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Study of Bacterial Isolates in Eye Infection Cases of Dogs

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Abstract

One hundred dogs of different breeds, sexes, and ages with various eye infections were examined over a year. Bacteriological examination of conjunctival swabs taken from both eyes revealed that 38 dogs, 38%, were positive for pathogenic microorganisms. Coagulase-positive *Staphylococcus aureus* was the most predominant 86.4% among isolates. Other microorganisms isolated were Beta-Streptococci 9.1%, followed by *Pseudomonas aeruginosa* 4.5%.

Susceptibility of Staphylococcus aureus to antibiotics indicated that they were susceptible to most antibiotics used but less sensitive to Erythromycin and Ampicillin.

Infected dogs showed excellent response to gentamycin (drops and ointment) treatment.

A higher incidence of infection was significantly 0.05, revealed in females at 57.9%, than in males at 42.1%. The age group of four years in females and two years in males were highly susceptible to infection. The mixed terrier was the most common breed examined at 38%, followed by Shihtzu at 16 %. The maltase breed was susceptible to *Pseudomonse aeruginosa*.

Keywords: Dogs, Eye infection, Microbial isolation, Treatment

Introduction:

In dogs, external eye diseases such as conjunctivitis, Keratitis, Corneal ulceration, Blepharitis, traumatic laceration, and dacryocystitis are widespread [1]. Among the predisposing causes are corneal trauma, foreign bodies, hair irritation, ectopic cilia, chemical burns from shampoos, and corneal disease conditions [2]. Previous surveys have been conducted on the normal conjunctival form of the dogs [3] to establish the microorganisms that may represent potential pathogens when infection is suspected. Microorganisms associated with external eye diseases in dogs and their antibacterial susceptibility were studied [4]. Relationship studies between breed, sex, and age, with the incidence of eye infection being minimal, especially those involving sex and age [5].

There is no previous study in Iraq associated with an eye infection in dogs; accordingly, the present study was undertaken to determine the bacterial sensitivity test for the most common bacterial isolates from diseases eyes of dogs, especially in relation to breed, sex, and age.

Materials and Methods:

One hundred dogs of different breeds, sexes, and ages with clinical signs of various eye infections were examined from 2021-2023. Conjunctival swabs were collected from both eyes of each dog. No topical anesthetics were used. The specimens were transferred immediately to the laboratory under cold conditions. Swabs were inoculated in brain heart infusion broth and incubated at 37 C for 24-48 hours. Blood agar plates, McConkey agar plates, and Mannitol agar were streaked from broth cultures and incubated as mentioned above. The bacteria were isolated in pure culture and identified by standard procedures for bacteria according to [6]. Human plasma coagulase test was used to identify and differentiate Staphylococcus spp, according to [7]. The antibiotic sensitivity test was determined by the Kirby-Bauer method 1966. Using agar diffusion technique (disc method) Oxoid.

Treatment with Gentamycin was used for dogs, and positive results were obtained after laboratory diagnosis of the isolated bacteria. Prognosis and judgment were checked after treatment. Chi-square X2 was used to evaluate distribution frequency related to breed, sex, and age.

Ethical approval

Every experimental technique was authorized by the College of Veterinary Medicine of Kerbala and complied with the ethical approval number (UOK.VET.SU.2022.056).

Results:

100 dogs examined (38%) were positive for a bacterial culture where *S.aureus* was the most predominant isolate, 38 out of 44 isolates (86.4%). Table 1 which was isolated from one or both eyes of dogs.

The susceptibility of *S.aureus* to various antibiotics available is present in Table 2. It was shown that most S. aureus isolates were susceptible to most antibiotics used but less sensitive to Erythromycin and Ampicillin. Beta-hemolytic Streptococci 4 (9.1%) and *Pseudomonas aeruginosa* 2 (4.5%) were highly sensitive to gentamycin.

All infected dogs responded well to the locally applied gentamycin (drops and/or ointment) and were considered healthy after two or three weeks.

According to chi-square, there were significant differences (0.05) between both sexes with positive cultures—i.e. (16 males and 22 females) % 41.1 and 57.9% respectively Table 4.

The age of dogs, two years in males and four years in females was highly susceptible to infection.

The mixed terrier was the most common breed examined (38%), followed by shitzue (16%) Table 3. However, the relationship between breed and incidence of infection was not significant. On the other hand, the maltase breed was more susceptible to *Pseudomonas aeruginosa*.

Table (1) Frequency of bacterial isolation from one or both eyes of dogs.

Isolate	No.	%	Dogs in which bacteria was isolated from one eye		Dogs in which bacteria was isolated from both eye
			Right	Left	
S.aureus	38	86.4	1	12	6(12 eyes)
B.hemolytic	4	9.1	3	1	…….
Streptococcus Spp.	-	-	-	-	-
Pseudomonas aeruginosa	2	4.5	2		……..

Table (2) Antibiotic sensitivity (%) of Staphylococcus aureus isolated from eye infection.

OB	E	P.N	CN	CSI	F.D	AM	C	TE
100	50	37.5	100	94.7	100	81.9	88.9	64.3

Abbreviations antibiotic:
OB: Cloxacillin 5 mg. E: Erythromycin. P.N: Ampicillin 10 mg. CN: Gentamycin 10 mg. SCI: Cephaloridine 30 mg. F.D. Fucidin 10 mg AM: Amoxicillin 25 mg C: Chloramphenicol
TE: Tetracycline 30 mg.

Table (3) Breed distribution of dogs with various forms of eye infection.

Breed	Dogs with positive culture		Dogs examined %
	No.	%	
Mixed terrier	**14**	**36.8**	**38**
Poodle	**4**	**10.5**	**6**
German shepherd	**2**	**5.3**	**6**
Shih Tzus	**8**	**21.1**	**16**
Local	**2**	**5.3**	**2**
Maltase	**2**	**5.3**	**2**
Lasha Apso	**2**	**5.3**	**2**
Mixed breed	**2**	**5.3**	**4**
Cocker Spanie	**2**	**5.3**	**2**
Other	**0**	**0**	**22**
Total	**38**	**100**	**100**

Table (4) Sex distribution of dogs with various forms of eye infection

	No. dogs	%
Female	**22**	**57.9%**
Male	**16**	**42.1%**
Total	**38**	

Discussion:

According to the results mentioned in this study, coagulase-positive *S.aureus* was the most predominant isolated microorganism from dogs with eye infections. This result follows the

pattern reported in dogs [8] and humans [9] that the bacteria most commonly found in normal and infected human and dog eyes were *S.aureus* and Streptococci.
Our findings confirmed the results of others in relation to S. aureus [10]. However, beta–hemolytic Streptococci isolates were less frequently isolated at 9.1%, which differed from those in previous surveys of normal and diseased conjunctival sacs in dogs [11]. While *Pseudomonas Aeruginosa* was isolated from two dogs, 4.5 % with Keratitis and Corneal opacity agreed with [12].
Results of susceptibility testing for antibiotics against the isolates of *S. aureus* showed that gentamycin, Cloxacillin, Cephaoridine, Fucidin, Amoxycillin, and Chloromphincol were highly efficient. All the isolated species showed the same results. Treated dogs recovered after two or three weeks, and there was no reoccurrence of infection except in one dog due to mixed bacterial or fungal infection.
According to previous experience and the results of this study, gentamycin proved to be the most successful antibiotic for the treatment of eye infection, particularly keratitis and corneal ulcers, which was in agreement with [13], who suggests that initial therapy with gentamycin is indicated unless resistance is suspected .while [14] suggested that gentamycin should be reserved for those dogs in which infection with resistant microorganism has been established by bacterial culture, this author also suggested that combination by bacterial culture, this author also suggested that combination of antibiotics is often used in dogs against gram-positive and gram-negative microorganisms.
Information concerning the influence of sex on the frequency of isolation was studied by [15]. However, this study and [16] showed that the sex incidence is significant as females were more affected than males.
While no information is available concerning age incidence, the susceptibility of females at the middle age of life could be attributed to reduced immune responses.
The terrier breed, in general, is known to be more susceptible to eye infection [17]. Our study showed that the mixed terrier represents the most common breed affected with eye diseases, followed by Shin Tzu, whereas [18] reported that the cocker spaniel was the most common breed affected with external eye disease, followed by Shih Tzu. The maltase breed was found to be more susceptible to Pseudomonas aeruginosa. Which were isolated from the right eyes of two dogs; there was no obvious explanation for this.
On the other hand, there is a failure to isolate microorganisms from different breeds, particularly Pekingese, because most of these dogs were treated just before referral for examination [19].
Breed sex and age should be taken into consideration in the diagnosis and treatment of most cases of eye infection in dogs, and the fact that the Maltase breed showed high susceptibility to *Pseudomonas aeruginosa* should have more attention in the future [20].

Conclusion:

The *Staphylococcus aureus* was most predominant, and other microorganisms isolated were beta- streptococci, followed by *Pseudomonas aeruginosa* and *Staph. Aureus*.
Most bacteria are susceptible to Erythromycin and Ampicillin; in some cases, they have an excellent response to Gentamycin drops or Ointment.

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Conflict of Interest:

There are no conflicts of interest

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