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Clinical Abnormalities Pertaining to *Malassezia* dermatitis in Dogs

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ABSTRACT: *Malassezia* dermatitis is a relatively common pruritic dermatosis caused by the yeast *Malassezia pachydermatis*. As *Malassezia* dermatitis mimics many other pruritic dermatoses and is usually secondary to them, screening of a large number of samples and differential diagnosis of the disease is quite challenging. The present study was undertaken to record the clinical abnormalities of the dogs affected with *Malassezia* dermatitis. During the study period, from April 2022 to September 2022, a total of 2974 dogs were screened. Of these, 736 dogs (24.75%) demonstrated clinical signs indicative of *Malassezia* dermatitis and were subjected to cytological examination for confirmation. Out of 736 dogs screened, 106 dogs were found affected with *Malassezia* dermatitis by acetate tape impression smear examination. Cytological examination of the acetate tape impression smears upon new methylene blue staining revealed the presence of blue coloured footprint/ peanut shaped budding yeast cells. Upon culture, *Malassezia pachydermatis* colonies on SDA were observed as smooth, convex, white, or creamy with a pasty texture initially after 36 to 48 hours of incubation at 37ºC that later became dry, wrinkled and light brown with the advancement of age. Mild to intense pruritus, alopecia, erythema, rancid odour, ear affections, scaling, hyper pigmentation and lichenification are the predominant clinical signs noticed in *Malassezia* dermatitis. Though the lesions were uniformly spread and distributed throughout the body of the affected dogs, they were predominantly seen at the ventral neck, followed by external ear/ auricular, interdigital spaces and least on the face, muzzle/ lips. Further, 49 dogs (46.23 per cent) were associated with concurrent infections/ conditions *viz.* demodicosis and tick infestation (24.49 %), followed by pyoderma (20.41 %), sarcoptic mange and dermatophytosis (8.16 %), diabetes mellitus, hypothyroidism and flea allergic dermatitis (4.08 %) and renal failure (2.04 %).

Keywords: *Malassezia* dermatitis, Jabalpur, cytological examination, dogs, demodicosis.

INTRODUCTION

Skin is the body's largest and most prominent organ, serving as an effective morphological and physiological barrier that separates animals from their external environment (Muller *et al.,* 2013). Further, the most sensitive part, the skin is vital to the aesthetic appearance and health status of dogs. Dermatological conditions represent a substantial portion of cases in small animal clinics, accounting for over 20 percent of the caseload (Nauriyal, 2007).

Malassezia dermatitis is a relatively common pruritic dermatosis caused by the yeast *Malassezia pachydermatis* (Kumari, 2007). *Malassezia pachydermatis* a lipophilic, nonmycelial, unipolar budding commensal yeast is usually present in subdued numbers in the superficial mucocutaneous sites and external ear canals in dogs. Alterations in the cutaneous

microenvironment or host defence mechanisms may permit the organisms to multiply exponentially and become pathogenic (Bajwa, 2017).

Canine *Malassezia* dermatitis can manifest in localized or generalized forms and is clinically characterized by intense pruritus, hair loss (alopecia), excessive skin pigmentation (hyperpigmentation), lichenification, and visibly increased skin thickness. It may be secondary to endocrinopathies, e.g., hypothyroidism, hyperadrenocorticism and diabetes mellitus, keratinization disorders, immunological dysfunctions, and skin neoplasms (Mircean *et al.*, 2010). Breeds predisposed to *Malassezia* dermatitis include West Highland White Terriers, Shih Tzus, Basset Hounds, American Cocker Spaniels, Boxers, and Dachshunds (Bond *et al.*, 2020).

Definitive diagnosis is based on the detection of yeast in representative skin lesions: cytology evaluation of the cellophane tape impression smears from dry lesions, direct glass slide impression smears from the moist and greasy lesions, culture analysis, and polymerase chain reaction (Kumari, 2007). An accurate diagnosis is vital for the appropriate treatment and management of *Malassezia* dermatitis in dogs. In perspective, the present study was undertaken to record the clinical abnormalities of the dogs affected with *Malassezia* dermatitis.

MATERIALS AND METHODS

For this study, a total of 2,974 dogs of either sex, irrespective of breed and age group, presented at Veterinary Clinical Complex, College of Veterinary Science and Animal Husbandry, Jabalpur (M.P.) and different private clinics in and around Jabalpur were carefully screened based on history and presence of clinical symptoms indicative for *Malassezia* dermatitis *viz.* erythema, pruritus, hyper pigmentation, offensive odour, scales, crusts, alopecia, lichenification, etc.

Of 2,974 dogs, 736 with dermatological disorders were screened for *Malassezia* dermatitis. For confirmation of Malasseziosis and diagnosis of concurrent conditions, dogs with dermatological disorders were subjected to cytological examination and skin scrapping respectively. Acetate tape impressions were collected from the dry lesions of the suspected animals as per the procedure given by Eluk*et al.* (2003). Glass slide impression smears were used to collect the samples from wet lesions (Muse, 2000) and roll swab smears were obtained based on the technique used by Gotthelf and Young (1997) from the external ear canal. The prepared smears were stained with a drop of new methylene blue for one minute by Diff- Quick method, the stain was removed, rinsed with distilled water and allowed to air dry. The stained slides were then examined under oil immersion objective. The presence of more than five organisms per oil power field (x1000) was considered positive. The swabs collected from skin lesions were inoculated onto Sabouraud's Dextrose Agar (SDA) with 0.05 per cent chloramphenicol for culture examination. The plates were then incubated at 37°C. They were monitored daily for the presence of growth for seven days. Colony characters were studied by observing colonies' shape, size, colour and consistency. *Malassezia pachydermatis* was identified based on the macroscopic and microscopic appearance of colonies and its ability to grow on the medium with no lipid supplementation.

For diagnosis of concurrent conditions deep skin scraping from the affected area was collected as per the procedure given by Soulsby (1982).

RESULTS AND DISCUSSION

Diagnosis. Different tests like direct slide impression smears, acetate tape impressions and cotton swab smears were undertaken for diagnosis of malasseziosis depending on the nature of the lesion and/or anatomical site.

Acetate tape impression smear. Out of 736 dogs screened, 106 dogs were found affected with *Malassezia* dermatitis by acetate tape impression smear examination. In all the positive cases examination of the acetate tape impression smears upon new methylene blue staining revealed the presence of blue coloured footprint/ peanut shaped budding yeast cells (Fig. 1).

Glass slide impression smears. On direct glass slide impression smear examination peanut or footprint shaped budding yeast cells were detected. However, acetate tape impression detected the budding yeast cells more frequently when compared with direct glass slide impression smear examination.

Sterile cotton swab method. Swab smears made from greasy lesions and otitis externa and upon staining with new methylene blue revealed blue coloured footprint shaped budding yeast cells (Fig. 2).

The result of the present study correlates well with the findings of earlier reports of Eluk *et al.* (2003); Rosales *et al.* (2005); Balappanavar and Vasant (2013); Lakshmi and Padmaja (2013); Reddy and Kumari (2015). Eluk *et al.* (2003) compared adhesive tape strips and dry swab sampling techniques and concluded that adhesive tape sampling coupled with staining and culture was superior to other tests in diagnosing *Malassezia* dermatitis. Each collection method has its benefits and either of the techniques can be selected based on the dog's temperament, clinicians' preference and sampling site.

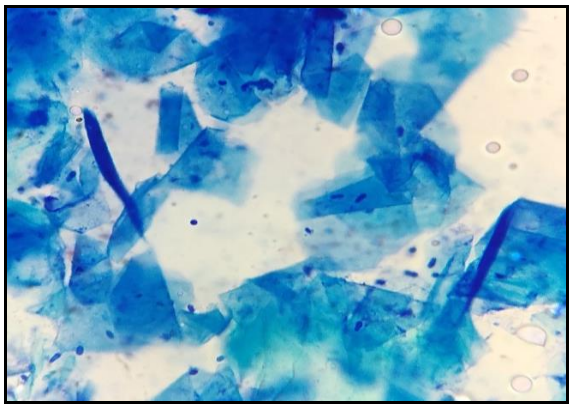

Fig. 1. Microscopic examination of acetate tape impression smear showing peanut or footprint shaped budding yeast (New methylene blue, x1000).

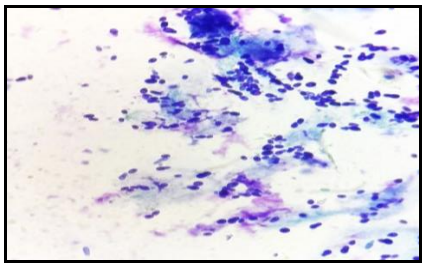

Fig. 2. Microscopic examination of cotton swab smear showing peanut or footprint shaped budding yeast (New methylene blue, x1000).

Culture examination. Sterile swabs were used for the collection of samples from dogs which were found positive for *Malassezia* organisms on cytological examination. The samples were inoculated onto Sabouraud's Dextrose Agar (SDA). The species identification of *Malassezia pachydermatis* was confirmed by its ability to grow on SDA without the addition of any lipids. In the present study, *Malassezia pachydermatis* colonies on SDA were observed as smooth, convex, white, or creamy with a pasty texture initially after 36 to 48 hours of incubation at 37ºC that later became dry, wrinkled and light brown in colour with the advancement of age (Fig. 3). For microscopic identification of *Malassezia* spp., a loopful of single isolated colonies were picked up, stained with new methylene blue and examined under oil immersion.

Fig. 3. Colony morphology of *Malassezia pachydermatis* on Sabouraud's Dextrose Agar (SDA) showing smooth, convex, white or creamy coloured colonies.

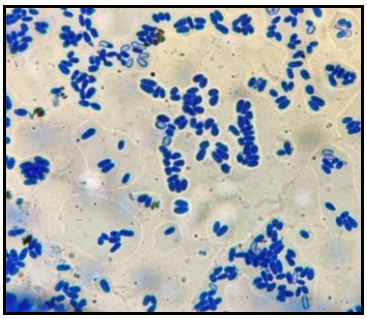

Fig. 4. Smear from pure colony showing blue coloured peanut or footprint shaped budding yeast (New methylene blue, x1000).

Microscopically, blue coloured footprint/peanut shaped budding yeast cells with buds attached to the mother cell by a broad base was observed (Fig. 4). The present observations are in close agreement with the findings of other authors namely, Reddy and Kumari (2015); Suresh and Kumar (2017); Seetha *et al.* (2018). Reddy and Kumari (2015) isolated *Malassezia pachydermatis* on Sabouraud's dextrose agar (SDA) and reported that the colonies were pale, convex, smooth and dry with cream/ white colour initially and later turned to brown colour. Whereas, Seetha *et al.* (2018) isolated and identified *Malassezia pachydermatis* by inoculation in Sabouraud's dextrose agar (SDA) and Modified Dixon's agar (MDA) and stated that SDA was the preferable medium for isolation of *Malassezia pachydermatis*.

Clinical symptoms of *Malassezia* dermatitis in dogs in and around Jabalpur. During the study, a variety of clinical aberrations were observed among the affected dogs. Pruritus was observed in 98.11 per cent of dogs (104 out of 106), followed by alopecia in 82.08 per cent of dogs (87/106), erythema in 76.42 per cent of dogs (81/106), rancid odour in 67.92 per cent dogs (72/106), ear affections in 63.21 per cent dogs (67/106), scaling in 58.49 per cent (62/106), hyperpigmentation in 50.94 per cent dogs (54/106) and lichenification in 43.40 per cent dogs (46/106) (Fig. 5).

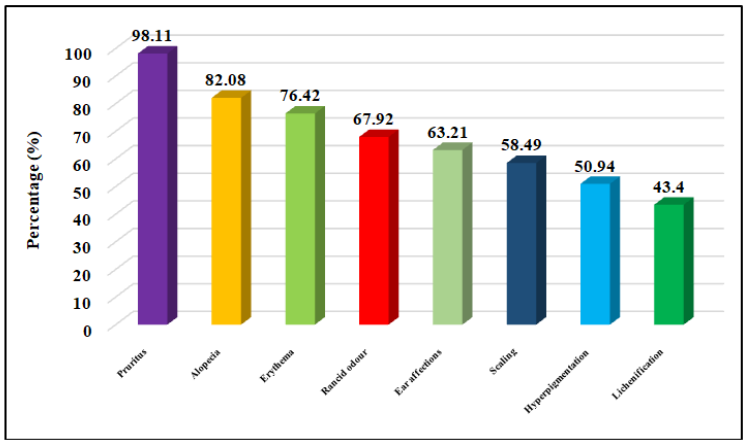

Fig. 5. Clinical symptoms of *Malassezia* dermatitis in dogs (n=106).

The present observations are in line with the findings of other authors namely, George and Yathiraj (2010), Maynard *et al.* (2011); Machado *et al*. (2011); Lakshmi and Padmaja (2013); Valle (2014); Bajwa (2017); Suresh and Kumar (2017); Bond *et al.* (2020); Anju *et al.* (2021). Anju *et al.* (2021) recorded alopecia, pruritus, erythema, hyperpigmentation, lichenification, epidermal collarettes, pustules, vesicles and nodules in dogs afflicted with *Malassezia pachydermatis.*

In the early stages of infection, pruritus of variable intensity, erythema, alopecia, papules, macules and scaly lesions were noticed in the present study. While hyperpigmentation, lichenification and other secondary lesions were noticed in chronic cases due to scratching and licking which is in close agreement with the findings of Bond *et al.* (1995), Carloti (2001), Dorogi (2002), Lakshmi and Padmaja (2013); Bond *et al.* (2020).

Pruritus may be produced by cutaneous inflammation triggered by the release of certain enzymes such as lipase and protease, both of which contribute to cutaneous inflammation via lipolysis and proteolysis, respectively (Mircean *et al.*, 2010). Other symptoms, such as erythema, exudation, scaling, alopecia and offensive odour, may be caused by the release of chemical mediators at the site of inflammation, such as serotonin, prostaglandins, peptides, and leukotrienes (Valle, 2014).

Carlotti and Bensignor (2002) suggested that the smell of seborrheic dogs is most likely to be caused by changes in surface lipids. This rancid fat odour is quite characteristic of greasy seborrhoea and may be exacerbated by secondary bacterial or *Malassezia pachydermatis* infections. Chronic lesions are often thickened, lichenified and hyperpigmented and they are variably pruritic.

Topography of lesions in dogs with *Malassezia* dermatitis. The topography of lesions in dogs with *Malassezia* dermatitis was recorded at the time of the case presentation. The lesions were localized or multifocal. The assessment of clinical cases was done mainly based on the distribution pattern of lesions (either generalized or localized). Though the lesions were uniformly spread and distributed throughout the body of the affected dogs, they were predominantly seen at the ventral neck i.e., 80.19 per cent (85 out of 106), followed by external ear/ auricular i.e., 78.30 per cent (83 out of 106), interdigital spaces i.e., 71.70 per cent (76 out of 106), axillae i.e., 62.26 per cent (66 out of 106), inguinal/ ventral abdomen i.e., 55.66 per cent (59 out of 106), pectoral limbs (distal portions) i.e., 36.79 per cent (39 out of 106), dorsum i.e., 32.08 per cent (34 out of 106), pelvic limbs (distal portions) i.e., 24.53 per cent (26 out of 106) and least on the face, muzzle/ lips i.e., 17.92 per cent (19 out of 106) (Fig. 7). Generalized lesions were observed in 48 animals (45.28 per cent) and localized lesions in 58 animals (54.72 per cent).

Fig. 6. Clinical symptoms of *Malassezia* dermatitis in dogs (a) Alopecia; (b) Erythema; (c) Ear affections; (d) Scaling; (e) Hyperpigmentation; (f) Lichenification.

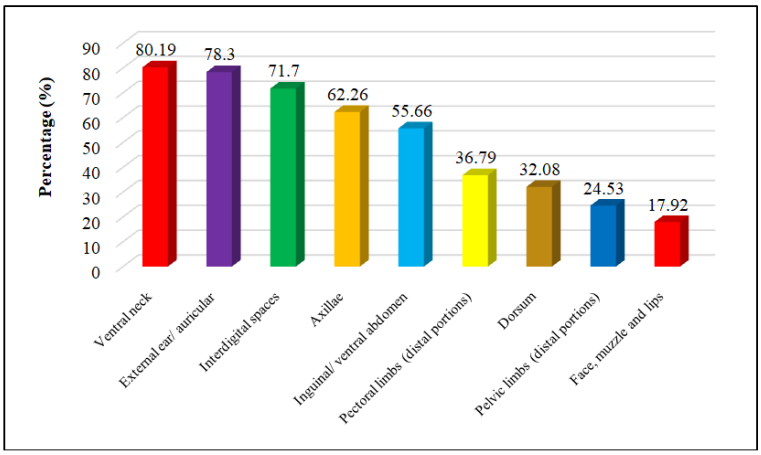

Fig. 7. Topography of lesions in dogs with *Malassezia* dermatitis (n=106)

The results of the present study are consistent with the findings of Valle (2014), Reddy and Kumari (2015), Suresh and Kumar (2017); Daniel (2021); Bond *et al.* (2020) and Dohre (2021) who reported that the auricular region/ external ear was mostly affected in the dogs with malasseziosis. They stated that the higher incidence might be due to excessive moisture and greater relative humidity, stable temperature and stasis of ceruminous discharge within the ear canal (rich in lipid) which in turn creates an ideal environment for *Malassezia pachydermatis* to grow and multiply to cause the lesions. However, the results of the present study are in contrast to Mircean *et al.* (2010) who reported that the distal part of the thoracic limb: the phalangeal region was mostly affected by malasseziosis followed by auricular, face and least on the ventral neck. In the present study, it was found that there was a lack of regular grooming and cleaning of the external ear canal by pet parents. This may have contributed to a higher isolation rate of the organisms from the external ear canals.

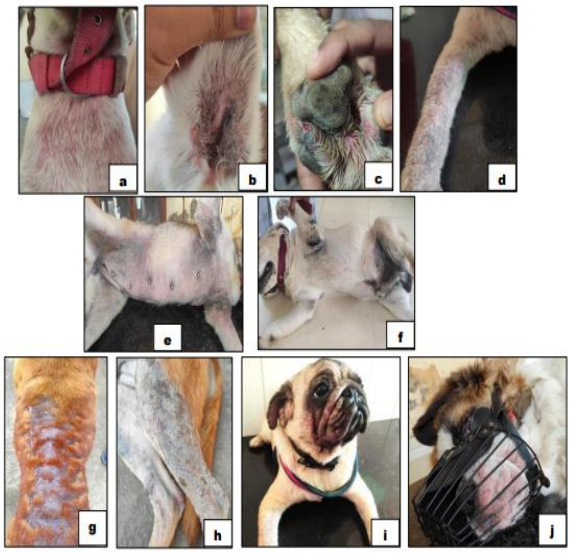

Fig. 8. Topography of lesions in dogs with *Malassezia* dermatitis (a) Ventral neck; (b) External ear/auricular; (c) Interdigital space; (d) Pectoral limb; (e) Axillae; (f) Inguinal/ventral abdomen; (g) Dorsum; (h) Pelvic limb; (i) Face; j) Muzzle/lips.

Concurrent conditions/ infections observed along with *Malassezia* dermatitis in dogs in and around Jabalpur. Out of 106 dogs with *Malassezia* dermatitis, 49 dogs (46.23 per cent) were associated with concurrent infections/ conditions. Out of these, demodicosis and tick infestation was recorded to be highest in24.49 per cent of dogs (12 out of 49), respectively, followed by pyoderma in 20.41 per cent of dogs (10 out of 49), sarcoptic mange and dermatophytosis in 8.16 per cent (4 out of 49) respectively, diabetes mellitus, hypothyroidism and flea allergicdermatitis were recorded in 4.08 per cent dogs (2 out of 49) and renal failure in 2.04 per cent dogs (1 out of 49) (Fig. 9 and 10).

These findings were partly in agreement with the earlier reports of Suresh and Kumar (2017), who reported that 13.3 per cent of dogs with *Malassezia* dermatitis also had concurrent infections *viz.* demodicosis (6.6 per cent), pyoderma (4.4 per cent) and dermatophytosis in 2.2 per cent dogs, respectively. While Srikala *et al.* (2010) reported concurrent *Malassezia* dermatitis in 14.66 per cent of dogs suffering from demodicosis. Srikala and Kumar (2014) reported *Malassezia* dermatitis in 36.6 per cent of dogs suffering from hypothyroidism. They opined that endocrinopathies may result in higher production of sebum leading to seborrhoea. This malady, in turn, promotes the exponential growth of *Malassezia*, predisposing dogs to sub-clinical infection. Bond *et al.* (2020) reported that *Malassezia* dermatitis has been associated with concurrent dermatosis like hypersensitivity disorders, ectoparasitic infestation, bacterial pyoderma, endocrinopathies, or cornification defects.

Canine malasseziosis is caused by several predisposing factors, including allergy, ectoparasitism, keratinization defects, endocrinopathies, bacterial infection and any disease process that compromises the skin epidermal barrier and suppresses the host's immune response. As a result, it is critical to identify these predisposing factors that lead to yeast overgrowth while treating *Malassezia* dermatitis, because *Malassezia* is typically a contributing factor rather than the sole cause of clinical signs.

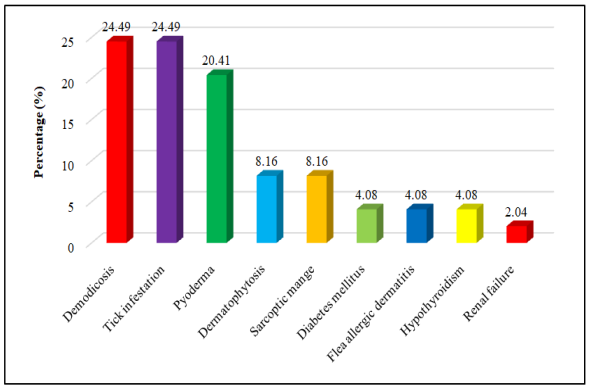

Fig. 9. Concurrent conditions/ infections observed along with *Malassezia* dermatitis in dogs in and around Jabalpur (n=49).

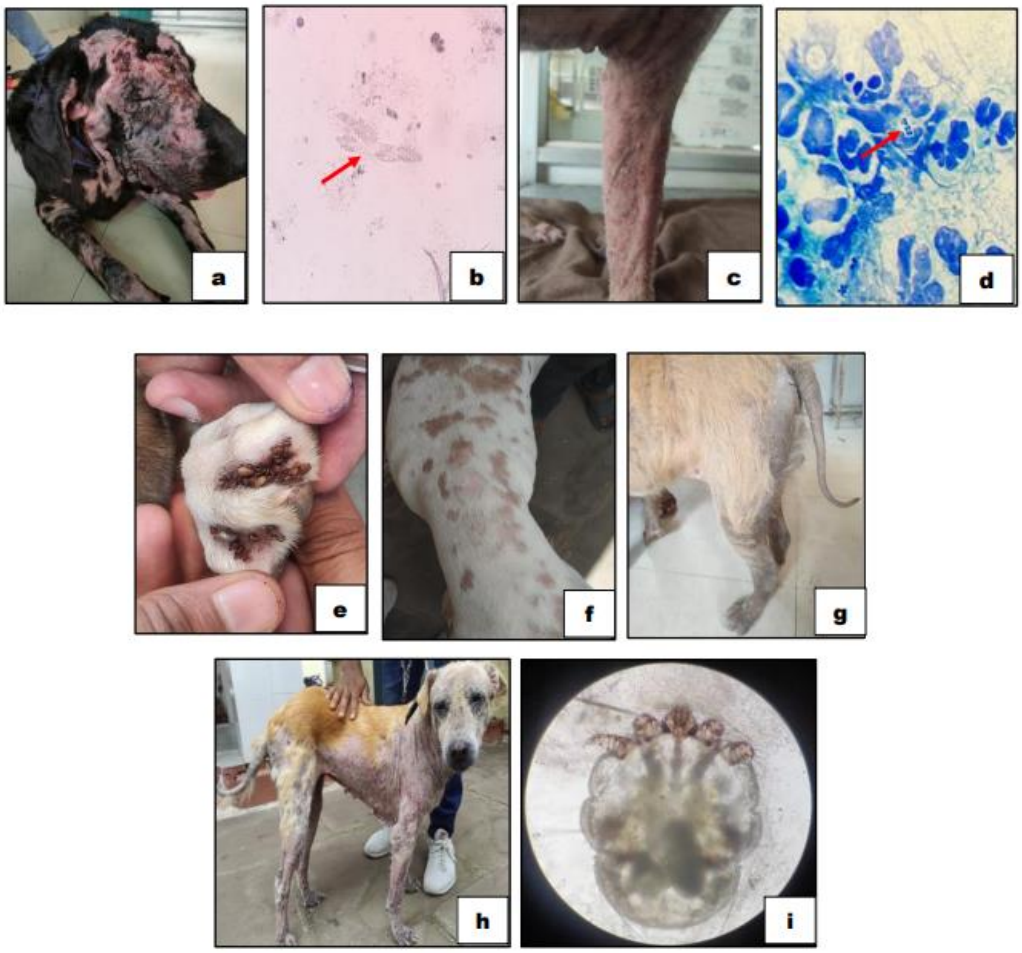

Fig. 10. Concurrent condition observed along with *Malassezia* dermatitis(a)Generalized demodicosis, (b) *Demodex canis* (x100); (c)Pyoderma, (d) Microscopic examination of slide impression smear of pustule showing degenerated neutrophils engulfing cocci (arrow) (New methyleneblue, x1000); (e) Tick infestation; (f) Dermatophytosis showing circular patches of alopecia; (g) Hypothyroidism showing typical rat tail appearance; (h) Scabies, (i) *Sarcoptesscabiei* (x1000)

CONCLUSIONS

Various diagnostic methods, including direct slide impression smears, acetate tape impressions, and cotton swab smears, can be utilized to diagnose malasseziosis. However, cytological examination of the acetate tape impression smears coupled with staining and culture was found superior to other tests in diagnosing *Malassezia* dermatitis. Mild to intense pruritus, alopecia, erythema, rancid odour, ear affections, scaling, hyperpigmentation and lichenification are the predominant clinical signs noticed in *Malassezia* dermatitis. The lesions were predominantly seen at the ventral neck, followed by external ear/ auricular, interdigital spaces, and least on the face, muzzle/ lips. Further, demodicosis and tick infestation (24.49 %) were the predominant concurrent infections/ conditions associated with *Malassezia* dermatitis.

FUTURE SCOPE

Thus, the current research offers pertinent data on clinical abnormalities of *Malassezia* dermatitis in dogs at Jabalpur (M.P.). Future comprehensive research may be done to study the ultrastructural characteristics of the yeast, *Malassezia pachydermatis* by scanning and transmission electron microscopy and treatment of *Malassezia* dermatitis using different therapeutic regimens.

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Conflict of Interest. None.

REFERENCES

Anju, K.D., David, P.V., Ravishankar, C., Sindhu, O. K. and Ajithkumar, S. (2021). Diagnosis and therapeutic management of malasseziosis in dogs. *Journal of Veterinary and Animal Sciences*, *52*(3), 262-266.

Bajwa, J. (2017). Canine *Malassezia* dermatitis. *Diagnostic Dermatology*, *58*: 1119-1121.

Balappanavar, B.R. and Vasanth, M.S. (2013). Clinico-diagnostic and therapeutic management of canine malasseziosis. *Intas Polivet*, *14*(2), 353-357.

Bond, R., Morris, D. O., Gulliot, J., Besignor, E. J., Robson, D., Mason, K. V., Kano, R. and Hill, P. J. (2020). Biology, diagnosis and treatment of *Malassezia* dermatitis in dogs and cats. *Veterinary Dermatology*, *31*, 27-34.

Bond, R., Rose, J. F., Ellis, J. W. and Lloyd, D. H. (1995). Comparison of two shampoos for treatment of

Malassezia pachydermatis associated seborrheic dermatitis in Basset hounds. *Journal of Small Animal Practice*, *36*, 99-104.

Carlotti, D. N. (2001). *Malassezia* dermatitis in the dog. In: 26th WSAVA Congress, Vancouver, British Columbia, Canada, 8-11, August 2001, World Small Animal Veterinary Association, pp 56-60.

Carlotti, D. N. and Bensignor, E. (2002). Management of keratoseborrhoeic disorders. *European Journal of Companion Animal Practice*, *12*, 123-133.

Daniel, A. K. (2021). Diagnosis and therapeutic evaluation of malasseziosis in dogs. M.V.Sc. thesis (Veterinary Clinical Medicine, Ethics and Jurisprudence), Kerala Veterinary and Animal Science University, Wayanad.

Dohre, K. (2021). Therapeutic management of *Malassezia* dermatitis in dogs. M.V.Sc. thesis (Veterinary Clinical Medicine, Ethics and Jurisprudence), Maharashtra Animal and Fishery Sciences University, Nagpur.

Dorogi, J. (2002). Pathological and clinical aspects of the disease caused by *Malassezia* species. *Acta Microbiologica et ImmunologicaHungarica*, *49*(3), 363-370.

Eluk, O. A. J., Baker, K. P. and Fuller, H. (2003). Comparison of two sampling techniques for the detection of *Malassezia pachydermatis* on the skin of dogs with chronic dermatitis. *The Veterinary Journal*, *165*, 119-124.

George, S. and Yathiraj, S. (2010). Malasseziosis in dogs. *Journal of Commonwealth Veterinary Association*, *26*(2), 23-27.

Gotthelf, L. N. and Young, S. E. (1997). New treatment of *Malassezia* otitis externa in dogs. *Veterinary Forum*, *14*, 47-53.

Kumari, K. N. (2007). Malassezial infections in dogs: a review. *Intas Polivet*, 8(1): 20-29.

Lakshmi, K. and Padmaja, K. (2013). A clinic microbiological and *in-vitro* sensitivity study of canine *Malassezia pachydermatis*. *Intas Polivet*, *14*(2), 350-352.

Machado, M. L. S., Ferreiro, L., Ferreira, R.R., Corbellini, L.G., Deville, M., Berthelemy, M. and Guillot, J. (2011). *Malassezia* dermatitis in dogs in Brazil: diagnosis, evaluation of clinical signs and molecular identification. *Veterinary Dermatology*, *22*, 46-52.

Maynard, L., Reme, C. A. and Viaud, S. (2011). Comparison of two shampoos for the treatment of canine *Malassezia* dermatitis: a randomized controlled trail. *Journal of Small Animal Practice*, *52*, 566-572.

Mircean, V., Titilincu, A., Mircean, M. and Magdaş, C. (2010). *Malassezia pachydermatis* infection in dogs: a retrospective of its epidemiology, clinical and cytological results in Cluj, Romania. *Scientia Parasitologica*, *11*(3), 153-163.

Muller, W. H., Griffin, C. E. and Campell, K. L. (2013). Muller and Kirk's Small Animal Dermatology, 7thEdn., Elsevier Mosby., St. Louis, Missouri, 19 p.

Muse, R. (2000). *Malassezia* dermatitis. *In*: Muller, W.H. (ed.). Kirk's Current Veterinary Therapy, 8thEdn., W.B Saunders Company, Philadelphia. pp 574-576.

Nauriyal, D.S. (2007). Canine dermatosis associated with nutritional deficiencies. *Intas Polivet*, *8*, 471-478.

Reddy, C.B.K. and Kumari, K.N. (2015). Therapeutic management of *Malassezia* dermatitis in a Labrador Retriever dog. *International Journal of Livestock Research*, *5*(7), 105-109.

Rosales, M.S., Marsella, R., Kuncle, G., Harris, B. L., Nicklin, C. F. and Lopez, J. (2005). Comparison of the clinical efficacy of oral Terbinafine and Ketoconazole combined with Cephalexin in the treatment of *Malassezia* dermatitis in dogs: a pilot study. *Veterinary Dermatology*, *16*, 171-176.

Seetha, U., Kumar, S., Pillai, R. M., Srinivas, M. V., Antony, P. X. and Mukhopadhyay, H. K. (2018). *Malassezia* species associated with dermatitis in dogs and their antifungal susceptibility. *International Journal of Current Microbiology and Applied Sciences*, *7*(6), 1994-2007.

Soulsby, E. (1982). Helminths, Arthropods and Protozoa of domesticated animals, 7th Edn., Elsevier, London, pp 359-479.

Srikala, D. and Kumar, K. S. (2014). Hypothyroidism association with systemic and peripheral disorders in dogs. *Animal Science Reporter*, *8*(1), 31-40.

Srikala, D., Kumar, K. S., Kumar, V. V. V. A., Nagaraj, P., Ayodhya, S. and Rao, D. S. T. (2010). Management of mixed infestation of malasseziosis and demodicosis in dogs. *Intas Polivet*, *11*(1), 74-76.

Suresh, R. and Kumar, K. S. (2017). Prevalence of *Malassezia pachydermatis* in dogs. *International Journal of Livestock Research*, *7*(9), 205-211.

Valle, R. (2014). Clinico-diagnostic and therapeutic studies on *Malassezia* dermatitis in dogs. M.V.Sc. thesis (Veterinary Medicine), Sri Venkateswara Veterinary University, Tirupati.

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