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Successful management of Malassezia dermatitis and Intertrigo co-infection in a lactating female Labrador dog

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Abstract
A two-year-old lactating female Labrador was presented with history of pruritis and abnormal odour. Upon physical examination, mild loss of hair along the upper and lower lip line and over the ventral neck region was observed. In addition, superficial accumulation of pus between the folds of mammary glands and reddish discolouration of skin around the mammary gland region was also observed, suggestive of Malasseziasis and intertrigo co-infection. Laboratory diagnosis confirmed presence of *Staphylococcus sp., Proteus sp., E. coli* and *Micrococcus sp.* in bacterial culture and presence of footprint shaped organism characteristic of *Malassezia pachydermatitis.* Successful management involved oral administration of antibiotics based on ABST along with antibacterial / antifungal medicated bath for two weeks.

Keywords: Malassezia, pyoderma, dermatitis, lactating dog

Introduction
Intertrigo is a type of pyoderma that occur in skin fold of dogs, including lip, facial, vulvar, caudal, obese, and mammary folds. Intertrigo involves bacterial infection on the surface of the skin [9]. In general, the primary bacteria involved in causing intertrigo include *Staphylococcus sp.,* and other bacteria including *Pseudomonas* sp., *Proteus sp.,* and *Escherichia coli, Bacteroides sp., Peptostreptococcus* sp., *Fusobacterium* sp., *Porphyromonas sp., and Clostridium sp.* can also cause pyoderma [8]. Malasseziasis in dogs can occur in ear canals, axillae, groin, ventral neck, interdigital skin, facial folds, or tail folds, perivulvar skin, and perianal skin [2, 6]. Other predisposing factors that aid Malassezia in becoming a pathogen include humidity, altered cutaneous pH levels, previous antibiotic therapy, prolonged corticosteroid therapy and altered hormonal levels [2, 7]. In the present clinical case study, medical management of co-infection of intertrigo and Malasseziasis in a lactating female Labrador is discussed in detail.

Case history
A two-year-old lactating female Labrador weighing 12 kg that had whelped four puppies two months back was presented to the Veterinary Dispensary, Gandamanur with a history of pruritis and abnormal body odour.

Clinical observation, laboratory diagnosis and Results
Upon physical examination, mild loss of hair along the upper and lower lip line (Fig.1) and over the ventral neck region (Fig.2) was observed. In addition, mammary folds showed superficial moist pus accumulation, and reddish discolouration of skin over the ventral body region between the mammary glands was also observed (Fig. 3). Based on these clinical observations, co-infection of Malasseziasis along the lip line and intertrigo between the mammary gland skin fold was suspected. For laboratory confirmation, tape impression smear from the lip line regions were taken for detecting the presence of *Malassezia pachydermatitis* using Methylene blue staining procedure. Tape impression smear showed typical footprint shaped organism characteristic of *Malassezia pachydermatitis* (Fig. 4). Bacterial sample was collected from the intertrigo at mammary folds using a swab (Fig. 5) and was subjected to bacterial culture and antibiotic sensitivity test (ABST). Bacterial culture tested positive for growth of *Staphylococcus* sp., *Proteus* sp., *E. coli* and *Micrococcus sp.* and ABST results showed sensitivity towards amikacin and enrofloxacin; intermediate towards Cefatoxime, Azithromycin and Tetracycline; and resistant towards Amoxicillin.

Treatment and management

Treatment of intertrigo and Malsseziasis involved administration of oral antibiotic Enrofloxacin @ 5mg/kg body weight once daily and antihistamine Hydroxazine @ 2.2 mg/kg body weight once daily for 7 days. Topical treatment involved medicated bath once in 3 days using shampoos with Chlorhexidine gluconate / Ketoconazole, and Benzoyl peroxide composition. After one week, pruritis and intertrigo was reduced. The treatment was continued for another week, after which the dog had completely recovered from both Malasseziasis and intertrigo. The mammary folds were dry with absence of any visible pus accumulation (Fig. 5). During the treatment, the pet owners were advised to refrain the dog from breast-feeding the puppies.

Discussion

Pyoderma is a bacterial skin infection that occurs in dogs, and can be classified as surface, superficial and deep pyoderma. Surface pyoderma primarily involves bacterial infection on the surface of the skin, especially in facial skin folds and mammary gland folds, which is also called intertrigo [3]. Superficial pyoderma involves bacterial colonization of the epidermal layer, whereas deep pyoderma involves infection of hair follicle [9]. Malasseziasis caused by *Malassezia pachydermatitis*, is an opportunistic yeast that is present normally in the cutaneous microbiota of healthy dogs. During immunocompromised or stressful conditions, these opportunistic yeasts become pathogens and cause Malasseziasis [5]. In the present study, the female Labrador dog that whelped two months back had enlarged mammary glands due to lactation. Due to this, the mammary fold served as a conducive environment for proliferation of bacteria, which led to intertrigo [3]. Bacterial culture revealed the causative agents of intertrigo as *Staphylococcus sp.*, *Proteus sp.*, *E. coli* and *Micrococcus sp.* In the present study, treatment of intertrigo involved oral administration of Enrofloxacin. It is a broad-spectrum bactericidal antibiotic that inhibits bacterial multiplication by inhibition of DNA gyrase and is effective against *Staphylococcus sp.*, *Proteus sp.* and *E. coli*. Further, oral administration of Enrofloxacin has been reported to have higher bioavailability and rapid absorption in monogastric animals including dogs, thereby leading to successful management of intertrigo in this female Labrador dog [10]. Enrofloxacin can be secreted into milk, hence the female dog was refrained from feeding the puppies [1].

Due to lactation stress, hormonal changes, and intertrigo infection, the female dog was immunocompromised, which led the opportunistic organism *Malassezia pachydermatitis* to develop into a pathogen and cause Malasseziasis [5]. Management of Malasseziasis depends on factors such as localised or generalised lesions and underlying primary condition [2]. In the present study, the underlying condition was intertrigo, which will be managed using antibiotics. For the management of Malasseziasis, medicated shampoos with a combination of Chlorhexidine gluconate / Ketoconazole, and Benzoyl peroxide was used. The mechanism of action of Ketoconazole involves inhibition of ergosterol, an important component of fungal cell membrane; Chlorhexidine gluconate involves both bacteriostatic and bactericidal activity by disrupting cell membrane; and benzoyl peroxide involves anti-bacterial activity by disruption of cell membrane and possess keratolytic, antipruritic and follicular flushing property [4]. Thus, the use of medicated shampoos for management of Malasseziasis endures successful inhibition of fungal growth, and also endures successful inhibition of bacterial growth both in superficial and deep skin layers, thereby managing intertrigo simultaneously.

Fig 1: Dog showing mild loss of hair along the upper and lower lip line

Fig 2: Dog showing mild loss of hair along the ventral neck region

Fig 3: Mammary folds showing superficial moist pus accumulation and reddish discolouration

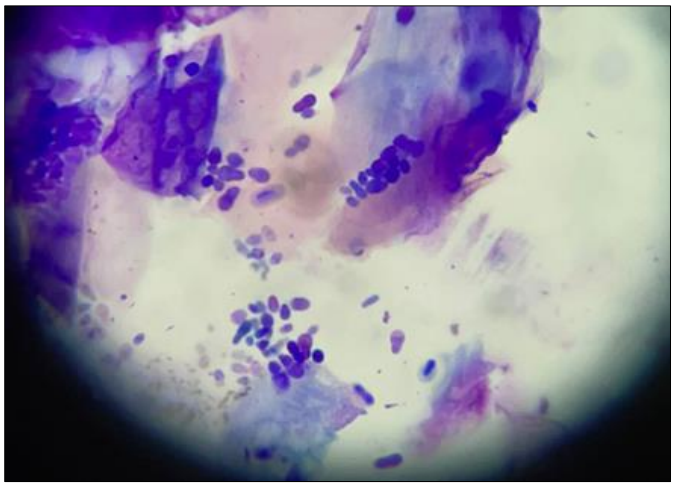

Fig 4: Microscopic examination showing *Malassezia pachydermatitis* in tape impression smear

Fig 5: Bacterial sample was collected from the intertrigo at mammary folds using a swab

Fig 6: Successfully managed intertrigo after two weeks of oral antibiotic and medicated shampoos

Conclusion

Successful management of co-infection of intertrigo and Malasseziasis involves oral administration of antibiotics based on ABST and medicated bath using antibacterial / antifungal shampoos until complete clinical cure.

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