



## MICROBIOLOGICAL EXAMINATION OF CORNEAL ULCER IN DOGS

Priyanka Pandey, A. Shahi & A. Nayak

Nanaji Deshmukh Veterinary Science University, Jabalpur- 482001 (Madhya Pradesh)

MVSc Scholar, Associate Professor Department of Veterinary Surgery and Radiology, Associate Professor, Department of Veterinary Microbiology, College of Veterinary science and A.H. Madhya Pradesh

Corresponding author email: itsmepriyankapandey@gmail.com

### ABSTRACT

The present study was undertaken on 12 clinical cases of dogs irrespective of age, sex and breed, having corneal ulcer for microbiological examination of corneal ulcer. In microbiological examination performed bacteria and fungus staining performed respectively along with antibiotic sensitivity test was also done to identified most sensitive antibiotic for bacterial infection. Microbiological examination of each animal was conducted at 0 day before starting the treatment to check the general health status of the animals.

**KEYWORDS:** corneal ulcer, bacteria, fungus, antibiotic.

### INTRODUCTION

Corneal ulceration or ulcerative keratitis, is one of the most common extra ocular diseases identified in dogs. Corneal ulcer results due to break in the continuity of corneal epithelium that exposes the underlining corneal stroma (Wilkie and Whittaker 1997). In most of cases the cause of corneal ulcers is corneal trauma, however, foreign body, eyelid abnormalities, aberrant cilia, exposure and keratoconjunctivitis sicca (KCS), should also be considered as the causative factors. Uncomplicated superficial ulcer heals rapidly, with mild scar formation, however, complicated deep ulcers, infected with microbia may lead to impaired vision (Miller, 2001). The principles in treatment of corneal ulcer include removal of the primary cause, reduction of inflammation, control of infection, enhancement of corneal healing and minimization of corneal scar. Looking to the high detrimental effect of corneal ulceration in dog there is need to evaluate the major cause of corneal ulcer, newer antibiotic and anti inflammatory drugs to promote corneal ulcer healing.

### MATERIAL & METHODS

The study was conducted on twelve clinical cases of corneal ulcer in dogs, presented at Teaching Veterinary Clinical Complex (TVCC), irrespective of age, sex and breed. Dogs suffering with moderate and severe corneal ulcer were included in the present study. The detailed history of age, breed, sex, hereditary origin, diet and any trauma of the eye was recorded. Clinical examination includes rectal temperature (°F), respiration rate (per minute), pulse rate (per minute) and palpebral mucous membrane was recorded prior to treatment to judge the

health status of the animal. Swab was collected aseptically from corneal ulcer then keep in to the transport media. Gram's staining (Tille, 2014) and Potassium hydroxide (KOH) staining performed for bacteria and fungus respectively. Antibiotic sensitivity test (Kirby-Bauer disk diffusion method for antimicrobial susceptibility test, CLSI, 2013) was also done to identify most sensitive antibiotic for bacterial infection.

### RESULTS & DISCUSSION

#### Microbiological examination

Pre-operative microbiological examination was performed on 0 day before start of treatment in all the dogs of both groups.

#### Bacterial infection

All the dogs were suffering with bacterial infection, 7 (58.33%) dogs were positive for Gram +ve bacteria, out of which 2 dogs were showing Gram +ve cocci in short chains and 5 dogs showed Gram +ve rods in short and long chains Table 02.. One (8.33%) dog was positive for Gram –ve cocco bacilli and 4 (33.33%) dogs were showing mixed bacterial infection.

Present findings were in consonance with the observations of Petersen (2007) and Ramani *et al.* (2013) who suggested bacterial infection in most of the dogs. In the present study bacterial infection was found in most of the dogs which might be due to exposure of moist corneal surface from the surrounding environment and moist and abraded surface of cornea easily pickup the infection another reason for mixed infection may be attributed that because of the presence of ulcer a lot of debris, necrotic material and inflammatory cells accumulate at the site which acts as a good medium for the growth of bacteria.

## Examination of corneal ulcer in dogs

**TABLE 1:** Pre-operative bacterial infection in case of corneal ulcer in dogs

S.No.	Type of infection	No. of dogs	Per cent
1.	Gram +ve	7	58.33
2.	Gram -ve	1	08.33
3.	Mixed infection	4	33.33

### Fungal infection

Ocular corneal swab was taken on the glass slide and then mounted with 10% KOH solution. Out of 12 dogs, 3 (25%) were showing septate and 2 (16.66%) cases were showing non septate hyphae, they were indicative for fungal infection. Thus total 5 dogs were showing mixed infection (Both fungal and bacterial) which account

41.66% (Table 2). Similar finding were also reported by Prado *et al.* (2006). Mixed infection in the present study may be attributed to the fact moist and abraded corneal surface of dog easily pick up the contamination from the surroundings also necrotic material may attract fungal growth.

**TABLE 2:** Pre-operative microbiological examination

Case No.	Bacterial infection (Gram's staining)			Fungal infection (10% KOH mount)
	Gram +ve	Gram -ve	Mixed infection	
1	++	-	-	++
2	+++	-	-	++
3	-	-	++	++
4	-	-	+++	-
5	++	-	-	-
6	-	++	-	+
7	-	-	++	-
8	++	-	-	-
9	+++	-	-	++
10	-	-	++	-
11	+	-	-	-
12	+	-	-	-

Grading scale: Mild (+), Moderate (++), Severe (+++), Absent (-)

### Antibiotic sensitivity test

Antibiotic sensitivity test was performed on 0 day in all the 12 dogs. Out of 12 dogs, 7 (58.33%) dogs were sensitive, 4 (33.33%) dogs intermediate and 1 (8.33%) dog was resistant for moxifloxacin (Table 03). In rest of the antibiotic discs, cefoperazone, amikacin and gentamicin also showed sensitivity towards the bacterial infection. Prado *et al.* (2006) reported bacterial growth in 100% samples and it was sensitive to the gentamicin, ciprofloxacin, chloramphenicol and tobramycin. Ramani *et*

*al.* (2013) also found that the pathogens were more sensitive to cefotaxime followed by enrofloxacin, tetracycline, gentamicin, azithromycin and amoxicillin. In the present study antibiotic moxifloxacin was used which is a recent antibiotic used for the treatment of corneal ulcer in human patients. It has great penetration power and easily enters into the deep layer of cornea and hence it is effective for Gram +ve as well as Gram -ve bacteria.

**TABLE 3:** Pre-operative antibiotic sensitivity test

Case No.	Cefoperazone (CPZ)	Cefpodoxime (CPD)	Ceftazidime (CAZ)	Cefepime (CPM)	Imipenem (IPM)	Gentamicin (GEN)	Amikacin (AK)	Moxifloxacin (MO)
1	S	R	R	S	S	S	S	S
2	S	S	R	S	R	S	S	S
3	S	R	R	I	R	S	S	I
4	S	R	R	S	S	S	S	S
5	S	R	R	S	R	S	S	S
6	S	R	R	I	R	S	S	I
7	S	R	R	S	S	S	S	S
8	R	R	R	R	R	R	R	I
9	S	R	R	S	S	S	S	S
10	R	R	R	S	R	R	R	R
11	S	R	R	S	R	S	S	I
12	S	R	R	I	R	R	S	S

Grading scale: Sensitive (S), Resistant (R), Intermediate (I)

**CONCLUSION**

All the dogs were suffering with bacterial infection, 7 (58.33%) dogs were positive for Gram +ve bacteria. Out of 12 dogs, 3 (25%) were showing septate and 2 (16.66%) cases were showing non septate hyphae, they were indicative for fungal infection.

Thus total 5 dogs were showing mixed infection (Both fungal and bacterial) which account 41.66%. Out of 12 dogs, 7 (58.33%) dogs were sensitive, 4 (33.33%) dogs intermediate and 1 (8.33%) dog was resistant for moxifloxacin. In rest of the antibiotic discs, cefoperazone, amikacin and gentamicin also showed sensitivity towards the bacterial infection.

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