Short Communication

EVALUATION OF ANTIBIOTIC SENSITIVITY OF BACTERIAL ISOLATES FROM CLINICAL CASES OF CANINE DERMATITIS

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ABSTRACT

The study was conducted to identify the common bacteria leading to dermatitis in canines. The swab samples taken from the dermatitis affected dogs brought to MVC teaching hospital were subjected to Antibiotic Sensitivity Test (ABST). A total of 21 dermatitis affected dogs were screened for the presence of Staphylococcus spp and Escherichia coli, by subjecting swab samples for culture by using MSA and EMB agar respectively. All the samples tested positive for Staphylococcus species while 50% of the samples tested positive for Escherichia coli. Subsequent ABST of the collected swab samples revealed resistance towards Penicillin-G (100%), Amoxicillin (91%) and Cefalothin (91%). Fluoroquinolones like Ciprofloxaxin and Levofloxacin showed 60% and 82% resistance respectively. Cephalosporins such as Cefotaxime and Ceftriaxone were moderately resistant (55% and 45.5% respectively) while Clindamycin and Vancomycin showed high level of resistance (82%) indicating rapid emergence of resistance among Staphylococcus spp and E. coli against a variety of antibiotics tested.

Keywords: ABST, Antimicrobial resistance, Canine, Dermatitis

Canine bacterial dermatitis, also called as Pyoderma is a pyogenic cutaneous bacterial infection. It is one of the most common skin diseases of dogs. Dogs are more susceptible to skin infections due to lack of a follicular lipid plug, which acts like a drain stopper, fragile skin barrier and alkaline pH (Keith and Patterson, 2016).

Since dermatological diseases have assumed a prevalent role among dog pathologies, bacterial causes of dermatitis in dog have been investigated worldwide. Different bacteria have been involved in the course of dermatological diseases, among which *Staphylococcus species* and *E. coli,* represent opportunistic pathogens in dogs (Ruscher *et al.,* 2009).

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Skin infections are becoming increasingly resistant to a variety of antibiotics which is a significant cause for concern. Methicillin resistant *Staphylococcus aureus* (MRSA) are highly resistant to antibiotic therapy, conferred in most part by the *mec*A facilitating efflux of antibiotics (Adams *et al.,* 2005). Most of the commonly used antibiotics such as penicillins, cephalosporins and carbapenams have been rendered ineffective in MRSA treatment, and recently many other classes of antibiotics have proven ineffective against MRSA (Thejedor *et al.,* 2002). The emergence of MRSA can be attributed to a variety of factors, prominent among them being the indiscriminate antibiotic usage, sub-therapeutic administration of systemic antibiotics (dose or duration), long term treatment with steroids, failure to identify and manage the underlying cause for repeated infections (Jones *et al.,* 2007).

Topical application of antibiotics has been proven to be highly effective, also minimizing the risk for antibiotic resistance. A wide range of shampoos, sprays, ointments, creams, gels and wipes containing antibacterial and antifungal agents such as chlorhexidine, miconazole, benzoyl peroxide, ethyl lactate, bleach and silver containing products have been efficacious in the treatment of mild and moderate dermatitis (Loeffler *et al.,* 2011). However, in several instances, when the dermatitis is severe with significant bacterial load, a combination of systemic and topical therapy is the way forward. In such instances, ABST should be performed to help in the choice of antibiotic and reduce the opportunity for development of resistance (Valerie, 2014). Antibiotic sensitivity testing (ABST) of antibiotics prior to treatment facilitate early recovery and reduces the occurrence of antimicrobial resistance (Miller *et al.,* 2013). In view of the above, the present study was undertaken to identify the common bacteria responsible for dermatitis in dogs and gain insight into the resistance pattern of these microorganisms against a variety of antibiotics commonly employed in clinical practices.

Twenty one swabs were obtained from lesions of canine dermatitis from dermatitis affected dogs broughted to Madras Veterinary College (MVC) over a period of 60 days (Fig. 1). The samples were subjected to phenotypic screening for *Staphylococcus spp.* and *E. coli* by observing differential growth on MSA and EMB agar, respectively. Antimicrobial susceptibility test was performed by using the standard Kirby-Bauer disk-diffusion method (Quinn *et al.,* 1994). The antibiotics that are commonly used in the treatment of dermatitis in dogs were chosen from the ABST.

The phenotypic screening of the collected samples revealed the presence of *Staphylococcus spp.* (100%) (Fig. 2) and *E. coli* (50%) (Fig. 3) as indicated by growth in MSA and EMB agar respectively. Results of ABST indicated significant emergence of resistance among these bacteria against a variety of antibiotics (Table 1). All the samples showed resistance for Penicillin G followed by Amoxycillin and Cephalothin (91%). Ciprofloxacin and Levofloxacin also exhibited high degree of resistance at 60% and 82%, respectively. Clindamycin and Vancomycin showed increasing resistance against the tested samples indicating 82% resistance for both the drugs. Ceftriaxone

and Cefotaxime were moderately resistant at 45.5% and 55%, respectively. The present study clearly indicates an emerging pattern of resistance thereby narrowing our options for treatment in severe cases of dermatitis. There is a heightened need to develop better strategies in terms of dosage, duration and combinations of antibiotics to deal with the growing problem of antimicrobial resistance in veterinary practice. Similar findings that have highlighted the growing problem of antibiotic resistance in treatment of canine dermatitis and other infections further accentuate the seriousness of the problem warranting immediate intervention in terms of antibiotic usage, duration, dosage etc (Ghidini *et al.,* 2011).

Table 1. Resistance pattern of various antibiotics to commonly employed antimicrobials

Organisms	**Isolate (%)**
Staphylococcus spp.	100
E. coli	50
Antibacterial drugs and its resistance level	
Antibacterial drugs	**Resistant (%)**
Penicillin G	100
Amoxicillin	91
Cefotaxime	55
Ceftriaxone	45.5
Cephalothin	91
Clindamycin	82
Ciprofloxacin	60
Levofloxacin	82
Vancomycin	82

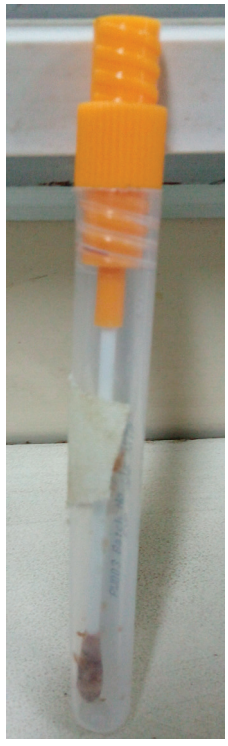

Fig. 1. Canine dermatitis swab

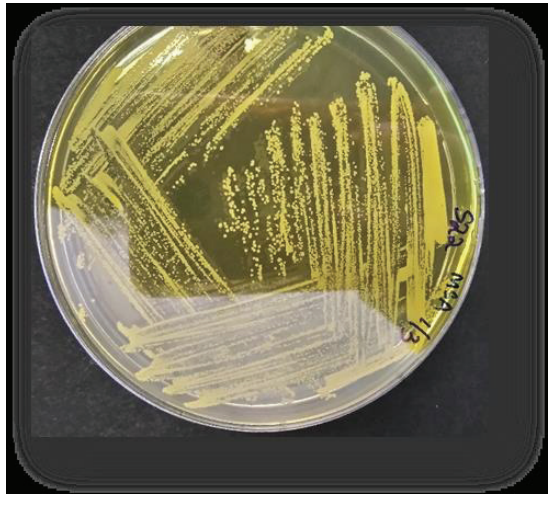

Fig. 2. Growth of yellow colour colonies on MSA agar indicated the presence of S. aureus

Fig. 3. Escherichia coli were differentially isolated on EMB agar

In the current study, it was observed that the commonly used antibacterial agents are resistant to microorganisms causing canine dermatitis. This increasing resistance could be due to an indiscriminate and continuous use of these antimicrobials with improper dose or dosage regimen which may also result in transfer of resistance to human microbes. Hence, we suggest enforcement of strict diagnostic protocol based on identification of bacterial isolates and antibiotic sensitivity testing prior to prescription of antibiotics in the treatment of canine skin diseases.

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