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Occurrence of cutaneous candidiasis among domestic dogs in Thrissur

Abitha J. Soman[1], K. Justin Davis[1], P.V. Tresamol[1], K. Vijayakumar[1] and Binsy Mathew[2]

[1]Department of Veterinary Epidemiology and Preventive Medicine, College of Veterinary and Animal Sciences, Mannuthy, Thrissur-680651, [2]Department of Veterinary Public Health, College of Veterinary and Animal Sciences, Mannuthy, Thrissur-680651, Kerala Veterinary and Animal Sciences University, Kerala, India

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Abstract

The present study was aimed to determine the occurrence of cutaneous candidiasis in dogs. Thirty dogs confirmed positive for Candida spp., by cultural, biochemical and molecular techniques. The occurrence was higher in dogs within the age group of 6 months to 2 years (43%) followed by adult dogs 2 to 6 years (30%), senile dogs more than 6 years (17%) and puppies less than 6 months (10%). The sex predisposition of cutaneous candidiasis did not show any significant differences. The occurrence was higher in Labrador retriever dogs (47%) followed by Dachshund (13%), Pug (10%), Beagle, Shih Tzu and crossbred dogs (7% each). The disease was observed more often in dogs with mixed diet practice (57%) and indoor housing (67%). The predominant clinical signs observed were dermatitis, otitis, intertrigo, paronychia and perineal candidiasis. The lesions were distributed mainly in the ear (54%), skin folds (17%), and combined form (29%). In summary, this research sheds light on the risk factors for cutaneous candidiasis in dogs, highlighting the age groups, breeds, and environmental factors that may influence the occurrence of the condition. The findings provide valuable insights for veterinarians and pet owners, aiding in the understanding and management of cutaneous candidiasis in canines.

Keywords: *Canine, cutaneous candidiasis, occurrence*

Candida spp., a diverse group of yeast could be clinically manifested in different forms such as cutaneous, muco-cutaneous and systemic candidiasis. Canine cutaneous candidiasis is less prevalent in Kerala compared to malasseziosis. The *Candida* genus encompasses over 200 distinct yeast species. Investigation of the microbial flora of various animals leads to the discovery of novel *Candida* spp., These commensal yeasts, under conducive circumstances such as compromised host immune responses, microbial dysbiosis and epithelial injury can transform into pathogenic forms (Wang *et al.,*, 2023). Factors such as breed, gender, age, and management conditions are potential predisposing factors to candidiasis. This study could potentially help to explore the predisposing factors for canine cutaneous candidiasis and effective management practices for the disease.

The present study was carried out in the Department of Veterinary Epidemiology and Preventive Medicine, College of Veterinary and Animal Sciences, Mannuthy for a period of 12 months from September 2022 to August 2023. Dogs presented to the University Veterinary Hospital, Kokkalai and Teaching Veterinary Clinical Complex, Mannuthy with clinical signs suspecting cutaneous candidiasis were subjected to primary isolation, identification and confirmation

**Corresponding author: abithajsoman9523@gmail.com, Ph. 7034981425*

through cytological and cultural characteristics. Budding yeast cells with round to oval shape and broad neck (Fig. 1) were suggestive of *Candida* spp. (Reagan *et al.,*, 2019). Creamy white colonies with yeasty appearance and odour were observed in Sabouraud dextrose agar (Fig. 2). Green coloured colonies of *C. albicans* and rough pink colonies of *C. krusei* were observed in Hichrome candida agar (Fig. 3). The species differentiation based on colour of colonies was done as per Giri and Kindo (2015). The study included thirty confirmed cutaneous candidiasis in dogs. Epidemiological data were collected according to the prescribed proforma and analysed.

Cutaneous candidiasis was most commonly seen in young growing animals of six months to 2 years of age (43%) followed by adult dogs of two to six years of age (30%), senile dogs of more than 6 years of age (17%) and puppies of less than 6 months old (10%). Scott (2001) and Kumar *et al.,* (2011) reported that age is one of the important factors in the case of fungal dermatitis.

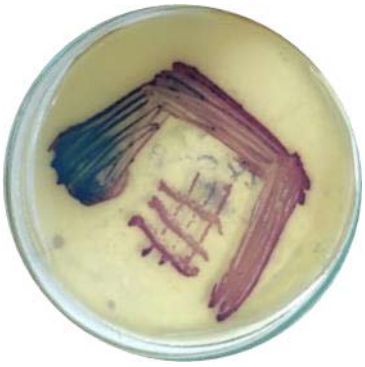

Fig. 1. Budding yeast cells of *Candida* spp. (100 X Giemsa stain)

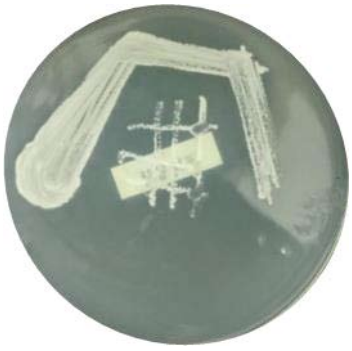

Fig. 2. Creamy white colonies of *Candida* spp. in SDA agar

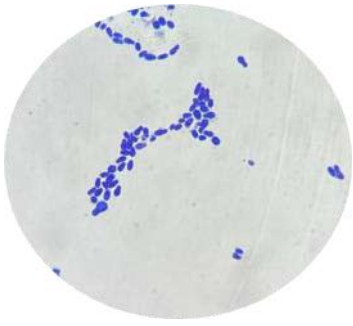

Fig. 3. Mixed culture of *Candida albicans* (Green) and *Candida krusei* (Pink) on Hichrome candida agar

Our findings were in par with Singh *et al.,* (2012) who reported that the highest incidence of fungal dermatoses was observed in age group below one year of age followed by 1-2 years of age. Hay (1992) listed the possible reasons for high occurrence in growing animals as lack of specific immunity acquired after first exposure in young dogs, and high nutritive demand. Bhatia and Sharma (2014) reported that incidence of non-dermatophytes was high (80%) in age group of dogs above two years. In the present study, second highest number of cases were found in the same age group, whereas, Pfaller and Diekema (2007) reported that fungal infections were commonly found in extremes of age.

Cutaneous candidiasis was predominantly observed in Labrador Retrievers (47%) followed by Dachshund (13%), Pug (10%), Beagle (7%), Shih Tzu (7%), Cross bred (7%), American bull dog (3%), Pit bull (3%) and Non-descript breeds (3%). The present study is on par with Kumar *et al.,* (2011) and Sudhir (2022) who reported a higher incidence of dermatomycosis in purebred Labrador dogs and explained that this might be due to the greater number of apocrine glands on the skin of these dogs. Jadhav and Pal (2013) and Reagan *et al.,* (2019) stated that German Shepherds were the most commonly affected breed.

Among 30 cases of candidiasis, 53 per cent were females and 47 per cent males. Similarly, no significant difference was noticed between males and females (Brilhante *et al.,,* 2003). According to Kumar *et al.,* (2011) and Singh *et al.,* (2012), male dogs were more susceptible due to the roaming habits of male dogs during seasonal breeding where they came into close contact with infected dogs. Lee *et al.,* (2011) reported that incidence was higher in females due to physiological stresses like the oestrous cycle and pregnancy.

Predominant occurrence of cutaneous candidiasis was found in dogs with mixed diet practices (57%) followed by dogs under commercial food (30%) and homemade food (13%). Pfaller and Diekema (2007) and Kumar *et al.,* (2011) reported that the diet has an influence on the occurrence of candidiasis in dogs. The infection rate is higher in malnourished animals and the animals under metabolic stress. Out of the 30 positive cases of canine cutaneous candidiasis, a high occurrence of the disease was observed in indoor dogs (67%) followed by partially indoor dogs (20%) and the least occurrence was noticed in outdoor dogs (13%) shown in graph 5. Cordeiro *et al.,* (2017) and Perez-Garcia *et al.,* (2017) reported that management conditions influenced the occurrence of disease in dogs.

Secondary infection was identified (60%) more than primary occurrence (40%). It is similar to Moretti *et al.,* (2006), Cordeiro *et al.,* (2017), Perez-Garcia *et al.,* (2017), Moretti *et al.,* (2004) Pfaller and Diekema, (2007)

had reported that cutaneous candidiasis predisposed by either hyper (allergic) or hypo active (immunosuppression) immunity. Czezhowicz *et al.,* (2022) classified the factors predisposing to infection into immunological factors and non-immunological factors. Kaszak *et al.,* (2020) enlisted the predisposing factors of the disease such as physiologic factors pathologic factors, genetic factors and nutritional factors.

Out of total 30 confirmed cases, 20 per cent animals had generalised lesions and 80 per cent animals had localised lesion. Among the 80 per cent localised candidiasis, the lesions were distributed over face folds, ear base, neck fold, interdigital spaces, arm pit, groin, tail fold, perineum and external ear canal etc. The total sites of lesions were categorised into three *viz*, ear, skin fold, combined and each site had 54 per cent, 29 per cent and 17 per cent respectively. Carlotti (1997) and Lee *et al.,* (2011) reported that *Candida* spp. prefer constantly humid areas, which favour tissue maceration such as mucous membranes (Fig 4), mucocutaneous junctions, intertriginous areas, nail substructure, inter-digital spaces, ear canals (Fig 5) and the lateral face of the ear and genital tract membrane. Correia et al. (2016) reported that while *Candida* spp. typically colonizes the gastrointestinal (GI) tract, respiratory tract, reproductive tract, and skin as a commensal organism, it can, under certain conditions, lead to a wide range of infections.

Fig. 4. Inflammation of skinfolds

Fig. 5. Otomycosis

Table 1. Demographic characteristics of canine cutaneous candidiasis

Parameter	Number (per cent)
Age	
<6 Months	3 (10)
6 Months – 2 Years	13(43)
2 Years-6 Years	9(30)
>6 Years	5(17)
Sex	
Male	14(47)
Female	16(53)
Breed	
Labrador Retriever	14(47)
Dachshund	4(13)
Pug	3(10)
Beagle	2(7)
Shih Tzu	2(7)
Cross breed	2(7)
American bully	1(3)
Pit bull	1(3)
Non descript	1(3)
Type of lesion	
Generalized	6(20)
Localized	24(80)
Type of Infection	
Primary	12(40)
Secondary	18(60)
Distribution of lesion	
Generalised	6(20)
Localised	24(80)
Distribution of lesion	
Ear	13(54)
Skin fold	7(29)
Combined	4(17)
Diet	
Homemade	4(13)
Commercial	9(30)
Both	17(56)
Housing	
Indoor	20(67)
Outdoor	4(13)
Partially indoor	6(20)

Summary

According to the present study age, breed, diet and housing could possibly act as predisposing factors for cutaneous candidiasis. The organism prefers humid areas so managemental practices like keeping the animal

dry and maintaining the skin healthy is very important for control of candidiasis. As future prospective for getting more accuracy this work can be expanded with increased no of samples and geographical area.

Conflicts of interest

There are no conflicts of interest reported by the authors.

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