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Video Oto-endoscopic, Canalographic and Ultrasonographic Evaluation of Ear Canal in Canine Otitis Patients

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Abstract

Otitis externa is one of the most commonly presented ear affections in canine clinical practice yet highly challenging surgico-therapeutic management if root cause is undiagnosed at the earliest presentation of the case. Chronic cases make the condition even worse to be managed. This article deals with the diagnostic evaluation of the ear canals affected with acute or chronic otitis externa in dogs with special emphasis on efficient andprecise diagnostic modalities as radiography, ultrasonography and video-otoendoscopy in combination.

Keywords: Otitis externa, Video-oto-endoscopy, Stenotic ear canal, Canalography.

Understanding the structural and functional anatomy of the ear, related structures, and breed differences along with management practices is crucial before moving on to the diagnosis and treatment of ear diseases in dogs. Ear is one of the sense organs of the body with prime function of hearingand to maintainbody balance (Bajwa, 2019). Also, many bacteria, ectoparasites and fungi are ear commensals.The most prevalent ear disease in dogs comprises acute or chronic inflammation of the external auditory meatus epithelium, occasionally affecting the pinna and is classified as reactive and infective otitis externa (August, 1988). Clinically, this develops over few days to few weeks and if left untreated, chronic condition leads to more serious secondary otitis media and otitis interna. According to Osguthorpe and Neilson (2011), otitis externa exhibits characteristic unilateral or bilateral odorless ootic discharge progressing to seropurulent discharge, discomfort,pruritus, pain on tragus palpation, violent head shaking with hyperemic and edematous ear canal. In severe stage of this disease, ear canal gets occluded due to hyperplasia. Radiography,ultrasonography (USG) and video-otoendoscopyform the integrated approach for diagnosis of stenotic ear canal affected from otitis externa (Benigni and Lamb, 2006).Video-otoscopy aids in accurate diagnosis improvingvisualization and enables surgical-therapeutic care, cleansing, sampling and even myringotomy in a variety of ear diseases.

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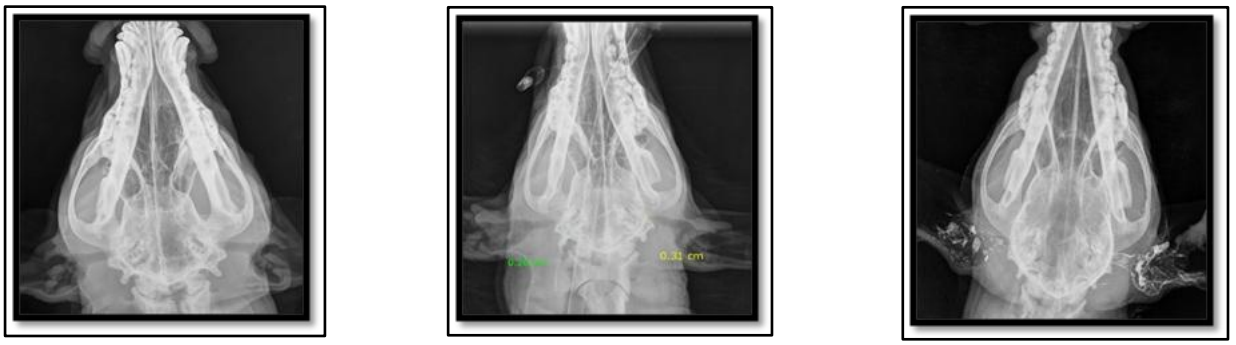
Materials and Methods

A total of 32 cases of dogs of either sex, presented with various ear affections showing clinical signs as ear scratching, foul smelling otic discharge, head shaking, head tilting or signs of facial nerve paralysis, any growths in the ear canal leading to blockage of ear canal etc. were included in the study and screened thoroughly using radiography, USG and video-otoendoscopy under general anaesthesia with tiletamine-zolazepam @ 9mg/kg intramuscularly. Physiological parameters such as rectal temperature (°F), heart rate (bpm), respiration rate (breathes/min)were recorded in all the cases. Lateral and DV or VD skull radio-

graphs (plain and contrast) were performed to assess the thickening or calcification of ear canal lumen and wall. For canalographyusing iohexol@ 8-10 mL (Fig. 2c), patients were sedated with inj. Atropine sulphate @ 0.02-0.04mg/kg IM, inj. Dexamethasone sodium @0.2 mg/kg SC and inj. Xylazine hydrochloride @1-2 mg/kg IM. The pinna was pulled to straighten the canal, iohexol instilled and vertical canal was gently massaged for even distribution of contrast agent and then canal was plugged with cotton ball. Normal saline was used to flush out the contrast agent from ear canal after the procedure. Vertical canal USG was performed in lateral recumbency in cases where canals appeared to be stenotic in radiographs. External ear canal was visualized till the junction of vertical and horizontal. Video-otoscopy in the anaesthetized patients was performed with Karl Storz Veterinary Otoscope(diameter-5mm, working channel diameter-5Fr). Oto-endoscope was inserted from the inter-tragic incisure (Angus and Campbell, 2001)and the findings were recorded.

Results and Discussion

In the present study highest incidence of otitis externa was observed in the age group of 4.1-6.0 years (31.2%), followed by 2.1-4.0 years (24.43%), 6.1-8.0 years (21.05%), <2year (12.40%) and >8 years (10.90%).Male dogs (65.03%) outnumbered females (36.84%).Bilateral ear affections were observed in 45.45% cases and unilateral (majority in right ear) in 54.55% cases. Closed mouth, VD skull radiography with extended neck aided best in measurement of ear canal diameter and changes in its opacity, assessment of ear canal calcification, stenosis, wall-thickening, patency and soft tissue density in ear canal. Patent ear canals (56.25%), stenotic ear canal (43.75%) and soft tissue density of the canal (46.87%) were observed (Fig. 1a and 1b). Horizontal ear canal diameter was measured and average diameter of the normal ear canal was found to be 5.13±0.24 mm (right ear) and 5.25 ± 0.19 mm (left ear).Radiographs revealing narrow radiolucent ear canal lumen, thickened ear canal wall and cartilage were suggestive of stenosis (Fig. 1c). The average diameter of stenotic ears was 2.74±0.35 mm (right ear) and 3.04±0.19 mm (left ear). In a recurrent chronic otitis case, severe stenosis of right ear canal (1.5 mm) was observed which could be due to soft tissue proliferation in response to constant inflammation. In two different chronic otitis externa cases, tortuous ear canal with stenosis (diameter-2.6 mm) and bilateral dystrophic calcification of ear canals were observed. On USG examination (Akhilesh, 2008), the canal appeared as an anechoic fluid-filled structure surrounded by a hyperechoic cartilage wall (Fig. 2b). The mean diameter of ear canals in the stenotic cases was found to be 2.96±0.45 mm (right) and 2.88±0.43 mm (left). Extensive ear canal stenosis was observed in right ear of single case with a diameter measuring 2.8 mm, at the junction (Fig. 2c). Video-oto-endoscopy in normal animals helped in comparison between normal and abnormal appearance of ear canal

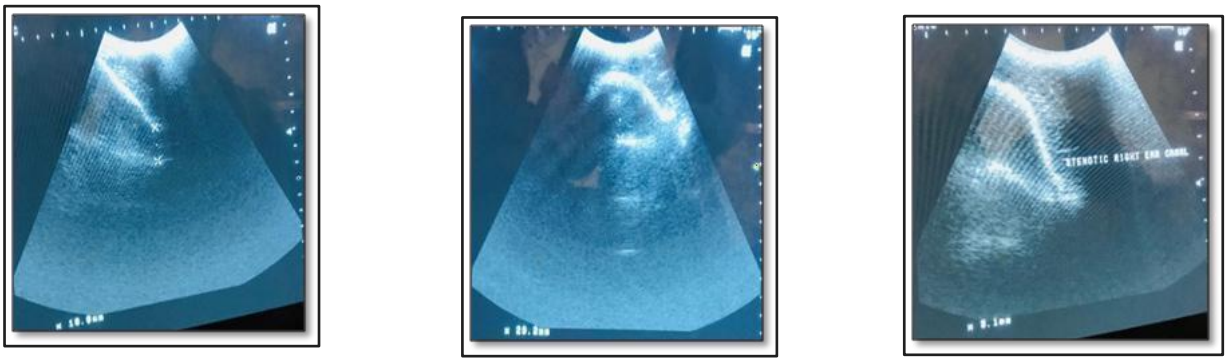


a. Normal ear canals

b. Bilateral soft tissue opacity of ear canals in otitis

c. Canalography using iohexol

Fig. 1: Radiographic observations in canine otitis externa



a. Normal Left ear

b. Transverse ear canal USG showing anechoic lumen surrounded by hyperechoic wall

c. Right ear stenosis at the junction of vertical and horizontal canal

Fig. 2: Ultrasonographic findings of ear canals in canine otitis externa

a. Wall erythema and stenosis of canal

b. Stenosis of horizontal canal

c. Blocked horizontal canal

Fig. 3: Video-oto-endoscopic observations of external ear canal in canine otitis cases

(Angus and Campbell, 2001). Normal ear canal epithelium appeared pink with small superficial blood vessels. A small amount of cerumen was found accumulated on the floor of the horizontal canal giving a glistening appearance to the wall. Subjective evaluation of the inside of the ear canal revealed that most of the cases (75.00%) showed erythema of the canal wall due to inflammation (Fig. 3a). Otitis externa causes varying degrees of changes in the ear canal wall from mild erythema, hyperplasia, fibrosis, calcification etc. depending on the chronicity of the condition to complete occlusion of the canal in severe long-standing cases (August, 1988; Bajwa, 2019). Various changes in the wall observed during oto-endoscopy were wall hyperplasia (12.50%), ulcerated walls (31.25%), polyps (6.25%) and circular calcified rings (9.37%).Patency of ear canal lumen is essential for transmission of sound waves, aeration of the canal, expulsion of cerumen from the ear, maintenance of temperature, humidity and microenvironment of the ear and drainage of any kind of exudates (August, 1986). Various factors interfere in maintaining ear canal patency are acute or chronic otitis externa, ceruminoliths and foreign bodies (August, 1988). Patency or stenosis was observed based on the radiography, ultrasonography and ability to forward the video-otoscope in the ear canal to view the horizontal canal and tympanum (Bischoff and Kneller, 2004; Benigni and Lamb, 2006). Atotal of 68.75% cases reported normal patency while in 31.25% cases, limitation in progression of the otoscope in the horizontal canal was observed because of the stenotic or blocked ear canals (Fig.3b and 3c). The progression of proliferative changes in chronic otitis externa leads to steno-

sis of the canal and ultimately occlusion. As the time passes or with recurrence, the continued inflammation leads to fibrosis, calcification and further ossification of the auditory cartilages (Bajwa, 2019).

Summary

Otitis externa is the most prevalent ear disease and a challenging condition to manage in canine practice. An integrated diagnostic protocol using plain and contrast radiography, USG and video-otoendoscopy allows early and better intervention in managing this condition thereby preventing chronic otitis externa. Video-otoscopy guided flushing aids in early treatment of otitis cases with prevention of irreversible conditions as stenosis, occlusion or calcification.

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Incidence of Nitrate Toxicity in Buffaloes in Andhra Pradesh

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Abstract

Nitrate poisoning occurs in animals due to consumption of fodder or drinking water containing high nitrate levels. Incidence of nitrate poisoning occurred in 20 buffalos of Santhanuthalapadu village of Prakasam dist. Affected animals exhibited symptoms like respiratory distress, cyanotic to brownish discolouration of mucous membranes and death in some cases. Ailing animals recovered following treatment with 1% solution methylene blue. The qualitative test for nitrate in water samples and fodder samples was done with Sulphanilic acid and diphenylamine reagent. Quantification was done by AOAC methods. The farmers were advised to give nitrate free water to the animals and to get the water samples often tested for nitrates.

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