

# SUCCESSFUL MANAGEMENT OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA)-ASSOCIATED PYODERMA IN A DOG

Javed Jameel A.<sup>1</sup> and Syam K.Venugopal<sup>2</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Professor and Head University Veterinary Hospital (KVASU),  
Kokkalai, Thrissur, Kerala.

DOI 10.29005/IJCP.2023.15.2.109-111}

[Received: 31.05.2023; Accepted: 09.11.2023]

**How to cite this article:** Jameel, J. and Venugopal, S.K. (2023). Successful Management of Methicillin-resistant *Staphylococcus aureus* (MRSA)-Associated Pyoderma in A Dog, *Ind. J. Canine Pract.*, 15(2): 109-111.

Methicillin-resistant *Staphylococcus aureus* (MRSA) has emerged as a significant pathogen causing pyoderma in dogs, posing a challenge in veterinary medicine. The dog, a 3-year-old, male beagle, was presented to University Veterinary Hospital, Kokkalai, Thrissur, with the history of recurrent generalized coetaneous lesions and alopecia for the past seven months. The dog was treated with linezolid orally, along with concurrent management of fungal infections. Significant improvement was observed within 10 days, and a complete resolution was achieved after a 28-day treatment course.

**Keywords:** Dog, Linezolid, MRSA, Skin infection..

In veterinary medicine, MRSA (Methicillin-Resistant *Staphylococcus aureus*) has emerged as a significant pathogen causing pyoderma within the past decade (Morris *et al.*, 2006). During this period the prevalence of *Staphylococcus* species of greatest clinical importance to dogs and cats, namely *S. pseudintermedius*, *S. aureus* and *S. schleiferi* escalated rapidly (Kawakami *et al.*, 2010). Antibiotic resistance is a growing problem among *S. aureus* isolates obtained from healthy or infected companion animals as they can act as reservoirs of antimicrobial-resistant bacteria that may be transferred to humans when they interact with the animals (Vincze *et al.*, 2014). Dogs can acquire MRSA through direct contact with infected individuals, contaminated objects, or from healthcare settings such as veterinary hospitals (Davis *et al.*, 2012).

MRSA skin infections in dogs are typically present as pyoderma, which is characterized by redness, swelling, pustules, crusting, and discomfort in the ventral abdomen, inguinal area, auxiliary region, perennial area, and interdigital spaces. MRSA infections of companion animals are of particular concern due to limited treatment options and their zoonotic potential (Davis *et*

*al.*, 2014). The selection of antibiotics for MRSA infections should be based on the results of the bacterial culture and sensitivity testing. This article reports a case of successful management of MRSA using linezolid, a potent antibiotic effective against MRSA.

## Case history and Observations

A three-year-old, male, Beagle dog was presented to University Veterinary Hospital, Kokkalai, Thrissur with the history of recurrent generalized coetaneous lesions and hair loss for the past seven months. Despite previous antibiotic treatments with amoxicillin, cephalosporins, and clindamycin, the dog's condition had not improved significantly. The clinical and physical examination revealed multifocal alopecia along with erythema and pruritic skin lesions on the ventral part of neck (Fig.1), face (Fig.2), abdomen, inguinal region, and axilla. Other clinical features were reduced appetite, mild rise in temperature (102.9 °F), congested ocular mucous membrane, and a normal heart rate, pulse, and respiration.

Superficial skin scraping detected endothrix fungal spores on hair shafts. Stained impression smear from coetaneous lesions revealed the presence of bacteria and

pus cells. Hematology on a 5-part hematology analyzer (Mythic 5 Vet pro) revealed leukocytosis with mild neutrophilia and moderate thrombocytosis. Faecal sample and peripheral blood smear were negative for parasites of pathogenic importance or their

life stages. Bacteriological culture of skin yielded pure growth of *Staphylococcus aureus*. Thus, based on clinical signs, laboratory, and microbiological investigations, a diagnosis of coetaneous pyoderma associated with MRSA was made.



**Fig.1: Skin lesions on ventral neck showing erythema and alopecia on day-1.**



**Fig.2: Erythema and alopecia at facial region on day-1.**

### **Treatment**

The dog was treated initially with linezolid @ 10 mg/ kg BID PO for 14 days. The concurrent fungal and yeast infection was managed with Tab. Carebest (ketoconazole) at the dose rate of 10 mg/kg OD PO for 14 days. Supportive therapy included skin tonics (omega 3+6 suspension) 10 ml OD *per os* and Conaseb shampoo (ketoconazole, 2 % w/v; chlorhexidine, 2 % w/v; cetrimide, 0.1 % w/v) for topical application every five days.

### **Results and Discussion**

After 10 days of linezolid treatment, erythema and purities reduced substantially (Fig.3) and hence the owner was advised to continue the same medications. Significant improvement was observed within 10 days, and a complete resolution was achieved after a 28-day treatment course.

A review of the case on day-28 (Fig.4) found marked improvement in skin conditions, with absence of erythema, absence of pruritus and a significant growth of hairs at the ventral

neck and facial regions. No adverse effects were noted during the treatment period. There was no history of relapse even after two months. *Staphylococcus aureus* resistant to cefoxitin is considered as MRSA. The organism was susceptible to vancomycin, linezolid and teicoplanin and resistant to cephalixin, cefpodoxime, ampicillin, cloxacillin, co-trimoxazole, and erythromycin. The antimicrobial resistance pattern of the MRSA strain justifies the failure of initial therapy carried out with an inappropriate antibiotic. A combination of systemic therapy with topical antibacterial treatment is recommended whenever possible to reduce environmental contamination and the risk of transmission to other hosts. By tailoring the treatment to the identified pathogen with proper treatment duration, the chances of successful resolution are significantly improved, reducing the risk of prolonged infection and the development of further antibiotic resistance.



**3: Partial resolution of erythema and alopecia on day-10.**



**Fig.4: Complete resolution of skin lesions on day-28.**

### Conclusions

In the presented case report, linezolid demonstrated its efficacy in managing MRSA-associated pyoderma in a dog. Prompt diagnosis, appropriate antibiotic therapy based on culture and sensitivity testing and diligent infection control measures are essential for successful management.

### References

Davis, M.F., Iverson, S.A and Baron, P. (2012). The role of the household in transmission of methicillin-resistant *Staphylococcus aureus* and other staphylococci. *Lancet Infect. Dis.*, **12**: 703–716.

Davis, J.A., Jackson, C.R., Fedorka-Cray, P.J., Barret, J.B., Brousse, J.H., Gustafson, J. and Kucher, M. (2014). Carriage of methicillin-resistant Staphylococci by healthy companion animals in the US. *Lett. Appl. Microbiol.*, **59**: 1-8.

Kawakami, T., Shibata, S. and Murayama, N. (2010). Antimicrobial susceptibility and methicillin resistance in *Staphylococcus pseudintermedius* and *Staphylococcus schleiferi* subsp. *coagulans* isolated from dogs with pyoderma in Japan. *J. Vet. Med. Sci.*, **72**: 1615–1619.

Morris, D.O., Rook, K.A. and Shofer, F.S. (2006). Screening of *Staphylococcus aureus*, *S. intermedius*, and *S. schleiferi* isolates obtained from small companion animals for antimicrobial resistance: A retrospective review of 749 isolates (2003-2004). *Vet. Dermatol.*, **17**: 332–337.

Vincze, S., Stamm, I., Kopp, P.A., Hermes, J., Adlhoch, C., Semmler, T., Wieler, L.H., Lubke-Becker, A. and Walther, B. (2014). Alarming proportions of methicillin-resistant *Staphylococcus aureus* (MRSA) in wound samples from companion animals, Germany 2010-2012. *PLoS One.*, **9**: 1-6.