

Video otoscopic, radiographic and clinical evaluation of dogs suffering from ear affections

Harsimran Kaur¹, Jasmeet Singh Khosa^{2*}, Jitender Mohindroo³, Shashikant Mahajan³ and Nittin Dev Singh⁴

Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana-141 004 (Punjab)

¹MVSc Scholar, ²Assistant Professor, ³Professor, Department of Veterinary of Surgery and Radiology; ⁴Associate Professor, Department of Veterinary Pathology, College of Veterinary Science

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The present study involved video otoscopic, radiographic and clinical examination of 100 dogs suffering from various ear affections. Video otoscopy was performed in 45 dogs and various kinds of exudates and lesions like inflammation, erythema, proliferation of glands, ulceration, maggots, crusts and masses were observed. Tympanic membrane could be visualised in 19 (42%) cases, which was intact in 14 (31%) cases and ruptured in five (11%) cases. Ear canal cytology was performed in 96 dogs and highest occurrence of bacterial infection (57, 60%) was recorded. Culture and sensitivity testing was done in 31 cases with chronic recurrent otitis externa and Staphylococcus spp. was noticed in most cases (14, 45%). Most of the bacterial isolates were found to be sensitive to Enrofloxacin, followed by Amikacin and Gentamicin. Survey radiography revealed unilateral or bilateral calcification of ear canal in 50 out of 100 dogs. Unilateral or bilateral increase in radio-opacity of tympanic bulla was noticed in 26 dogs and unilateral lysis of tympanic bulla and adjoining bony structures was observed in one dog. The study concludes that video otoscopy is a useful diagnostic modality for precise and accurate assessment of ear canal affections along with radiography and clinical examination as important diagnostic tool that helps in deciding the line of treatment.

Keywords: Cytology, Dog, Ear, Otoscopy, Radiography

Diseases of the external and middle ear are common problems in dogs and comprise a substantial part of affections encountered in small animal practice. The diseases of the ear canal are usually represented by certain clinical signs such as inflammation, pain, malodour, excessive scratching, discharge, itching and head shaking. A systematic diagnostic procedure including proper history, clinical examination, otoscopy, cytology, culture and sensitivity, otitis media assessment and biopsy is required depending on the severity of the condition (Jacobson, 2002).

Otoscopy enables discerning the amount as well as consistency of the ear wax, presence of any kind of discharge, foreign body or mass in the ear canal and associated inflammation and stenosis. The tympanic membrane is also evaluated for perforations or any change in opacity. Ear canal cytology is considered effective in confirming inflammatory changes and any kind of infection. It also provides important informa-

tion regarding the choice of appropriate medical therapy. Bacterial culture and antimicrobial susceptibility testing are also essential to choose appropriate antimicrobial agents in chronic and recurrent cases. Radiographic changes in the ear canal and tympanic bulla provide an assessment about the disease condition and thus help in evolving a suitable line of treatment. The aim of the present study was to evaluate the utility of video otoscopy as an adjunct to radiographic and clinical examination of various ear affections in 100 dogs.

Materials and Methods

The study was conducted on 100 dogs of either sex, different breeds and age groups, suffering from different ear canal affections reported to the Department of Veterinary Surgery and Radiology, College of Veterinary Science, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana.

A thorough history of the cases was taken, comprising of the presenting complaint, duration of disease, previous treatment, head shaking, head tilt, itching or scratching and other signs indicating problem of ear canal. The signalment, anamnesis and clinical observations were recorded. Haematological parameters were estimated. Otoscopy was performed to evaluate the patency of ear canal and presence of injury, ulceration, foreign body, any mass or tumour in the ear canal, and to know the integrity and appearance of tympanic membrane.

Ear canal cytology was performed to identify ear infection and inflammatory cells in all the dogs. The swab samples of cerumen or otic discharge were collected preferably from horizontal ear canal or the junction of horizontal and vertical ear canal. In chronic/recurrent cases, antibiotic sensitivity test was done to find effective antibiotic therapy. Plain dorsoventral radiographs of skull were taken in all the cases to determine stenosis, increased opacity and calcification of ear canal. Tympanic bullae were also checked for increased opacity and possible changes in the wall.

Results and Discussion

In the present study, the mean $\pm$ SE value of age of the dogs presented with ear canal affections was 6.00 $\pm$ 0.34 yr, ranging from 0.5 to 16 yr of age; and the

*Corresponding author; E-mail: jasmeetkhosa@gmail.com

Table 1: Otoscope examination of ear canal in dogs (n=45).

Otoscope finding	No. of cases	Per cent (%)
Yellow purulent exudate	8	18
Inflammation (alone)	6	13
Proliferated glands	6	13
Pale brown exudate	4	9
Maggots	4	9
Ulceration	4	9
Crusts	4	9
Dark brown exudate	3	7
Mass	3	7
Erythema	2	4
Wax ball	1	1

**Fig. 1:** Otoscopic view of normal ear canal.**Fig. 2:** Otoscopic view of ear canal with dark brown exudate with ear mites.**Fig. 3:** Otoscopic view of ear canal with wax ball.**Fig. 4:** Otoscopic view of ear canal with proliferative masses in vertical ear canal.**Fig. 5:** Otoscopic view of ruptured tympanic membrane.

incidence of the disease was found to be highest in middle-aged dogs of 3 to 7 years age group (44%), followed by the age groups of 7 to 10 years (28%) and 1 to 3 years (16%). A lower incidence of ear canal affections was observed in dogs over 10 years of age (11%), while the dogs of less than one year were least affected (1%). Male dogs constituted higher number of the cases presented with ear canal affections (83%) than female dogs (17%). The body weight of dogs ranged from 4-50 kg with mean $\pm$ SE value of 26.56 $\pm$ 1.07 kg. It was observed that large sized dogs with body weight more than 25 kg were predominantly affected (63%). The possible reason for predisposition of heavier dogs to otitis was deemed to be large breed and obesity (O'Neill *et al.*, 2021)

Breed wise study on prevalence revealed that Labrador Retrievers (24%) were over represented, followed by German Shepherds (21%). Similar findings were reported by Świącicka *et al.* (2015), who have observed higher occurrence of otitis in Labrador Retriever, Golden Retriever, German Shepherd, Cocker Spaniel and Yorkshire Terrier breeds of dogs.

Head shaking and scratching were seen as most common clinical signs, exhibited by 88/100 dogs. Head tilt towards the side of affection was observed in 10 dogs. Among the total cases, otorrhea was the major problem in 91 dogs; however, in five cases erythema and pain were noticed without any otic discharge. Complete occlusion of the ear canal was observed in 3 cases and mass involving whole ear canal in 1 case.

The mean $\pm$ SE duration of disease was observed to be 5.33 $\pm$ 0.97 months, and it ranged from 3 days to 72

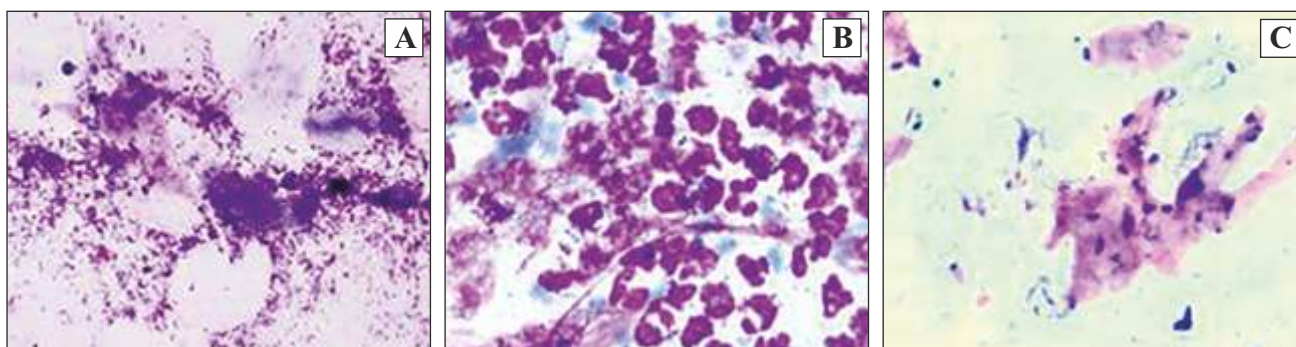


Fig. 6: Cytology showing (A) mixed bacterial infection of rods and cocci, (B) marked inflammatory response to cocci bacterial infection and (C) *Malassezia* overgrowth and squamous epithelial cells.

months. Chronic cases were relatively more (56%) than acute cases (44%); this classification was made as per Bajwa (2019), who classified otitis as acute when it was less than 3 months duration and chronic, which lasted for 3 months or longer.

During the clinical examination of 91 cases with otorrhea, a yellow to green purulent discharge was seen in 58% cases, followed by yellowish-brown purulent discharge in 13% cases and blood mixed discharge in 12% cases. Pale brown ceruminous, white watery, and dark brown exudates were recorded in 7%, 6% and 4% cases, respectively.

The haematological parameters were within the normal physiological range for majority of the cases. A rise in TLC above normal levels was observed in 22 of the 92 (23.9%) cases subjected to haematological estimation, while neutrophilia was recorded in 76 (82.6%) cases. Eosinophilia was seen in four (4.3%) cases.

Otoscopy was performed in 45 dogs with patent ear canals and various lesions were observed. Inflammation of varying degrees at various sites of ear canal was predominant finding in 38 (84.44%) cases, which was accompanied by different kinds of exudates, proliferation of glands, ulceration, maggots and masses. Various findings of otoscopic examination are listed in the table 1 and Figs. 1-4. Tympanic membrane was also visualised in 19 (42%) cases; it was found to be intact in 14 (31%) cases and ruptured in five (11%) cases (Fig. 5). It could not be visualised in 26 (58%) cases because of stenosis, presence of masses, excessive hair and debris obstructing the view of the otoscope.

Ear canal cytology was performed in 96 dogs. It was noticed that the occurrence of bacterial infection was more, comprising 57 (60%) cases. Most of the cases with bacterial infection showed mixed rods and cocci (36, 38%; Fig. 6A), followed by only cocci in 12 (13%) cases and only rods in nine (9%) cases. Mixed bacterial and fungal infection was seen in 27 (28%) cases. In nine (9%) cases, only fungal infection was seen, which was appreciated as round, oval or pear-shaped yeast cells of *Malassezia* spp (Fig. 6C). Neutrophils and macrophages along with the keratinized epithelial cells were also seen supporting the evidence of

infection (Fig. 6B). Similar findings were observed by Shaw (2016) who stated that bacterial and yeast infections comprise the major proportion of the cases with ear disease. Direct examination of cytological slides from three dogs with dark brown ear exudate revealed presence of ear mite, *Otodectes cyanotis*.

On studying relationship between nature and exudates and cytological examination in 91 dogs with otorrhea, it was found that 45 of the 53 (85%) dogs with yellow to green purulent discharge had bacterial infection, while a mixed infection with bacterial and fungal organisms was observed in eight (15%) dogs, suggesting that yellow to green purulent discharge was predominant in cases with bacterial infection. Mixed fungal and bacterial infection was seen in all of the 12 dogs (100%) with yellow brown purulent otic exudate. Blood mixed purulent discharge was seen in 11 dogs, out of which six dogs revealed bacterial and five dogs showed mixed bacterial and fungal infection. Fungal infection was observed in all six (100%) dogs with pale brown ceruminous exudate. Five dogs had white watery discharge comprising three (60%) bacterial and two (40%) fungal infections. Dark brown otic discharge was observed in four dogs, out of which mite infestation was seen in three dogs and fungal infection in one dog.

Culture and sensitivity testing was done in 31 cases with chronic recurrent otitis externa. *Staphylococcus* spp. was noticed in 14 (45%) cases, which was significantly higher than other bacterial types isolated in the study. *Pseudomonas aeruginosa* was found alone and in combination with *Staphylococcus* in five and two cases, respectively. *Proteus mirabilis* was seen in 4 cases and *Streptococcus* spp. in four cases. In one case, *Escherichia coli* was isolated alone, and in another case *Escherichia coli* and *Staphylococcus* in combination were isolated.

Most of the bacterial isolates i.e., 29/31 (93.55%) were sensitive to Enrofloxacin, followed by aminoglycosides- Amikacin and Gentamicin in 28 (90.32%) cases, 19 (61.29%) isolates were found to be sensitive to Ciprofloxacin, 15 (48.38%) to Kanamycin, 11 (34.37%) to Ofloxacin, 10 (32.25%) to Neomycin, 10 (32.25%) to Chloramphenicol, one (3.22%) to ceftriaxone and one (3.22%) to Pefloxacin.

Survey radiography was done in all the cases and showed calcification of ear canal in 50/100 dogs. Bilateral calcification was seen in 33% dogs varying from mild to severe ossification while 17% dogs showed unilateral calcification. Most of the cases with calcification also exhibited increased opacity, soft tissue opacity or fluid opacity of the ear canals. This indicated that more than 50% cases in the present study were suffering from chronic ear affections. Soft tissue or fluid opacity without any evidence of calcification was observed in 23% dogs, comprising unilateral affection in 11% dogs and bilateral in 12% dogs. Slight increase in opacity accompanying mild-moderate stenosis was manifested in 14% dogs (unilateral- 11% and bilateral- 3%). Radiographically normal ear canals were observed in 13% dogs, indicating early/ initial stage of the disease. Similar findings with regard to chronic bilateral otitis externa were recorded by Zur (2005) who reported radiographic findings of significant calcification and obstruction with an absence of air in the ear canals.

Increased radio-opacity of tympanic bulla was noticed in 26% dogs indicating extension of infection to middle ear, which was bilateral in 19% and unilateral in 7% dogs. Unilateral lysis of tympanic bulla and adjoining bony structures was observed in one case. Similarly, Doust *et al.* (2007) interpreted radiographic findings of the tympanic bullae as increased soft tissue opacity of lumen, roughening or thickening of the wall.

From the present study it can be concluded that video otoscopy is a useful diagnostic modality for

precise and accurate assessment of ear canal affections along with radiography and clinical examination that can help in deciding the line of treatment.

References

- Bajwa, J. 2019. Canine otitis externa - treatment and complications. *Can. Vet. J.* **60**:97.
- Doust, R., King, A., Hammond, G., Cave, T., Weinrauch, S., Mellor, D. and Sullivan, M. 2007. Assessment of middle ear disease in the dog: a comparison of diagnostic imaging modalities. *J. Small Anim. Pract.* **48**: 188-192.
- Frazer, G., Withers, A.R. and Spruell, J.S.A. 1961. Otitis externa in the dog. *J. Small Anim. Pract.* **2**: 32-47.
- Jacobson, L.S. 2002. Diagnosis and medical treatment of otitis externa in the dog and cat. *J. South Afr. Vet. Assoc.* **73**: 162-170.
- O'Neill, D.G., Volk, A.V., Soares, T., Church, D.B., Brodbelt, D.C. and Pegram, C. 2021. Frequency and predisposing factors for canine otitis externa in the UK—a primary veterinary care epidemiological view. *Canine Med. Genet.* **8**: 1-16.
- Shaw, S. 2016. Pathogens in otitis externa: diagnostic techniques to identify secondary causes of ear disease. *In Pract.* **38**: 12-16.
- Świącicka, N., Bernacka, H., Fac, E. and Zawislak, J. 2015. Prevalence and commonest causes for otitis externa in dogs from two Polish veterinary clinics. *Bulg. J. Vet. Med.* **18**: 65-73.
- Zur, G. 2005. Bilateral ear canal neoplasia in three dogs. *Vet. Dermatol.* **16**: 276-280.