



**GULF COAST
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SPECIALISTS**

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**SPECIAL POINTS
OF INTEREST:**

- It is important to determine the Staph. species involved with the infection as MRSA is not common in pets while MRSP is more common in pets.
- MRSP should be suspected if a pyoderma does not resolve with 2 courses of antibiotics OR if new lesions develop while on therapy.
- Because MRSP does not adhere well to human skin, transmission risk to healthy people is low. Young, elderly and immune compromised people may be at increased risk, and should practice good hygiene with possible exposure.

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Multi-Drug Resistant Pyoderma

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Figure 1: Photograph of methicillin resistant Staph. bacteria

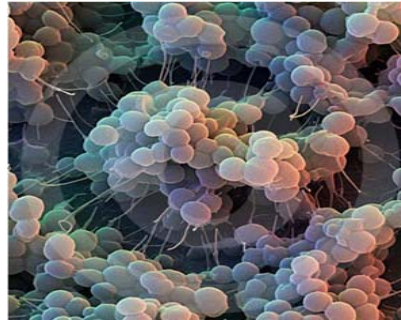


Figure 2: Canine patient at risk for resistant skin infections.



Dear Colleague,

Methicillin resistance in canine skin

infections is becoming much more common in the Houston area. It is critical to make the diagnosis early and institute aggressive topical therapy to get this disease under control, as we don't always have oral antibiotic options! It is also important to determine the Staphylococcal species involved and use the correct terminology with regard to these infections. Most dogs with resistant infections do not have MRSA (methicillin resistant Staph. aureus). Rather, they have MRSP (methicillin resistant Staph pseudintermedius) or MRSS (methicillin resistant Staph. schleiferi). These species are less likely to be contagious to humans. If a dog truly has a methicillin resistant Staph. aureus, the infection most likely was contracted from the humans with whom they interact.

What is methicillin resistance?

Methicillin resistance can occur in any of the Staph spp. While the incidence of MRSA in dogs has remained low, the number of MRSP cases has skyrocketed. Methicillin resistance is mediated by a genetic element containing a gene called *mecA* which often carries other antibiotic resistance genes. *mecA* inserts itself into the bacterial genome and all subsequent offspring of this bacterium are resistant. It will remain within the bacteria as long as antibiotic pressure is maintained. Because it actually slows the growth of the bacteria, the genetic element can be excised and removed, leading to bacteria that are sensitive to antibiotics again. *mecA* encodes for a mutant penicillin binding protein on the surface of the cocci. If the penicillin and cephalosporin antibiotics cannot bind, then they cannot kill the bacteria. By using topical antiseptic therapy instead of systemic or topical antibiotics we may actually be able to get the bacteria to revert to being sensitive to cephalosporins again.

How do we diagnose methicillin resistance?

Our level of suspicion is raised when a dog's skin infection has failed to respond to 2 different classes of antibiotics or if new lesions develop while on antibiotics. A culture and sensitivity is required, first to establish the species of Staph. involved, and second to choose the correct antibiotic. It is not helpful to try to guess which antibiotic to use because some of these bacteria are resistant to all the oral antibiotics we use in skin infections.

How to we treat methicillin resistance?

Treatment will be determined by the pathogen we are working and the depth of the infection. Many pyodermas we see are superficial in nature, resulting from folliculitis. If the bacteria is reported as sensitive to tetracyclines, doxycycline or minocycline can be used. If sensitive to erythromycin and clindamycin, clindamycin can be used. Potentiated sulfa drugs, particularly Primor, can be very helpful if reported as sensitive. If there are no usable oral antibiotics or if the only antibiotics to which the bacteria are sensitive are chloramphenicol or amikacin, aggressive topical therapy is strongly recommended. We have taken a series of 10 dogs with MRSP and treated them with daily or every other day baths with 3-4% chlorhexidine shampoos. Each of these dogs had resolved their infections by 30 days. This protocol is labor-intensive but it works, and provides a better option for the dog than either chloramphenicol, which has to be given TID and is very nauseating; or amikacin which must be given by injection and has the potential to damage the kidney. For owners who can't do daily bathing, other options may be helpful as well. DOUXO chlorhexidine shampoo used twice weekly with daily

use of the DOUXO chlorhexidine spray, resolved two patients with MRSP. More recently, we have advocated bathing 2-3x per week with either 3-4% chlorhexidine or a benzoyl peroxide shampoo **and** daily spraying between baths with Vetericyn VF, an oxychlorine-containing spray. Dogs with deep pyoderma will likely require systemic antibiotics. If their bacteria are sensitive to chloramphenicol or amikacin, those antibiotics will have to be used. Chloramphenicol is given at 50 mg/kg TID for at least 30 days. Owners should be cautioned to handle the capsules carefully due to the risk to human health. It can be helpful in dogs with weight loss and inappetance, to give probiotics a few hours after each dose of chloramphenicol. Amikacin at a dose of 15 mg/kg once daily can also be used. This drug is well-tolerated by many pets, but does have the potential to cause renal problems. A urine sediment is monitored 1-2X weekly to evaluate for casts. BUN and creatinine are measured before and after 30 days of therapy, however the urine sediment is the key to picking up early toxicosis. It may be necessary to have the drug compounded due to availability problems; we are currently using a compounded formulation at 300 mg/ml and it is surprisingly well-tolerated by most dogs.

How do we prevent the development of methicillin resistant infections?

Current thought suggests that we don't induce resistance in most cases; rather, we select for it. The exception, is when fluoroquinolones are used, as they are believed to have the ability to induce mutations. The best way to prevent the development of methicillin resistant infections in our patient is by using topical therapy whenever we can, and being aggressive with systemic therapy when we must. Most dermatologists advocate cephalosporins as the first choice antibiotic for pyoderma. In my opinion, the use of cefovecin is ideal because it keeps the tissue levels of cephalosporin consistently above the MIC for 2 weeks. Most cases of superficial pyoderma, can be resolved with one injection, thus avoiding compliance issues and missed doses. It is very important to avoid the use of fluoroquinolones for Staphylococcal pyodermas. Fluoroquinolones are best used for gram negative skin infections. Determining the underlying cause of the pyoderma and addressing it specifically and aggressively will give us our best chance at preventing frequent recurrences of infection and the likelihood of selecting for resistant bacteria.

What is the risk of infection to humans?

The good news about MRSP is that the risk to humans is very low. This bacterium is well-adapted to dog skin and cannot adhere well to human skin. Very young people (babies), the elderly, and immune compromised could be at increased risk. If the pet truly has a MRSA infection, the risk still remains low to healthy individuals. Prudence and common sense should be used however, particularly if there are humans in the household with the risk factors listed above. The most important thing we can do to avoid the spread of resistant bacteria frequent and thorough hand washing.

If you would like to consult or refer a patient with suspected methicillin resistant infection, please don't hesitate to call our Dermatology & Allergy team at (713) 693-1188.

An excellent source of information can be found at Dr. Scott Weese's Worms and Germs blog (www.wormsandgermsblog.com/promo/services) He has files which you can download to share with your clients; we highly recommend a visit to this informative and entertaining site!

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