

Otoscopic and Radiographic Examination of Dogs Suffering From External Ear Affections

Megha Gaur*, Reshma Jain, Brahm Prakash Shukla, Nidhi Shrivastava, Atul Singh Parihar, Vishal Kaushik

ABSTRACT

Otoscopic and radiographic examinations are effective tools to diagnose the ear affections like otitis externa, chronic hypertrophic otitis externa, neoplasia, pathological changes of ear canal, etc. The otoscopic examination of 84 dogs revealed presence of different types of texture and colour of exudates in the ear canal. It revealed that the inner wall of external ear canal suffered with erythema, ulceration, hyperplasia of inner wall, hyperplasia of ceruminous glands, presence of excessive hair and polyp. Radiography revealed stenosis, calcification of ear canal, bilateral involvement of ear and increased opacity of the tympanic bulla. Otoscopy and radiography are thus practical and accessible tools for detecting changes in the ear canal and other related structures.

Keywords: Calcification, Exudates, Opacity, Otitis externa, Otoscopy, Radiography.

Ind J Vet Sci and Biotech (2023): 10.48165/ijvsbt.19.6.07

INTRODUCTION

Ear affections are very common ailments in dogs which affect the general health and may produce further complications in canine practice. Otoscopy is a useful and effective tool in the diagnosis of ear affections. It facilitates direct visualization of the external ear canal and its detailed structures via magnification (Parlak *et al.*, 2021). It is helpful in assessing the normal and pathological appearance of the different ear structures (Ali, 2007). Radiography of the external ear canal can provide information on the integrity of the external ear canal (Gupta *et al.*, 2017), chronic proliferation, calcification and neoplasms (Parlak *et al.*, 2021). The radiographic view enables comparison between the left and right sides, which can aid recognition of abnormalities (Benigni and Lamb, 2006). Looking towards the importance of imaging techniques, the objective of this study was to use the otoscope and radiograph of ear canal to diagnose the different types of gross lesion of ear canal for better understanding of ear diseases.

MATERIALS AND METHODS

The present work was carried out in the Department of Veterinary Surgery and Radiology, Veterinary Clinical Complex (VCC), College of Veterinary Science and A.H., Mhow, NDVSU, Jabalpur (India) on 84 clinical cases of dogs presented for the treatment of external ear diseases. In cases of recurrent/chronic otitis, external ears were palpated at the base of ear, and then further examined otoscopically and radiographically.

Before otoscopic examination all hair and debris adhering to the external tympanic concavity were removed.

Otoscopy examination was done with the help of LED mini hand-held otoscope with different sized speculums to record any lesion in the external ear canal like ulceration,

Department of Veterinary Surgery and Radiology, College of Veterinary Science and Animal Husbandry, Mhow-453446 (Nanaji Deshmukh Veterinary Science University, Jabalpur) Madhya Pradesh, India

Corresponding Author: Megha Gaur, Department of Veterinary Surgery and Radiology, College of Veterinary Science & A.H., Mhow, NDVSU, Jabalpur, India, e-mail: vetmeghagaur1996@gmail.com

How to cite this article: Gaur, M., Jain, R., Shukla, B. P., Shrivastava, N., Parihar, A. S., & Kaushik, V. (2023). Otoscopic and Radiographic Examination of Dogs Suffering From External Ear Affections *Ind J Vet Sci and Biotech*. 19(6), 30-33.

Source of support: Nil

Conflict of interest: None

Submitted 22/05/2023 **Accepted** 25/07/2023 **Published** 10/11/2023

erythema, hyperpigmentation, crustation, amount and type of exudates, injury, foreign body or any mass in ear canal passage as per the procedure described by Shenoy (2004). Animals which were furious or did not allow otoscopic examination due to pain were sedated before examination.

The radiographic examination was done by using 65 mA X-ray machine with manual processing and 500 mA computed radiographic unit. Three radiographic projections, viz., lateral, ventro-dorsal and dorso-ventral of head were done depending on type of affection. Radiographic examination was done to rule out any pathological changes in ear canal, viz., narrowing of ear canal, ossification of ear canal etc. in chronic cases of otitis and to diagnose the extent of tumor or other type of hypertrophic growth in the ear canal.

RESULTS AND DISCUSSION

Otoscopy examination was performed in 84 dogs suffering from external ear affections. In some animals, it was difficult to pass the otoscope into the ear canal due to stenosis or

growth causing blockage of the ear canal. Initially, the ear canal was examined without cleaning for inspection of the exudates, followed by flushing with lactic acid and salicylic acid ear cleaning solution, being non-irritant, to remove wax and debris for inspection of the changes in ear canal epithelium. In some cases, symptomatic therapeutic treatment was given to reduce the inflammation for facilitating otoscopic examination. Huang *et al.* (2009) also stated that in chronic otitis, otoscopy may be difficult due to the accumulation of exudate and debris in the canal, or even impossible due to thickening or hyperplasia of the aural integument.

Texture and Colour of Exudates in the Ear Canal

The otoscopic examination of 84 dogs revealed presence of different types of texture and colour of exudates in the ear canal, viz. yellowish (pus) exudates (41.67%, 35/84), sanguinopurulent exudates (22.60%, 19/84), no exudates (13.10%, 11/84), blackish dry wax (8.33%, 7/84), creamy white exudates (7.10%, 6/84), brownish yellow exudates (3.60%, 3/84) and brownish sebum (3.60%, 3/84) (Fig. 1 & 2). The otoscopic examination provided a presumptive diagnosis of the infection type on the basis of texture and colour of wax / exudates, although significant differentiation of the colour of exudates was difficult in some cases.

Reddy (2014) observed purulent and ceruminous secretions in 4 ears, inspissated pus in 1 ear, ulcerations of external ear canal in 3 ears and excessive hair in 4 ears, that were unnoticed during naked eye examination in 6 dogs

suffering from otitis externa. Similarly, Singh *et al.* (2016) observed otorrhagia (5 cases), maggots (6 cases), suppurative otitis externa (7 cases), foreign body (2 cases) and tumour like mass (1 case) on otoscopic examination. They also observed black necrotic exudates in chronic otitis externa cases. Kamaljyoti (2015) reported the presence of brownish to black sebum in cases of yeast or ear mites infestation, while dark black wax with erythematous ceruminous lesion in fungal infection. Francesconi and Lupi (2012) observed brownish yellow discharge in maggotized wounds of ear along with inspissated pus. It is suggested yeast otitis or ear mites infestation causes dark brown waxy exudates, Gram positive bacterial infection causes tan coloured moist exudates and Gram negative bacterial infection causes purulent liquid or mucoid exudates (Gottself, 2016).

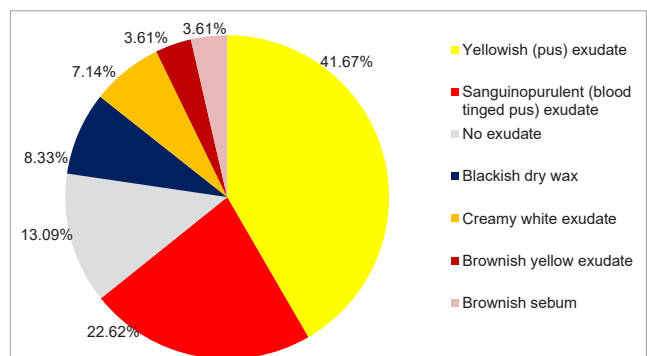


Fig. 1: Frequency of different texture and colour of exudates in the ear canal evident on otoscopic examination

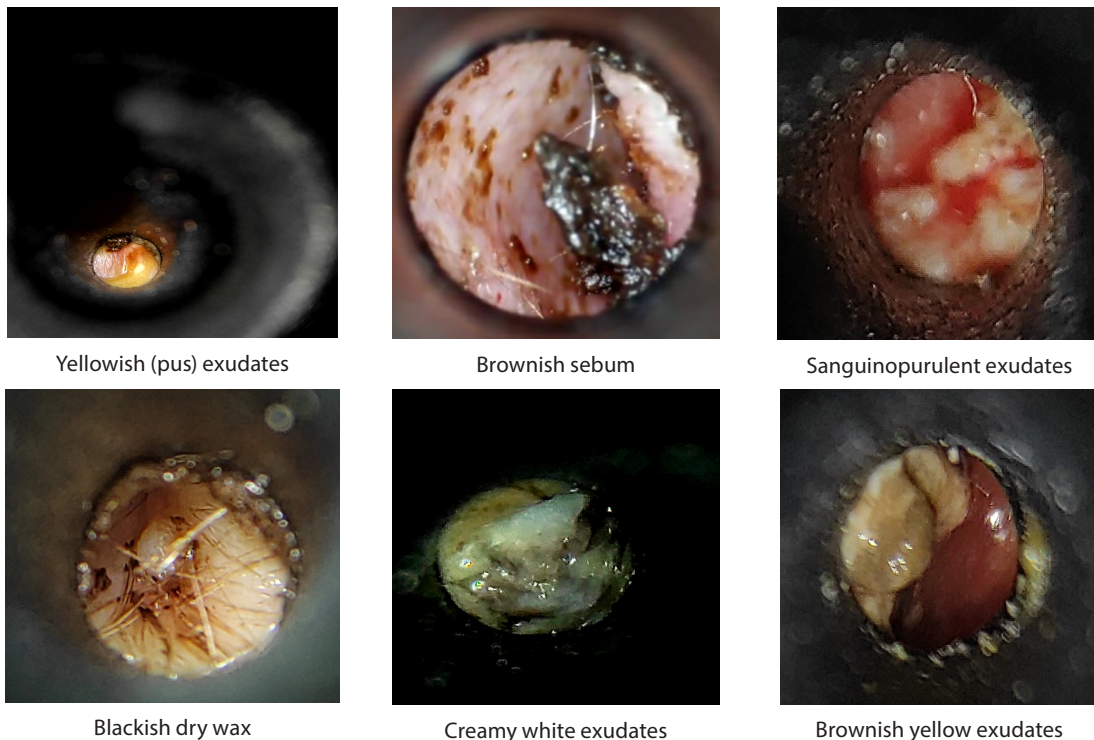


Fig. 2: Otoscopic visualization of exudates in ear canal and changes on inner wall of the external ear canal

Otoscopic examination of inner mucous membrane of ear canal showed erythema in 73.80% (62/84) dogs, ulceration in 29.76% (25/84) dogs, no change in inner wall in 11.90% (11/84) dogs, hyperplasia of inner wall in 7.14% (6/84) dogs, hyperplasia of ceruminous glands in 5.95% (5/84) dogs and polyp in 3.57% (3/84) dogs. Presence of excessive hair was also observed in ear canal in 3.57% (3/84) cases leading to incomplete visualization of ear canal. The ear canal was stenosed in cases of polyp, epithelium hyperplasia and ceruminous gland hyperplasia which lead to difficulty in further advancement of otoscope in the ear canal (Fig. 3).

Maniscalco *et al.* (2009) observed purulent secretions, ulcerated, hyperaemic or hyperplastic epithelium on otoscopic examination of 20 dogs. They further opined that otoscopy plays an important role in diagnosis and determining the prognosis of the auricular disorders. Usui *et al.* (2011) noted the considerable amount of foreign bodies (hair) adhered to external tympanic concavity and further they concluded that otoscopy helped to clean the ear canal from debris.

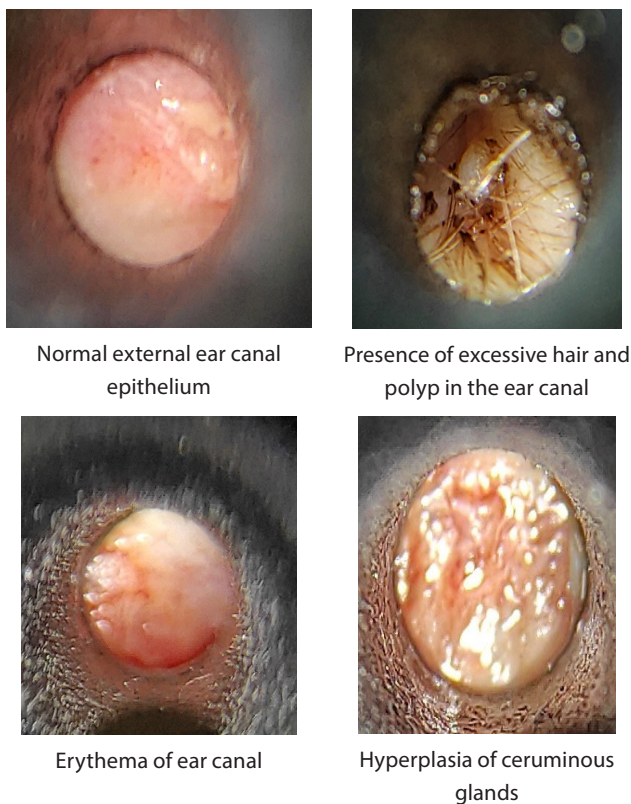


Fig. 3: Otoscopic visualization of the external ear canal epithelium

Radiographic Examination

Radiographic examination was done in 24 cases to rule out the causative factors during the study of ear affections. Study showed stenosis of ear canal in 87.50% (21/24) dogs, increased opacity of the tympanic bulla in 45.83% (11/84) dogs, bilateral involvement of ear canal in 20.83% (5/24) dogs

and calcification of cartilage of ear canal in 16.67% (4/24) dogs (Fig. 4-7). Our findings also concurred with Mahbubani (2017), who recorded stenosis of the ear canal in 22 dogs and calcification of the cartilage of the ear in 17 dogs, increased opacity of the tympanic bulla in 19 dogs, soft tissue density in 14 dogs and bilateral ear disease in 8 dogs. Sudhakar (2019) reported stenosis of ear canal in 42.65% dogs and increased radiopacity of bulla in 33.82% dogs out of 68 dogs.

Simpson (1997) stated that presence of air in the external ear canal helped to distinguish the canal from the surrounding soft tissue and to detect the abnormalites (Fig. 8). Hoskinson (1993) described the normal tympanic bulla structure on radiograph as air-filled rounded structures at the base of skull (Fig. 9). In chronic cases, excessive thickening of the aural integument and stenosis of the ear canal accompanied with ossification of the cartilage of the ear could usually be seen in end stage otitis externa and otitis media (Parlak *et al.*, 2021). Evaluation of tympanic bulla for the presence of increased opacity or thickening of the osseous bulla indicates otitis media, which is often sequelae of chronic otitis externa (Thrall, 2009).

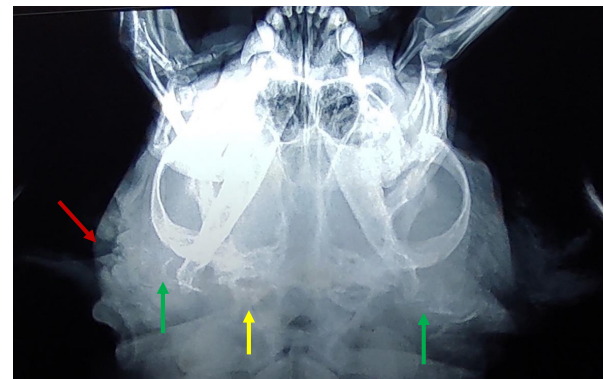


Fig. 4: Dorso-ventral projections showing tumourous growth in right ear (red arrow), calcification of both ear canal (green arrow) and increased opacity with ill-defined contour of the right tympanic bulla (yellow arrow)



Fig. 5: Dorso-ventral projection showing stenosis of both ear canal (green arrow) and increased opacity of the right tympanic bulla (yellow arrow)

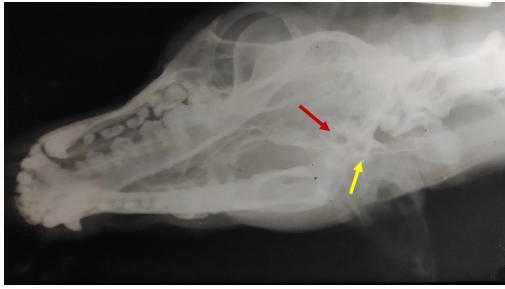


Fig. 6: Left Lateral oblique projection showing increased opacity of the left tympanic bulla (yellow arrow) than the right (red arrow)

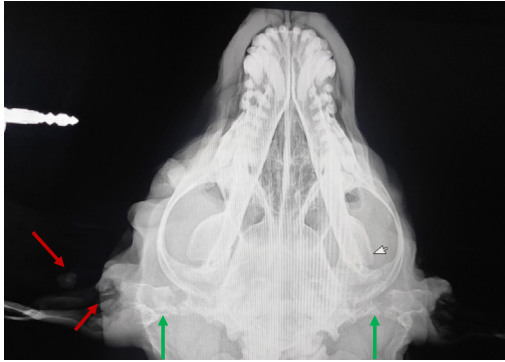


Fig. 7: Dorso-ventral projections showing tumorous growth on pinna and in right ear canal (red arrow), calcification of both ear canal (green arrow)

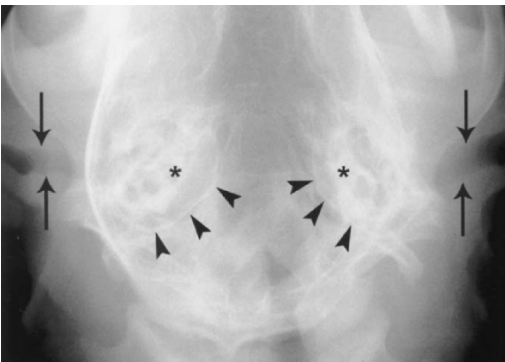


Fig. 8: Normal dorso-ventral radiograph of the middle ear. The soft tissue exposure technique allows visualization of the external ear canals (arrows). The walls of the tympanic bullae (arrowheads) surround the petrosal portions of the temporal bones (asterisks) (Gotthelf, 2004)



Fig. 9: Normal left lateral projection radiograph showing tympanic bulla of both sides overlapping each other (yellow arrow)

REFERENCES

- Ali, M. (2007). Otoscopy is a good technique for diagnosis of ear diseases in small animals. *Assiut Veterinary Medical Journal*, 53(113), 1-10.
- Benigni, L., & Lamb, C. (2006). Diagnostic imaging of ear disease in the dog and cat. *In Practice*, 28(3), 122-130.
- Francesconi, F., & Lupi, O. (2012). Myiasis. *Clinical Microbiology Reviews*, 25(1), 79-105.
- Gotthelf, L.N. (2004). *Small Animal Ear Diseases: An Illustrated Guide*. Elsevier, Saunders, St. Louis, 2nd Edn, pp 78-90.
- Gotthelf, L.N. (2016). Examination of the ear. *Clinician's Brief*, p. 64-72.
- Gupta, A., Kumar, A., Tyagi, S.P., & Kumar, A. (2017). Radiography of external ear canal and tympanic bullae in dogs. *Indian Journal of Veterinary Surgery*, 38(2), 104-107.
- Hoskinson, J.J. (1993). Imaging techniques in the diagnosis of middle ear disease. *Seminars in Veterinary Medicine and Surgery - Small Animal*, 8, 10-16.
- Huang, H.P., Little, C.J.L., & McNeil, P.E. (2009). Histological changes in the external ear canal of dogs with otitis externa. *Veterinary Dermatology*, 20, 422-428.
- Kamaljyoti (2015). Diagnosis and medical management of common ear affections in dogs. *M.V.Sc. thesis* (Veterinary Medicine), Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India.
- Mahbubani, K. (2017). Clinical studies on the diagnosis and surgical management of ear canal affections in dogs. *M.V.Sc. thesis* (Surgery and Radiology), Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India.
- Maniscalco, C.L., Aquino, J.O., Passos, R.F.B., Burger, C.P., & Moraes, P.C. (2009). Video-otoscopy use in the diagnosis of external otitis in dogs. *Rural Science*, 39(8), 2454-2457.
- Parlak, K., Yalcin, M., Erol, H., Akyol, E.T., Uzunlu, E.O., Zamirbekova, N., & Arican, M. (2021). Evaluation of video-otoscopic, radiographic and computed tomographic examinations of cats and dogs with ear diseases. *Macedonian Veterinary Review*, 44(1), 95-101.
- Reddy, C.B.K. (2014). Clinico-diagnostic and therapeutic studies on otitis externa in dogs. *M.V.Sc. thesis* (Veterinary Medicine), Sri Venkateshwara Veterinary University, Tirupati, India.
- Shenoy, S.J. (2004). Radiographic evaluation of otitis in dogs. *M.V.Sc. thesis* (Surgery and Radiology), Kerala Agricultural University, Thrissur, India.
- Simpson, D. (1997). Atresia of the external acoustic meatus in a dog. *Australian Veterinary Journal*, 75(1), 18-20.
- Singh, A., Tanwar, M., Bishnoi, P., Palecha, S., & Gahlot, T.K. (2016). A video-otoscopic study of canine (*Canis lupus familiaris*) ear. *Intas Polivet*, 17(2), 248-251.
- Sudhakar, C.K. (2019). Evaluation of video otoscopy and ultrasound examination for ear affections and its surgico-therapeutic management in dogs. *Ph.D. thesis* (Surgery and Radiology), Maharashtra Animal and Fishery Sciences University, Nagpur, India.
- Thrall, D.E. (2009). *Textbook of Veterinary Diagnostic Radiology*. Elsevier, Saunders, St. Louis, 5th Edn, pp 131-132.
- Usui, R., Fukuda, M., Fukui, E., & Hasegawa, A. (2011). Treatment of canine otitis externa using video otoscopy. *Journal of Veterinary Medical Science*, 73, 1249-1252.