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BACTERIAL ISOLATION FROM THE SURFACE OF SUPERFICIAL CORNEAL ULCER IN DOGS

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ABSTRACT

Seventeen dogs with superficial corneal ulcers were chosen for isolation of bacterial cells. All the dogs exhibited various clinical signs like blepharospasm, photophobia, lacrimation, and restlessness. Corneal swabs were collected from all the dogs prior to a detailed ophthalmic examination. They were subjected to culture and antibiotic sensitivity test and the identification of microorganisms. From the study, *Staphylococcus aureus* was the predominant bacteria isolated from the corneal surface.

Keywords: Dog, superficial corneal ulcer, bacterial isolates

INTRODUCTION

The nutrient rich ocular surface colonizes many microbes which in turn constitute the ocular flora. (Armstrong, 2000). Corneal ulcers are common in dogs, and they are primarily caused by traumatic injuries, following which they become quickly contaminated by bacteria. (Slatter, 2001). The invading pathogenic bacteria produces proteolytic enzymes and toxins that lead to the progression of the corneal ulcer (Whitley, 2000). The eyes are normally resistant to pathogenic microorganisms, but they become infected after injury or systemic diseases (Jones, 1955). According to Gelatt (2000), once the corneal ulcer is infected, the healing process is retarded and can lead to endophthalmitis and glaucoma.

MATERIALS AND METHODS

Seventeen dogs with superficial corneal ulcers were presented to the Teaching Veterinary Clinical Complex, Mannuthy, and the University Veterinary Hospital, Kokkalai. All the dogs had different history of external trauma. Dogs with superficial corneal ulcers exhibited clinical signs like severe blepharospasm, photophobia, lacrimation, and varying quantities of external ocular discharges.

Affected dogs were restless and tried to scratch the affected eye. All the dogs were treated at a nearby veterinary hospital with various ocular medications. On clinical examination, the physiological parameters like heart rate, respiration rate and rectal temperature were within the normal limits. Wet film, peripheral blood smear and buffy coat smear were taken for all the dogs to rule out any haemo-parasitic infections. Random blood sugar level was also examined for all the dogs. Prior to the detailed ophthalmic examination, a corneal swab was taken from the corneal ulcer without touching the periorbital area using sterile ready-made swabs. Proparacaine HCl (0.5%) was used as a topical ophthalmic anaesthetic before the collection procedure. The collected swabs were cultured in blood agar, and an antibiotic sensitivity test was carried out using Muller-Hinton agar. The bacterial

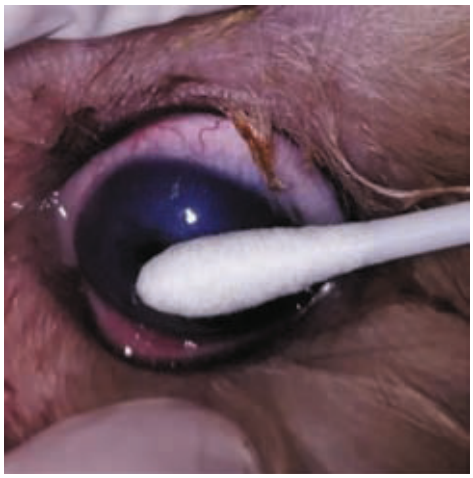

Fig. 1 Collection of corneal swabs

Fig. 2 Superficial corneal ulcer

Table 1. Canine ulcerative keratitis – according to breed, age, sex and affected eye

SI. No.	Breed	Age	Sex	Affected eye
1	Shih tzu	5 months	Female	Left
2	Shih tzu	6 months	Female	Left
3	Labrador retriever	1 years	Female	Right
4	Dachshund	6 years	Male	Right
5	Bull mastiff	2.5 years	Female	Right
6	Beagle	6 months	Male	Left
7	Dachshund	8 years	Male	Left
8	Rottweiler	2 years	Female	Left
9	Dachshund	3 years	Female	Left
10	Labrador retriever	1 years	Male	Left
11	Chinese pug	4 years	Female	Right
12	Chinese pug	2.5 years	Male	Left
13	Chinese pug	1.5 years	Female	Left
14	Spitz	4 years	Female	Right
15	Labrador retriever	2 years	Female	Left
16	Boxer	8 years	Female	Left
17	Labrador retriever	3 years	Female	Left

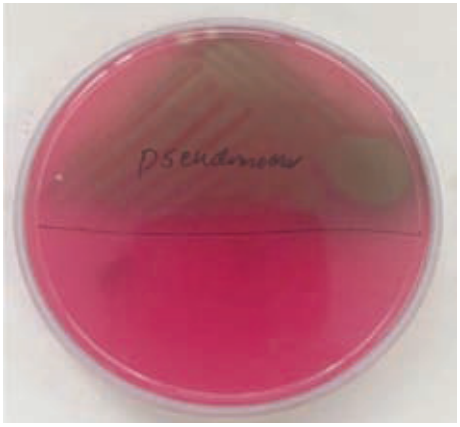

Fig. 3 *Staphylococcus aureus* in blood agar

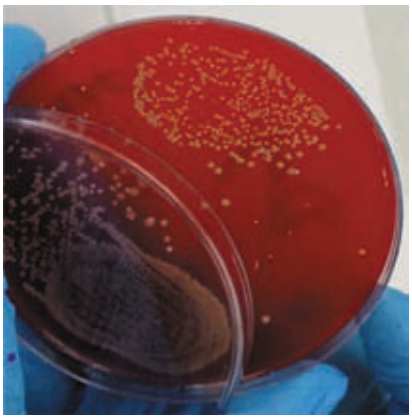

Fig. 4 *Pseudomonas aeruginosa* in blood agar

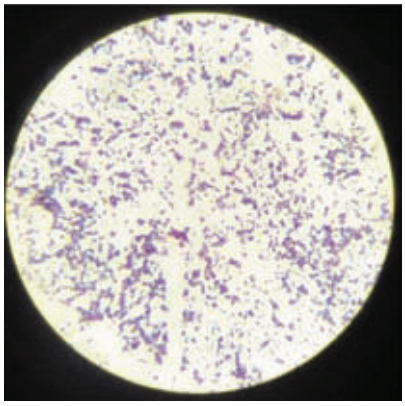

Fig. 5 *Staphylococcus aureus* under 100X

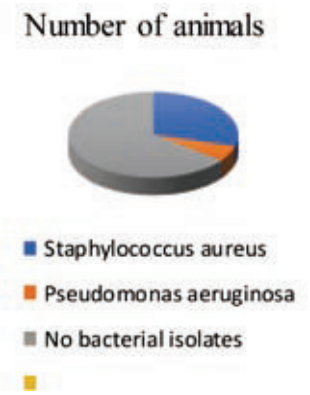

Fig. 6 proportion of Bacterial isolates

isolates were identified based on their culture, biochemical, and morphological properties. All the affected dogs underwent detailed ophthalmic examinations like Schirmer tear test I and II, fluorescein dye test, visual function tests and neuro-ophthalmic examinations. The dogs were subjected to appropriate treatment procedure.

RESULTS AND DISCUSSION

Among the Seventeen dogs, 12 (70.59%) were females and five (29.41%) were males. All dogs were free from blood haemo-parasitic infections. The random blood glucose level did not show any significant correlation with presence of corneal ulcer. Out of Seventeen dogs bacterial isolates were obtained in six (35.29%) dogs. Among that, five were *Staphylococcus aureus* and one was *Pseudomonas aeruginosa.* Schirmer tear test I and II values were within the normal range in all the dogs. Neuro-ophthalmic and visual function tests were positive for all the dogs. All the isolated organisms were sensitive for the antibiotics tobramycin, ceftriaxone, amikacin, gentamicin, cloxacillin, oxacillin, vancomycin and cephalexin.

Moore *et al*. (1988) opined that the appropriate antibiotic therapy is chosen based on the isolated bacteria's antimicrobial susceptibility test result. Gram-positive microorganisms (80.7%) outnumbered Gram-negative bacteria (19.3%) according to the study by Prado *et al.* (2006) and the most isolated species was *Staphylococcus spp*. (45.2%). Similar findings were noticed by Lin and Petersen-Jones (2007). In the study of Wang *et al.* (2008), among the isolates from 28 dogs with ulcerative keratitis, 68.2% were Gram-positive bacteria, while 31.8% were Gram-negative bacteria. Among the bacteria isolated, 47.06% belonged to *Staphylococcus spp.,* followed by *Streptococcus spp.* (12.94%), and 8.24% were *Pseudomonas spp. Staphylococcus intermedius* is the normal resident in the conjunctival sac of the canines and plays an important role in the host defence mechanism (McClellan, 1997). Wang *et al.* (2008) stated that Pseudomonas keratitis is a sight-threatening cause in small animals.

There are two types of conjunctival sac microflora: resident and opportunistic. The resident microflora is normally inhabited in the conjunctival sac, which is non-invasive in nature and isolated in large quantities from the conjunctival swabs. These organisms will prevent the invasion of pathogenic microorganisms through nutritional competition, occupying space, and secreting active substances (Gerding and Kakoma, 1990). The resident flora is destroyed by disease conditions or due to the continuous application of antibiotics or steroids, which allow opportunistic bacteria to invade and cause disease (Ollivier, 2003). In a study conducted by Deepika *et al.* (2022) in 32 dogs with superficial corneal ulcers, all the isolated bacteria were sensitive to the antibiotic moxifloxacin, followed by enrofloxacin, gentamicin, tobramycin, amoxicillin, and ofloxacin.

CONCLUSION

Superficial corneal ulcers are very common in dogs and most of them are unnoticed by the owners. Any disruption in the corneal surface barrier, can leads to bacterial invasion and cause serious complications in future. In the present study *Staphylococcus aureus* was the commonly isolated bacteria from superficial corneal ulcer in dogs. Only 35.29% of the selected cases yielded to bacterial culture and isolation.

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REFERENCES

Armstrong, R.A. 2000. The microbiology of the eye. *Ophthalmic Physiol. Opt.* **20:** 429 – 441.

Deepika, A., Nagaraj, P., Amruth Kumar, V.V.V., Usha Rani, M. and Satish Kumar, K. 2022. Antibiotic sensitivity and cultural pattern of superficial corneal ulcers in dogs. *Pharma Innov.* **11**: 238-240.

Gelatt, K.N. 2000. *Essentials of Veterinary Ophthalmology*, 3rd Ed., Lippincott Williams and Wilkins, Philadelphia. p. 595.

Gerding, P.A. and Kakoma, I. 1990. Microbiology of the canine and feline eye. *Vet. Clin. North Am. Small Anim. Pract.* **20:** 615 – 625.

Jones, W.G. 1955. A preliminary report of the flora in health and disease of the external ear and conjunctival sac of the dog. *J. Am. Vet. Med. Assoc*. **127:** 442 – 444.

Lin, C. T. and Petersen-Jones, S. M. 2007. Antibiotic susceptibility of bacterial isolates from corneal ulcers of dogs in Taiwan. *J. Small Anim. Pract.* **48:** 271–274.

McClellan, K.A. 1997. Mucosal defense of the outer eye. *Surv. Ophthalmol.* **42:** 233–246.

Moore, C.P., Heller, N., Majors, L.J., Whitley, R.D., Burgess, E.C. and Weber, J. 1988. Prevalence of ocular microorganisms in hospitalized and stabled horses. *Am. J. Vet. Res.* **49:** 773-777.

Ollivier, F.J. 2003. Bacterial corneal diseases in dogs and cats. *Clin. Tech. Small Anim. Pract.* **18:** 193 – 198.

Prado, M. R., Brito, E. H. S., Girao, M. D., Sidrim, J. J. C. and Rocha, M. F. G. 2006. Identification and antimicrobial susceptibility of bacteria isolated from corneal ulcers of dogs. *Arq. Bras. Med. Vet. Zootec.* **58:** 1024-1029.

Slatter, D.H. 2001. *Fundamentals of Veterinary Ophthalmology*, 3rd Ed., W.B. Saunders, Philadelphia. p. 640.

Wang, L., Pan, Q., Zhang, L., Xue, Q., Cui, J. and Qi, C. 2008. Investigation of bacterial microorganisms in the conjunctival sac of clinically normal dogs and dogs with ulcerative keratitis in Beijing, China. *Vet. Ophthalmol.* **11:** 145 – 149.

Whitley, R. D. 2000. Canine and feline primary ocular bacterial infections. *Vet. Clin. North Am. Small Anim. Pract.* **30:** 1151-1167.