

Original Article

Detection of Some Causes of Feline Eye Infections in Baghdad City

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Abstract

The current study aimed to determine the causes associated with ocular infection in cats received at Baghdad veterinary hospital from March 2020 to April 2021. Forty cats (22 females and 18 males) were examined at a small animal clinic in Baghdad veterinary hospital from March 2020 to April 2021. The cats suffered from severe eyes infection (inflammation, lacrimation, redness and other ocular signs). On the other hand, ten healthy cats were examined and prepared for bacterial isolation as a control group. For bacterial isolation, sterile cotton swabs with transport medium were taken gently from the corneal and conjunctiva area of infected eyes. The swabs were placed in an ice box within 24 hours for laboratory culture. Sterile swabs with transport media were used in our study; swabs passed directly on the inferior conjunctival sac of the compromised eye avoiding contact with eyelashes and skin of eyelids. All swabs were inoculated on the following media (5% Sheep blood agar, MacConkey agar and Nutrient agar) at 37°C for 24 to 48 h. ImmunoChromatography assay (ICG) of FCV on samples. The results showed that 50% of Mixed bacterial and FCV were the significant cause of isolates; also, it showed that *S. aureus* was the most bacterial cause of eye infection; young females were mostly infected in February. In conclusion, the wide distribution of ocular infections in cats is due to different causes, especially with bacteria, including Staphylococcus spp. and virus (FCV). The seasonal variation between months plays a significant factor in the spreading of eye infections in the feline.

Keywords: Eyes Infection, Bacteria, FCV, Cats, Baghdad

1. Introduction

Cats have overtaken dogs as the most popular pet in the United States, yet eye infections are prevalent in domestic cats, affecting the eyeball and the surrounding area (1).

All cats, regardless of breed or gender, are vulnerable to conjunctivitis, and the ailment is not heritable. In certain situations, the infection begins in only one section before spreading (2). For example, bacterial infections of the cornea, conjunctival or nasolacrimal drainage systems are related to ocular bacterial infections, as are intraocular infections following penetrating injuries and surgery (3).

Localized eyelid abscesses of glands in the eyelids can be caused by bacterial infections and generalized eyelid infections (4). Additionally, conjunctivitis, blepharitis, keratitis, uveitis, and style were found. Cats' most common clinical concerns are corneal sequestration and corneal ulceration, respectively (5).

Bacteria can also enter the cat's eyes from the environment, as can other pathogens (6). The feline immune system's inflammatory reaction to common pathogens is responsible for most feline conjunctivitis occurrences (7). Staphylococci, hemolytic and nonhemolytic Streptococci, and other genera in feline conjunctivitis, such as *Pseudomonas* spp., *Proteus* spp.,

and *Bacillus* spp., are among the most representative bacterial groupings identified by (8-10)

The current study aimed to determine the causes associated with ocular infection in cats received at Baghdad veterinary hospital from March 2020 to April 2021.

2. Materials and Methods

2.1. Specimen Collection

Forty cats (22 females and 18 males) were examined at a small animal clinic in Baghdad veterinary hospital from March 2020 to April 2021. The cats suffered from severe eyes infection (inflammation, lacrimation, redness and other ocular signs). On the other hand, ten healthy cats were examined and prepared for bacterial isolation as a control group. For bacterial isolation, sterile cotton swabs with transport medium were taken gently from the corneal and conjunctiva area of infected eyes. The swabs were placed in an ice box within 24 hours for laboratory culture.

2.2. Bacterial Culturing and Identification

Sterile swabs with transport media were used in our study; swabs passed directly on the inferior conjunctival sac of the compromised eye avoiding contact with eyelashes and skin of eyelids.

All swabs were inoculated on the following media (5% Sheep blood agar, MacConkey agar and Nutrient agar) at 37°C for 24 to 48 h. If no suspected colonies were observed, plates were kept in incubation for another 48 h before being considered harmful. Isolated microorganisms were identified by colony macroscopic characteristics, Gram staining, and different biochemical tests (11).

2.2.1. ImmunoChromatoGraphy Assay (ICG) of FCV on Samples

1. The cotton swabs were collected from eye discharge secretions.

2. The cassette was taken out from the foil pouch and placed horizontally.

3. The sample was mixed with the diluent, and 2-3 drops of the sample were gradually dripped into the sample holes S (Figure 1).

4. The result was interpreted in 10-15 minutes.

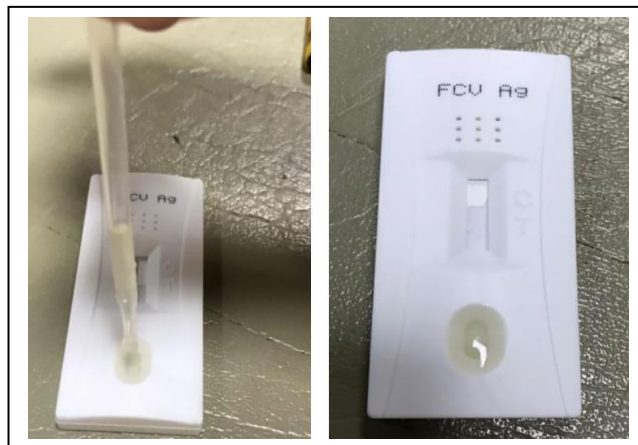


Figure 1. A picture of the rapid test kit (ICG assay)

2.2.2. Interpretation of Results

Positive: The presence of both the C and T bands (Figure 2).

Negative: Only a clear C band appears

Invalid: No coloured and appears in the C zone, no matter whether the T band appears.

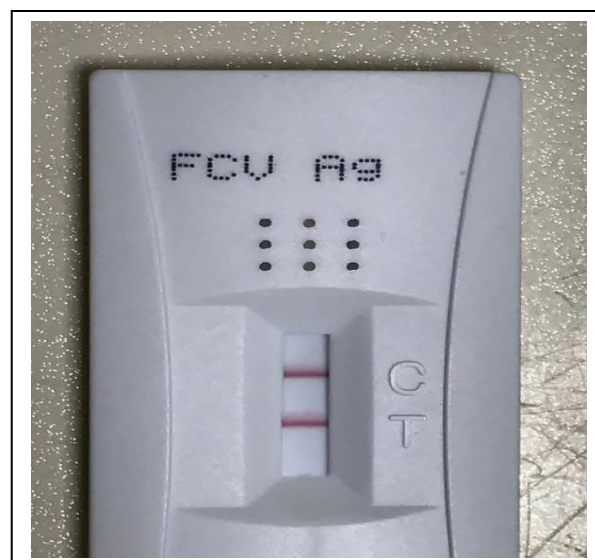


Figure 2. The positive results for FC virus by ICG assay

2.3. FCV (Feline Calci Virus) Antigen Detection Kit

Serum or plasma 2-3 drops into a diluent tube and mix it. The sample was immediately tested after its dilution. The presence of any visible bands on the test band (T) and the control band (C) indicates a positive result (12).

2.4. Statistical Analysis

Data were analyzed by using a statistical program (SPSS program version 20), chi-square test was used for comparison of the results at a level significance of ($P \leq 0.05$).

3. Results

Table 1 showed that 50% of Mixed bacterial and FCV was the significant cause of isolates.

Table 1. The total infection rates of eyes according to the different causes in Baghdad city

Types isolates	Number of isolates	a percentage from 40 sample
Mixed bacterial and FCV	2	50 %
FCV only	5	12.5 %
Bacterial isolates only	12	30 %

*Refer to the presence of significant value vertically at ($P \leq 0.05$)

The results showed that *S. aureus* was the most bacterial isolates of eye infection, while FCV showed a rate of 12% (Table 2).

Table 2. The infection rates of eyes according to types of bacterial isolates and FCV in Baghdad city

Types isolates	Number of isolates	The positive percentage from 40 sample
<i>Staphylococcus aureus</i>	4	10%
<i>Staphylococcus vitulinus</i>	2	5%
<i>Escherichia coli</i>	2	5%
<i>Pseudomonas aeruginosa</i>	2	5%
<i>Bacillus</i> spp.	3	7.5%
FCV	5	12.5%

*Refer to the presence of significant value vertically at ($P \leq 0.05$)

The current results showed that most infections occurred in February (Table 3).

Table 3. The infection rates of eyes according to months in Baghdad city

Months	Number of positive	Infection rate from 40 samples
Jan.	3	7.5%
Feb.	4	10%
Mar.	1	2.5%
Apr.	1	2.5%
May.	2	5%
Jun.	3	7.5%
Jul.	2	5%
Des.	1	2.5%

*Refer to the presence of significant value vertically at ($P \leq 0.05$)

Table 4 shows that most cases of infection were female than male.

Table 4. The rate of eye infection according to the sex of cats in Baghdad

Sex	Number of infected cases	Positive from 40 samples
Male	6	15%
Female	11	27.5%

*Refer to the presence of significant value vertically at ($P \leq 0.05$)

The present results showed that more eye infections occurred in young cats than in old ones (Table 5).

Table 5. The rate of eye infection according to the age of cats in Baghdad

Ages	Number of examined cases	positive from 40 samples
> 1 year	20	(11) 27.5%
<1 year-4 years	20	(6) 15%

*Refer to the presence of significant value vertically at ($P \leq 0.05$)

4. Discussion

Cats' eye infections are prevalent, although not always fatal; if left untreated, they can spread and harm the eye's internal structures, leading to blindness (13). Compared to other domestic species, Gelatt claims that

feline conjunctival and ocular surfaces are usually colonized to a lower degree. An infection can be triggered by various factors, including irritation caused by allergies or viral and bacterial infections in crowded environments and healthy cats coming into contact with infected cats. The results of the current study reveal that the percentage of isolated cats is (78.3%), while the lower rate of (59%) was previously recorded by Lakshmi (4).

Sneezing, coughing, and adventitious lung sounds are all symptoms that can occur in addition to the more severe form of the disease if it is present with other upper respiratory tract pathogens (14).

Staphylococcus species are the most commonly isolated microorganisms, according to La Croix (12), (15). Staphylococcus bacteria are opportunistic and may take advantage of a compromised immune system to cause illness based on these result (17).

Staphylococcus aureus, described by (16), Gelatt (17) and Staphylococcus caprae, described by, as well as other Staphylococcus species not previously reported in feline conjunctiva or other eye infections of cats, including Staphylococcus saprophyticus, Staphylococcus klossi and Staphylococcus spp., were also found in our study.

Corynebacterium has been reported as a cause of significant systemic and ocular infection and conjunctivitis, keratitis, and endophthalmitis in humans. Isolates attributed to Bacillus spp. have previously been found in our laboratory's cat conjunctiva (15).

One of the most common causes of corneal ulcers in small animals is a bacterial infection, and the bacteria that causes this infection, Pseudomonas spp. is the most common cause of this condition (18).

Detecting FC virus infection is essential for quickly isolating infected cats to minimize the spreading of the disease in a susceptible population.

The current findings with FCV were (12.5%) in the eye swabs; these results were supported by a study performed in Brazil, a close rates of infection were recorded in nasal (13.6 %) and eye (11.1 %) swabs (19).

In the present study, the most frequent signs that appeared on the infected cats were fever, respiratory signs, and oral lesions.

These results were agreed with Pesavento, Chang (20) in Australia, while in a study performed in Iran by Avizeh, Seyfi Abad Shapouri (21), the most characteristic lesion in infected cats by FC virus is oral ulceration only.

The study disagrees with Abayli, Sahna (22) in Turkey who isolated the virus at a high rate (76.8%) from symptomatic cats, such variation in the clinical signs might be owing to the length of the period of infection with the spreading of the virus in many other tissues, in addition to the presence of a large number of different strains of FC virus (23).

5. Conclusion

The wide distribution of ocular infections in cats is due to different causes, especially with bacteria, including Staphylococcus spp. and virus (FCV). The seasonal variation between months plays a significant factor in the spreading of eye infections in the feline.

Authors' Contribution

Study concept and design: A. M. R.

Acquisition of data: A. M. R.

Analysis and interpretation of data: A. M. R.

Drafting of the manuscript: A. M. R.

Critical revision of the manuscript for important intellectual content: A. M. R.

Statistical analysis: A. M. R.

Administrative, technical, and material support: A. M. R.

Ethics

The study protocol was approved by the ethics board of the, Baghdad University, Baghdad, Iraq.

Conflict of Interest

The authors declare that they have no conflict of interest.

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