



Studies on *Malassezia* Infection in Otitis External of Dogs

Kamaljyoti¹, Ashwani Kumar Sharma^{1*}, Gursimran Filia² and Shukriti Sharma¹

¹Department of Veterinary Medicine, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, INDIA

²Animal Disease Research Centre, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, INDIA

*Corresponding author: AK Sharma; Email: ashwanigadvasu@gmail.com

Received: 21 April, 2016

Revised: 08 Dec., 2016

Accepted: 14 September, 2016

ABSTRACT

The present study was aimed to investigate the prevalence of *Malassezia* in common ear affections of dogs. A total of 115 dogs with ear affections were evaluated between March 2014 and May 2015. Otoscopic examination and microbiological isolation was done for diagnosis. Case prevalence of *Malassezia* infection in otitis externa was 19.1%. Relatively higher proportion of *Malassezia* was found in males 68.2% (n=15) as compared to females 31.8% (n=7). The yeast was more prevalent in adult dogs (1-3 years old). Labrador, Beagle and Cocker Spanial were breeds more commonly predisposed to otitis externa. The prevalence was relatively higher in rainy season (July-August) 63.6% (n=14) followed by summer (April-June) 18.2% (n=4), winter (December-March) 13.6% (n=3) and autumn (September-November) 4.6% (n=1). Head shaking, frequent itching and malodour were the common presenting signs. It can be concluded that *Malassezia* infection is quite common in otitis externa, and can be diagnosed using otoscopy and microbiological isolation.

Keywords: Cytology, *Malassezia*, otoscopy, treatment

Otitis externa is defined as inflammation of the skin and adnexal structures of the ear canal. This condition is one of the most common and frustrating problems encountered in small animal practice. The diagnosis of otitis media in dogs can be quite difficult due to long, bent, funnel-shaped conformation of the dog's ear canal making visibility of tympanic membrane (TM) difficult. However, most canine patients with otitis media also have chronic otitis externa with pathologic changes in the ear canal.

Among yeast, *Malassezia* is one of the most common causes to external otitis in dog (Crespo *et al.*, 2002). *Malassezia* is considered as perpetuating factor of otitis externa that exacerbate the inflammatory process and can maintain the disease after the primary factor has been eliminated. They can induce permanent pathologic changes to the ear canal and are the main reasons of treatment failure in otitis externa. Predisposing factors for development of *Malassezia* infection include excessive production of sebum and/or decreased quality of sebum (seborrhoea), accumulation of moisture, damage of epidermis, concurrent dermatoses, atopy, and bacterial skin infections

(Patterson *et al.*, 2002). *Malassezia* infections could be secondary to other primary diseases like endocrinopathies (hypothyroidism, hyperadrenocorticism, and diabetes mellitus), keratinisation disorders, immunologic dysfunctions and skin neoplasias (Mauldin, 2002).

An important clinical symptom of *Malassezia* infection is intensive pruritus and strong odour of decomposing fat. Clinical signs in early stages of infection include alopecia, localized or generalized erythema, erythematous papules and macules, crusts and scaly skin on the facial area, the trunk, perianal and interdigital areas and in skin folds. In chronic cases hyperpigmentation and other secondary lesions due to scratching and licking have been reported (Dorogi, 2002).

Malasseziosis has been reported in dogs of various breeds at different ages and in both sexes (Bond *et al.*, 1996). Though numerous studies have been conducted on *Malassezia* infections in dogs, yet a scarce literature is available regarding epidemiological features associated with *Malassezia* infections in otitis externa cases.

MATERIALS AND METHODS

The presence of *Malassezia* was explored in the ear canal of 115 otitis dogs without any reference for age, sex and breed. A total of 15 healthy dogs were taken as control. All dogs were evaluated before sampling and were categorized as otitis according to their history, clinical signs and otoscopic examination. Otoscopic examination was carried out for each case to confirm the presence of otitis externa, changes in external ear canal epithelium and presence of abnormal secretions in ears canal. The sterile swab samples from the anterior ear canal were examined by direct examination of the slide smear. Slides were stained by methylene blue for cytological examination under microscope. The samples were also inoculated on Sabouraud dextrose agar for isolation and identification of *Malassezia*. The overall study was aimed to study the prevalence of *Malassezia* in the ear of dog by otoscopy, cytology and microbiological isolation.

RESULTS AND DISCUSSION

Malassezia was observed in 22 dogs out of a total of 115 dogs examined on the basis of clinical signs, cytology, isolation and identification, and the case prevalence of *Malassezia* infection in otitis externa was observed to be 19.1%. 17 of the 22 dogs (77.3 %) had pendulous ears and in contrast the prevalence was 22.7% in dogs with erect ears. Numerous studies have been conducted worldwide on *Malassezia* infections in dogs regarding etiology, diagnosis and management (Cafarchia *et al.*, 2012; Koike *et al.*, 2013; Yurayart *et al.*, 2013; Nardoni *et al.*, 2014; Oldenhoff *et al.*, 2014; Watanabe *et al.*, 2014; Czyzewska *et al.*, 2016). Otitis externa represents one of the most common reasons for which dogs are presented to veterinary attention. More importantly, presence of the yeast in the external ear canal of dogs is more frequent than other parts of the body.

Occurrence of *Malassezia* was significantly more prevalent in Labrador (45.5%) and Beagle (18.1%) breeds. The high isolation rates of these organisms could be explained by factors as humidity, breed, age, pendulous ears, season, intercurrent diseases (Kumar *et al.*, 2003). Similar to our findings, other studies have reported more involvement of breeds with pendular ears (Kiss *et al.*, 1997), which is probably due to the fact that these dogs are prone to poor ventilation and increased accumulation

of moisture in the ear canal. German Shepherd dogs have prick ears but are external otitis prone due to the apocrine glands. The prevalence of *Malassezia* in males (68.2 %) was significantly higher as compared to females (31.8%). Similarly some researchers reported higher predisposition of male dogs to otitis associated with *Malassezia* infection as compared to female dogs (Chaudhary and Mirakhr, 2002). *Malassezia* infection was more prevalent in dogs of 1-3 years age (n=16) followed by below <1 years (n=4) and >3 years (n=2). Season wise, *Malassezia* infection was highest during the rainy season (July-August) 63.6% followed by summer months (April-June) 18.2%, winter (December-March) 13.6% and autumn (September-November) 4.6%. Otitis prevalence was the highest during the rainy season followed by summer, winter and autumn, though in some studies, prevalence was relatively higher in the autumn (Čonková *et al.*, 2011).

Most Common presenting lesions (Fig. 1) included head shaking, frequent itching, and malodour in both ears (Table 1). In some cases, erythematous-ceruminous (n=19) and blackish waxy (n=5) ear discharge was present with increased amount of cerumen since 20-25 days. The other important features of affected animals included unilateral drooping pinna (n=5) and head tilt (n=3). In some cases (n=6) there was history of water lodgment in the ears while having bath. Alopecia with pruritis was common finding in all the cases as described previously (Charach, 1997). Cerumen was severely increased in all cases of otitis externa, and *Malassezia* was more likely to be cultured from ears with increased cerumen.



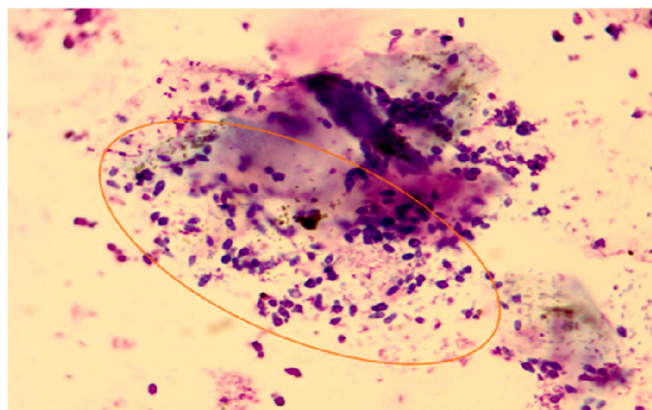
Fig. 1: Erythematous lesions and lichenification on pinna due to *Malassezia*

Table 1: Clinical signs of *Malassezia* associated with otitis externa in dogs

Sl. No.	Clinical Signs	Number of Dogs
1	Pruritis/itching	22
2	Head Shaking	22
3	Head Tilting	3
4	Rub against wall	9
5	Blackish waxy discharge	5
6	Erythematous ceruminous	19
7	Erythematous lesion	9
8	Malodorous	22
9	Water lodgement history	6
10	Unilateral ear drooping	5

Otoscope examination was considered adequate in otitic ears of 22 *Malassezia* cases. In 19 cases, prior to otoscopy, otic flushing was done to remove wax and debris for visualisation of ear canal. Excess hairs, ear wax and debris adhering to the external tympanic membrane were removed (Usui *et al.*, 2011). Otoscopic examination revealed bilateral erythematous, hyperaemia, and ceruminous in horizontal and vertical ear canal but tympanic membrane was visible in 40.9% (9/22) cases. No growth and foreign body was seen in horizontal or vertical ear canal in all the cases (n=22).

In present study, cytology revealed presence of significant increase in yeast count (Fig. 2) $48.75 \pm 5.79/40x$; Normal range of *Malassezia* is $<5/40x$, 5-10/40x is intermediate, while $\geq 10/40x$ at high power field is considered abnormal (Bahador *et al.*, 2014).

**Fig. 2:** Dense population of *Malassezia* in a cytology smear of ear cerumen.

Cytological examination revealed desquamated keratinocytes containing pigments granules, which appeared ovoid or round structures, yellow to brown in colour. Most of the affected dogs had chronic otitis and many of them showed hyperkeratinization and lichenification of the ear epithelium.

Treatment of the affected dogs was done by cleansing the ear of debris and lipid substrates, administration of antifungal agent like clotrimazole topically along with ketoconazole @ 10mg/kg per oral once a day for 10-15 days. Ketoconazole has been reported to be quite effective in the previous studies (Jacobson, 2002; Peano *et al.*, 2008).

REFERENCES

- Bahador, B., Mehdi T., Seyedeh, Z.P. and Maziar, A. 2014. Occurrence of *Malassezia pachydermatis* in the external ear canals of dogs with and without otitis externa. *WALIA J.*, **30**: 24-26.
- Bond, R., Fergusson, E.A., Curtis, C.F. and Craig, J.M. 1996. Factors associated with elevated cutaneous *Malassezia pachydermatitis* populations in dogs with pruritic skin disease. *J. Small. Anim. Pract.*, **37**: 103-107.
- Cafarchia, C., Figueredo, L.A., Iatta, R., Montagna, M.T. and Otranto, D. 2012. In vitro antifungal susceptibility of *Malassezia pachydermatis* from dogs with and without skin lesions. *Vet. Microbiol.*, **155**: 395-398.
- Charach, M. 1997. *Malassezia* dermatitis. *Can. Vet. J.*, **38**: 311.
- Chaudhary, M. and Mirakhur, K.K. 2002. Studies on occurrence of canine otitis. *Indian Vet. J.*, **79**: 748-749.
- Čonková, E., Sesztáková, E., Páleník, L., Smrčo, P. and Bílek, J. 2011. Prevalence of *Malassezia pachydermatis* in dogs with suspected *Malassezia* dermatitis or otitis in Slovakia. *Acta Veterinaria Brno.*, **80**: 249-254.
- Crespo, M.J., Abarca, M.L. and Cabanes, F.J. 2002. Occurrence of *Malassezia* spp. in the external ear canals of dogs and cats with and without otitis externa. *Med. Mycol.*, **40**: 115-121.
- Czyżewska, U., Siemieniuk, M., Pyrkowska, A., Nowakiewicz, A., Bieganska, M., Dabrowska, I., Bartoszewicz, M., Dobrzyn, P. and Tylicki, A. 2016. Comparison of lipid profiles of *Malassezia pachydermatis* strains isolated from dogs with otitis externa and without clinical symptoms of disease. *Mycoses.*, **59**(1): 20-27.
- Dorogi, J. 2002. Pathological and clinical aspects of the diseases caused by *Malassezia* species. *Acta Microbiol. Immunol. Hun.*, **49**: 363-370.

- Jacobson, L.S. 2002. Diagnosis and medical treatment of otitis externa in the dog and cat: review article. *J. South African Vet. Assoc.*, **73**: 162.
- Kiss, G., Radvanyi, S. and Szigeti, G. 1997. New combination for the therapy of canine otitis externa. I. Microbiology of otitis externa. *J. Small. Anim. Pract.*, **38**: 51-56.
- Koike, A., Kano, R., Nagata, M., Chen, C., Hwang, C.Y., Hasegawa, A. and Kamata, H. 2013. Genotyping of *Malassezia pachydermatis* isolates from canine healthy skin and lesional skin of atopic dermatitis in Japan, Korea and Taiwan. *J. Vet. Med. Sci.*, **75**(7): 955-958.
- Kumar, V., Pal, D., and Aggarwal, A. 2003. Antibigram of microorganisms isolated from ears of dogs having Otitis externa. *Indian Vet. J.*, **80**: 1316-1317.
- Mauldin, E.A. 2002. *Malassezia* dermatitis in the dog: A retrospective histopathological and immunopathological study of 86 cases (1990-95). *Vet. Dermatol.*, **7**: 191-202.
- Nardoni, S., Mugnaini, L., Pistelli, L., Leonardi, M., Sanna, V., Perrucci, S., Pisseri, F. and Mancianti, F. 2014. Clinical and mycological evaluation of an herbal antifungal formulation in canine *Malassezia* dermatitis. *J. Mycol. Med.*, **24**(3): 234-240.
- Oldenhoff, W.E., Frank, G.R. and DeBoer, D.J. 2014. Comparison of the results of intradermal test reactivity and serum allergen-specific IgE measurement for *Malassezia pachydermatis* in atopic dogs. *Vet. Dermatol.*, **25**(6): 507-511.
- Patterson, A.P. and Frank, L.A. 2002. How to diagnose and treat *Malassezia* dermatitis in dogs. *Vet. Med.*, **97**: 612-622.
- Peano, A. and Gallo, M.G. 2008. Management of *Malassezia*-related diseases in the dog. *Parasitologia*, **50**: 85-88.
- Usui, R., Usui, R., Fukuda, M., Fukui, E., and Hasegawa, A. 2011. Treatment of canine otitis externa using video otoscopy. *J. Vet. Med. Sci.*, **73**: 1249-1252.
- Watanabe, S., Koike, A., Kano, R., Nagata, M., Chen, C., Hwang, C.Y., Hasegawa, A. and Kamata, H. 2014. In vitro susceptibility of *Malassezia pachydermatis* isolates from canine skin with atopic dermatitis to ketoconazole and itraconazole in East Asia. *J. Vet. Med. Sci.*, **76**(4): 579-581.
- Yurayart, C., Nuchnoul, N., Moolkum, P., Jirasuksiri, S., Niyomtham, W., Chindamporn, A., Kajiwarra, S. and Prapasarakul, N. 2013. Antifungal agent susceptibilities and interpretation of *Malassezia pachydermatis* and *Candida parapsilosis* isolated from dogs with and without seborrheic dermatitis skin. *Med. Mycol.*, **51**(7): 721-730.