonize the owner, you, your staff, or others.
 - It is important to understand that merely becoming colonized with MRSA is not inherently dangerous.
 - MRSP or MRSA strains are not really more ‘virulent’ than other staph strains; they are just more difficult to treat.
- **KEY TAKEAWAYS:** *if pyoderma is poorly responsive, culture. You want to know not only the susceptibility, but also the species, as this determines both treatment and potential hazards.*

Exploring Solutions: Patient Treatment

- The emergence of MRS in the veterinary world suggests that we must redouble our efforts to use antibiotics wisely and judiciously and reconsider all efforts to use alternative, nonantibiotic treatments, if possible, especially in the face of recurrent infections.
- Increasingly, dermatologists understand that it is very possible to *eliminate* active superficial staphylococcal infections (even MRS) from the skin by using topical products as the primary treatment without antibiotics. For primary treatment of an existing superficial pyoderma, *daily* treatment is necessary until the infection is cleared, which typically takes 4 weeks or more.
- Antimicrobial topicals are the first line of defense for *prevention of relapse* in patients with recurrent pyoderma where the cause cannot be found or treated. For preventive maintenance, topicals are typically used 2-3 times weekly.
- Spray-on, wipe-on, leave-on, or mousse products are often preferable to shampoos for frequent or long-term use, as they both provide residual effect and improve client compliance. If a shampoo is used, 10 minutes of contact time is important.
- Whether used daily as primary treatment or every few days as preventive maintenance, the following ingredients are useful in topical products:
 - Chlorhexidine— 2-4% spray, mousse, or gel, for treatment or prevention.
 - Nisin wipes
 - Daily wipe-down (of the pet) with alcohol-gel hand sanitizer. Though unstudied, this treatment is reportedly very effective.
 - Use of oxidizing disinfectants such as very dilute sodium hypochlorite solutions (“bleach baths”) has become very popular in human atopic dermatitis recently to limit bacterial colonization of skin. Veterinary products with similar actions are gaining popularity with some dermatologists (e.g., Vetericyn), although critical studies are lacking.

- Peroxide is an excellent oxidizing disinfectant. The most recently popular products contain “accelerated hydrogen peroxide,” which is simply hydrogen peroxide with added stabilizers and surfactants to enhance its efficacy. We await critical “on-patient” studies of efficacy for these products.
- Mupirocin 2% ointment—applied daily to areas of local infection as a primary treatment; not for prevention. Somewhat controversial because this drug is used for serious human infections. Best current advice is to reserve this for infections not helped by other topical preparations.
- Immunomodulatory therapy can be remarkably effective for some patients with idiopathic recurrent superficial pyoderma. In particular, staphylococcal bacterin products such as Staphage Lysate (SPL, Delmont Labs) are very useful.
- *KEY TAKEAWAY: When you see superficial pyoderma, think topical first!*

Exploring Solutions: Sanitation and Public Health

- MRS is spreading very fast in both the human and veterinary world. It is time to start taking every precaution to prevent transmission of MRSP strains in your clinic, and prevent colonization of humans by MRSA.
- Key measures for sanitation have been developed by expert panels, and include:
 - Handwashing and disinfection; wearing gloves when appropriate
 - Protective clothing, with frequent laundering
 - Cleaning and disinfection of premises
 - Education of staff and pet owners
- *KEY TAKEAWAYS: Explore these very valuable online resources!*
 - Free journal issue containing excellent review articles. In particular see p94, Weese JS, Methicillin-resistant staphylococcal infections in pets [overall review]; and p90, Mateus A, Stewardship of antimicrobials and hygiene protocols in practice; are we there yet? [review of hygiene procedures currently recommended].
http://www.fecava.org/sites/default/files/ejcap_21_1.pdf
 - Most recent international expert panel recommendations for diagnosis and treatment of pyoderma, published April 2014. Great reference.
<http://onlinelibrary.wiley.com/doi/10.1111/vde.12118/abstract> (click on “get PDF” on the right to see the whole article)
 - FECAVA poster on clinic hygiene procedures. Great in your treatment room. Download and take to a copy store to have printed large-format.
<http://www.fecava.org/sites/default/files/files/FECAVA%20Key%20recomm%20odation%20for%20Hygiene%20and%20Infection%20Control.pdf>
 - A superbly interesting and entertaining blog site about zoonoses; provides great information. Recommended lunchtime reading! Click on “Resources-Pets” to access downloadable client handouts on MRS, etc.
www.wormsandgermsblog.com