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Total ear canal ablation and lateral bulla osteotomy for the management of chronic obstructive otitis externa in a geriatric dog

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Abstract
The present case report describes the clinical presentation, surgical treatment and outcome of a geriatric dog suffering from chronic obstructive otitis externa, which was treated by performing total ear canal ablation (TECA) and lateral bulla osteotomy (LBO). A ten year old, male Pomerarian dog was presented with the history of bilateral chronic otitis externa since one year, along with occasional purulent discharge with more severity in the left ear. Clinical examination of the left ear revealed severely stenotic ear canal and radiographic observations revealed bilateral calcification of the vertical and horizontal ear canals. As the animal became totally unresponsive to the medical management from the past one month we performed total ear canal ablation (TECA) and lateral bulla osteotomy (LBO) of the left ear. The surgical outcome was excellent with none of the complication(s) encountered during the intra operative and post-operative period. Total ear canal ablation (TECA) and lateral bulla osteotomy (LBO) was successful in the management of chronic obstructive otitis externa by removing the affected tissue as a whole.

Keywords: Otitis externa, total ear canal ablation, lateral bulla osteotomy, dog

Introduction
Otitis externa in the dog is a common and multifactorial cutaneous disorder accounting upto 20% of consultations in small animals Angus, 2004 [1]. Although the diagnosis is easily made on the basis of clinical signs and physical examination, but still a thorough investigation is warranted to determine the root cause because the otitis externa is often found to reflect the underlying dermatological disease Krahwinkel. 2003 [6]. After the diagnosis of otitis externa is made, medical treatment should be initiated as early as possible, failing which the problem becomes chronic Krahwinkel, 1993 [5].
In progressive chronic otitis externa narrowing of the vertical and horizontal ear canal is seen due to proliferative hyperplastic changes in the epithelium and dystrophic calcification occurs in the cartilage which eventually leads to the stenosis or occlusion of the ear canal (Smeak and Kerpsack, 1993) [10].
Surgical treatment plays an important role in the management of chronic otitis externa and various procedures advocated are lateral ear canal resection, vertical ear canal resection and total ear canal ablation with lateral bulla osteotomy (TECA/LBO) with TECA/LBO being considered the best treatment option in end stage otitis externa and where other surgical treatments have failed. Here, we report total ear canal ablation and lateral bulla osteotomy for the management of chronic obstructive otitis externa in a dog.

Case history and diagnosis
A ten year old, male Pomerarian dog was presented to Department of Veterinary Surgery and Radiology, KCVAS, Amritsar with the history of bilateral chronic otitis externa since one year, along with occasional purulent discharge with more severity in left ear. Clinical examination of the left ear revealed severely stenotic ear canal along with sero-sanguinous discharge (Fig. 1). Calcification of the ear canal was well appreciable on the palpation of ear. Radiographic observations revealed bilateral calcification of the vertical and horizontal ear canals (Fig. 2). As the animal became totally unresponsive to the medical management from the past one month, left ear was subjected to total ear canal ablation (TECA) and lateral bulla osteotomy (LBO).

Treatment and Discussion

The animal was premedicated with 0.3 mg/kg Butorphanol intramuscularly and 0.5 mg/kg Diazepam intravenously. Anaesthesia was induced intravenously using 2 mg/kg Propofol and maintained with Isoflurane. The animal was positioned in right lateral recumbency and the left pinna and surrounding skin was prepared for aseptic surgery. A T-shaped skin incision was made encircling the external ear canal opening (Fig. 3) using blunt and sharp dissection, the calcified vertical and horizontal ear canal was dissected free from the overlying skin and surrounding soft tissue (Fig. 4) and upon reaching the external acoustic meatus, the ear canal was transected with scissors (Fig. 5). The secretory tissue adherent to the rim of external acoustic meatus was curetted out carefully. A window was made in the lateral wall of the tympanic bulla with rongeurs followed by thorough irrigation with sterile solution which was then suctioned out (Fig. 6). Extreme care was taken while excising the wall of tympanic bulla so as to avoid any inadvertent damage to the adjacent structures.

The closure of the surgical site was done in two layers using 2-0 polyglactin 910 and 2-0 polypropylene for skin. Post-operative radiograph revealed a radiolucent space in the left ear canal (Fig. 7). Skin sutures were removed after 12 days. Complete recovery of the animal was seen without any sign of Horner syndrome i.e. enopthalmos, ptosis and unilateral KCS during the post-operative period.

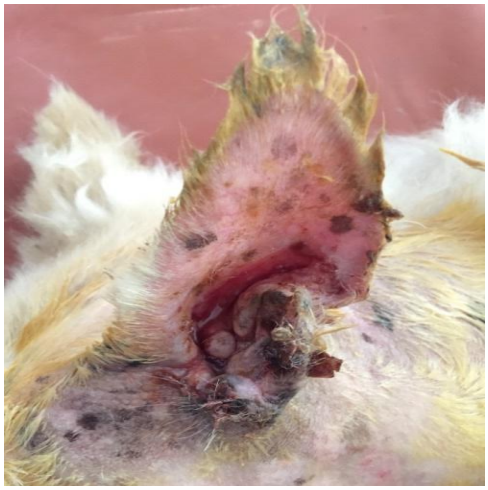

Fig 1: Proliferative changes in the ear canal along with serosanguinous discharge.

Fig 2: Bilateral calcification of the horizontal and vertical ear canals.

Fig 3: T shaped skin incision.

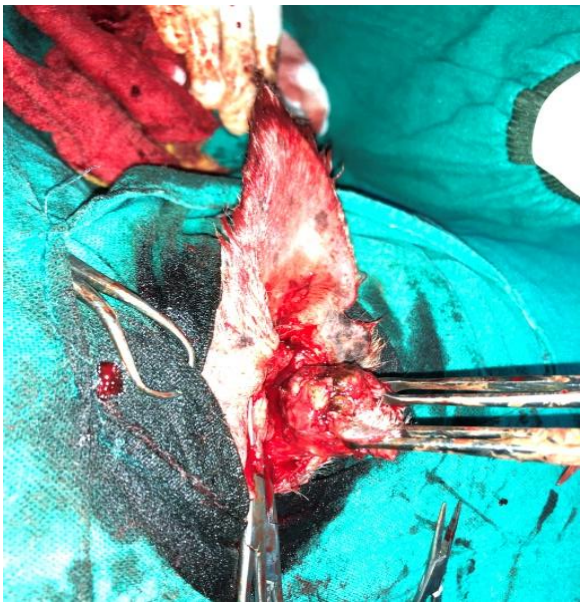

Fig 4: Dissection of the cystic ear canal from the surrounding tissue.

Fig 5: Completely removed ear canal

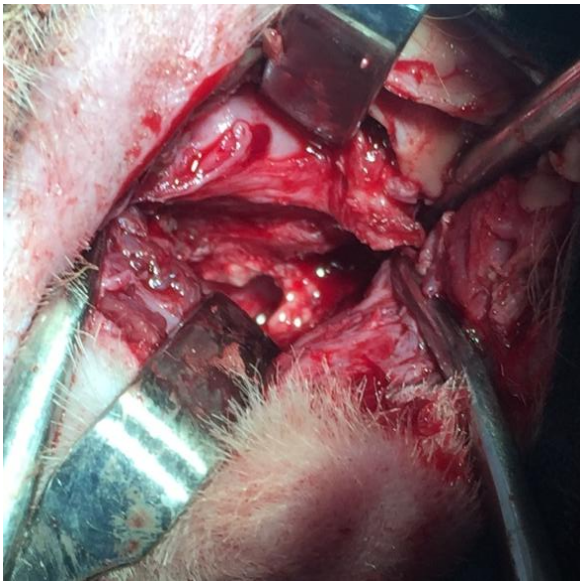

Fig 6: Intraoperative view of tympanic bulla after lateral bulla osteotomy.

Fig 7: Immediate post operative radiograph revealing radiolucent space created after total ear canal ablation

Radiography is a useful tool in revealing changes within the ear canal such as stenosis and calcification of cartilage (Devitt *et al*., 1997) [3]. Surgical treatment is an important part of the proper management of chronic otitis externa especially after medical treatment has failed and any underlying disease has been cured Grono, 1970 [4]. Total ear canal ablation and lateral bulla osteotomy is considered the best treatment option in cases of chronic irreversible stage of otitis externa making the animal more comfortable by the removal of infected tissue (Devitt *et al*., 1997) [3]. Total ear canal ablation and lateral bulla osteotomy is also indicated if previous surgical treatments (lateral ear canal resection, vertical ear canal resection and total ear canal ablation alone) of otitis externa has failed and is beneficial with severely stenotic ear canals White, 2003. Total ear canal ablation alone is contraindicated due to high risks of concurrent otitis media (Cole *et al*., 1998) [2] leading to postoperative para aural fistulation (Smeak and De hoff, 1986) [9].

Besides the removal of any infected tissue and exudate from the tympanic bulla, lateral bulla osteotomy combined with total ear canal ablation, also gives access to the tympanic bulla and encourages growth of granulation tissue in bulla, a result that is thought to prevent abscess formation (Mc anulty *et al*., 1995) [7]. During the entire lateral bulla osteotomy procedure, anything caught in the jaw of rongeurs should be visualized before cutting, so as to avoid inadvertent damage to important surrounding structures (Smeak and Ispanbutr, 2005) [11]. They further stated that excessive medial pressure during curettage of the medial bulla wall should be avoided as it may damage the internal carotid artery due to the disruption of thin bone wall between the carotid canal and tympanic cavity. After performing the lateral bulla osteotomy careful removal of the all the exudates, vigorous flushing of the site with sterile saline and appropriate antibiotic administration is inevitable to the present post-operative para aural abscessation and fistulation (Vogel *et al*., 1999) [12]. Para aural abscessation and fistulation is a serious complication which can be more difficult to treat than the original problem (Smeak *et al*., 1996) [8].

Total ear canal ablation and lateral bulla osteotomy is a technically difficult procedure and a high complication rate has been reported (White and Pomeroy, 1990) [13].

Vital structures surrounding the external ear canal and tympanic bulla such as facial nerve, ear ossicle, external carotid artery, maxillary vein and retro-auricular vein are at risk of iatrogenic damage during the surgical procedure (Smeak and Inpanbutr, 2005) [11]. None of the above mentioned complication was encountered in the present case study. Facial nerve injury, chacterized by palpebral reflex deficit, ptosis and dropping of facial muscle of the epsilateral side is a common surgical complication (Devitt *et al*., 1997) [3] which was again not observed in the present case study. In chronic end stage ear condition, the facial nerve is often intimately adhered to the deep ear canal as it course rostrally just lateral to the bulla increasing the chance of injury (Smeak and Inpanbutr, 2005) [11].

Conclusion

To conclude total ear canal ablation (TECA) and lateral bulla osteotomy (LBO) is found to be best treatment option in case of the end stage otitis externa, animals with severely stenotic ear canal and failure of previous surgical treatments (White and Pomeroy, 1990) [13]. Lateral bulla osteotomy gives access to the tympanic bulla thereby helping in removal of exudates within tympanic cavity and it shall be done very carefully so as to avoid any inadvertent damage to the surrounding structures, post-operative abscessation and fistulation.

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