



External Auditory Canal Atresia with Otitis Media in a Dog

Ah Reum Kim
Changhee Han
Gunha Hwang
Rakhoon Kim
Woohyun Go
Ji Yeong Lee
Jongbong Lee
Soyon An
Tae Sung Hwang
Dongbin Lee
Jae-Hoon Lee
Hee Chun Lee*

Institute of Animal Medicine, College of Veterinary Medicine, Gyeongsang National University, Jinju 52828, Korea

*Correspondence: lhc@gnu.ac.kr

ORCID

Ah Reum Kim:
<https://orcid.org/0000-0003-4048-8744>
Changhee Han:
<https://orcid.org/0000-0003-4018-445X>
Gunha Hwang:
<https://orcid.org/0000-0002-1805-9137>
Rakhoon Kim:
<https://orcid.org/0000-0002-1757-3572>
Woohyun Go:
<https://orcid.org/0000-0002-5119-6707>
Ji Yeong Lee:
<https://orcid.org/0000-0002-1288-1453>
Jongbong Lee:
<https://orcid.org/0000-0003-4614-2752>
Soyon An:
<https://orcid.org/0000-0002-9994-8760>
Tae Sung Hwang:
<https://orcid.org/0000-0001-6730-6061>
Dongbin Lee:
<https://orcid.org/0000-0002-2645-4508>
Jae-Hoon Lee:
<https://orcid.org/0000-0002-8340-3694>
Hee Chun Lee:
<https://orcid.org/0000-0001-5936-9118>

Copyright © The Korean Society of Veterinary Clinics

Abstract A 5-year-old, intact male, poodle dog with right external auditory canal obstruction and subaural mass was presented. Physical examination revealed that right external auditory canal opening was absent and right head tilt was identified. Aspiration in right subaural mass revealed a small amount of dark brown exudate. *Streptococcus canis* and *Staphylococcus* spp. were identified on the microbial culture. Radiography of the skull was revealed absence of air-filled ear canal at the right external ear canal (EEC) level. Computed tomography (CT) revealed well capsulated, hypoattenuated mass in the right EEC region. On the contrast enhanced CT images, rim enhancement around the mass and ear canal obstruction were identified. Fluid attenuated material filled with right bulla. Mild thickening of the right tympanic bulla wall with mild lytic lesion of the ventral wall were found. Based on the images findings, the case was tentatively diagnosed as right external auditory canal atresia with otitis media. Total ear canal ablation and lateral bulla osteotomy was performed. The entire ear canal was removed, numerous hair in the canal and the thickening wall were founded. Right ear canal was sent for histopathological evaluation and found to otitis externa. The patient was followed up for two weeks and there were no complications. This report described the CT diagnosis of right EEC atresia with otitis media rarely reported in small breed dogs.

Key words external auditory canal atresia, otitis media, otitis externa, dog.

Received April 20, 2021 / Accepted May 20, 2021



This is an open access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Introduction

External auditory canal atresia (EACA) is that the ear canal is abnormally closed or absent (2), there is no exact report of the incidence in dogs and cats. In humans, there is a tendency to occur on the right side, unilaterally, in males, and the rate of occurrence is 1/10,000 to 1/20,000 live births (5).

In dogs, the ear canal atresia is infrequent and may occur due to congenital or acquired causes (2,14). Congenital ear canal atresia is caused by the persistent meatal plug formed by proliferating ectodermal cells after birth in dogs (4,10,15). It has been reported that acquired ear canal atresia may result from stenosis due to chronic ear disorders in dogs and cats. Typically, the causes are by an accident or tumor and chronic inflammation such as otitis externa (3,6,9,13).

Clinical sign of EACA include ear pain, head tilt, para-aural abscess, and if the inflammation is persistent, peripheral vestibular sign may occur (2,14). Physical examination may reveal blunt end of the ear canal and round mass ventral to the ear canal (1,2,15).

Radiography of the skull shows that absence of air in the ear canal, increased opacity within tympanic bulla and thickened osseous wall of tympanic bulla (10,15). Computed tomography (CT) is blind-ending of air or fluid filled external ear canal and fluid-dense material in the tympanic cavity, thickening of tympanic bulla (2,8).

According to retrospective studies on EACA, physical, radiography, CT and magnetic resonance imaging (MRI) examination were used to diagnose with EACA. This study described radiographic, CT features of external ear canal atresia with otitis media in a dog.

Case Report

A 5-year-old intact male, Poodle dog was presented that a small amount of dark brown fluid was intermittently seen

in the right ear pinna from 3 weeks ago. The obstruction of right ear canal and round mass ventral to the ear canal have been confirmed from the time of adoption, four years ago.

Physical examination revealed that the right ear canal was not open, and tilted down the affected ear (Fig. 1A). Complete blood count revealed mild leukocytosis ($21.13 \times 10^9/L$, reference data: 5.05 to $16.76 \times 10^9/L$), and serum chemistry showed mild elevated globulin (4.9 g/dL, reference data: 2.5 to 4.5 g/dL). An ultrasound-guided fine-needle aspiration of right subaural mass was performed. A small amount of dark brown exudate was identified, *Streptococcus canis* and *Staphylococcus* spp. were identified on the microbial culture.

Radiographic examination revealed air-filled ear canal was not identified at the right external ear canal (EEC) level (Fig. 2). CT showed that well capsulated, hypoattenuated mass with a mean 22 HU (Max 79, Min -35) in the right EEC region. On the contrast enhanced CT images, rim enhancement around the mass and ear canal obstruction were identified. The obstructed ear canal was filled with non-contrast-enhanced material (Fig. 3). Fluid attenuated material filled with right bulla, and mild thickening of right tympanic bulla with mild lytic lesion of the ventral wall were also found. The right retropharyngeal lymph node was mild enlargement. Based on the radiography and CT examination, the tentative diagnosis was EACA with otitis media.

Subsequently, total ear canal ablation and lateral bulla osteotomy were performed as surgical procedures. The entire ear canal was removed, numerous hair in the canal and the thickening wall were founded (Fig. 1B). There was the mucus in the resected ear tissue, the mucus was judged to be consistent with hypoattenuated lesion on CT examination.

Histopathological examination of the resected ear canal showed otitis externa and no neoplastic changes. Some cocci colonies were observed only in localized regions. After 2 weeks following-up, the dog had a good condition.

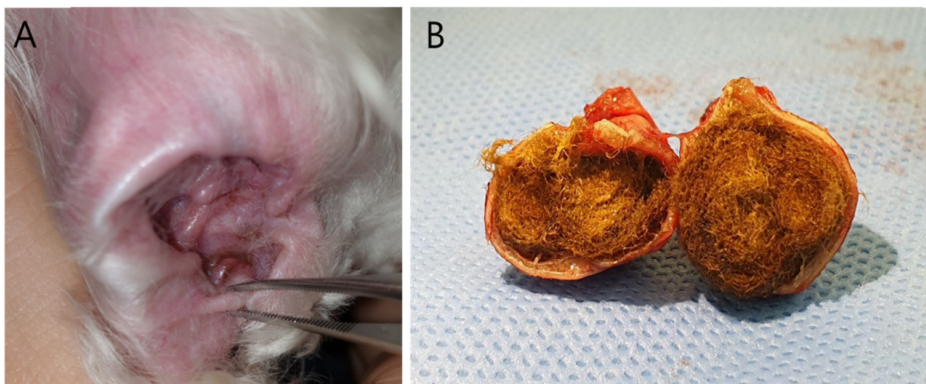


Fig. 1. Obstructed right ear canal (A) and surgically removed right ear canal (B). Obstruction of the right ear canal was confirmed. And numerous hair in the canal and the thickening wall were founded.

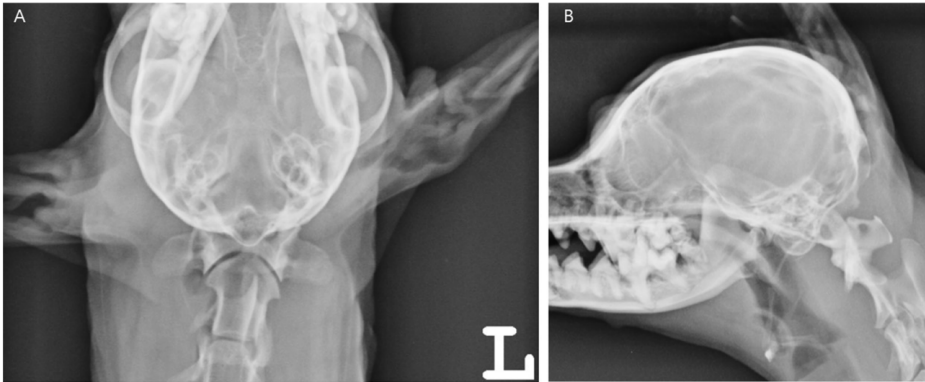


Fig. 2. Dorsoventral (A) and right lateral (B) radiographic images of the skull. Air-filled ear canal was not found at the right external ear canal level.

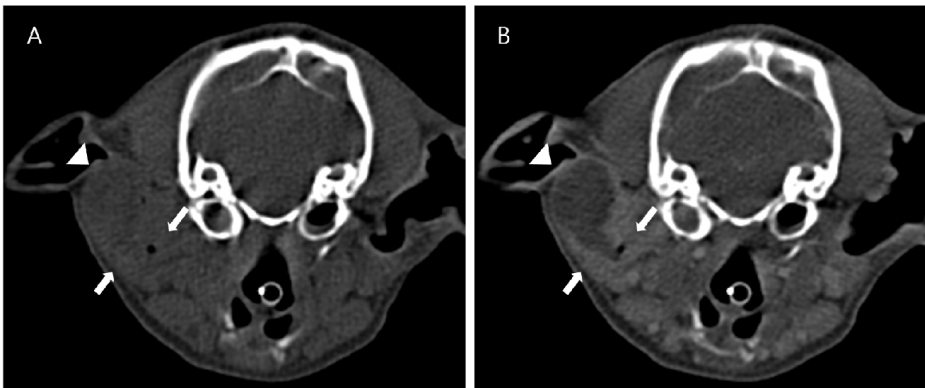


Fig. 3. Pre (A) and postcontrast (B) computed tomographic (CT) images of the patient, obstructed right ear canal (arrowhead) and contrast enhancement of the thickened ear canal wall was identified (arrows). Well-capsulated, hypoattenuated materials were found in the obstructed ear canal which were numerous hair and mucous wax.

Discussion

EACA can be caused by congenital and acquired causes. In previously reported cases, congenital EACA was diagnosed at various breeds with relatively younger ages, including nine-month-old male Labrador retriever (14), 6.5-year-old male French spaniel (2), 14-month-old male German shepherd (2), and 3-year-old male Labrador retriever (1). There were clinical symptoms such as otalgia, headshaking, head tilt, and deafness (1,2,14). In our case, head tilt was confirmed in a 5-year-old male poodle dog.

In the previously reported congenital EACA cases, the absence of an auditory canal opening and firm swelling or mass was confirmed around the ear canal on physical examination (2). In this case, similarly, a right EEC opening was absent and subaural mass was confirmed.

In the previously reported CT findings, the auditory canal ended blindly and the wall of the blind ear canal was slightly thickened (1,2,14). The ear canal could be markedly dilated and filled with material of non-contrast-enhancing soft-tissue attenuation (1,2,14). The ipsilateral tympanic bulla was also filled with fluid-attenuating material and the wall thickened and irregular (1,2,14). In this case, almost identical CT findings

were found.

In the cases of congenital EACA previously reported in dogs and cats, bacteria were not separated from the obstructed ear canal tissue (10,14,15), and abnormal accumulation of aseptic wax into the canal can be confirmed (2,14). In addition, inflammation of the obstructed ear tissue and otitis media can be identified without neoplastic changes, and there has been no history of trauma (2,7,10). In the acquired EACA of dogs and cats, septic inflammatory exudate and dark brown ear wax material can be found, abscesses and fistulas may be formed around the ear with a history of accidents or chronic ear inflammation (6,11,14,16). According to a previous report in dogs, untreated congenital EACA causes inflammation such as otitis externa and otitis media due to abnormal accumulation of hair and ear wax (2,15), also the para-aural abscess can be formed (12). Our case is considered to be similar to the untreated congenital EACA case, after the development of otitis externa and otitis media, the possibility of exposure of bacteria due to the spread of inflammation to surrounding tissues could be considered. Considering these cases and the ear canal obstruction was confirmed from the time the dog was adopted at a young age, the possibility of congenital ear canal atresia was considered in this case.

However, acquired EACA could not be ruled out.

In the previous reports, surgical treatments were performed and the prognosis was good (2,10). In this case, total ear canal ablation and lateral bulla osteotomy was performed, after follow-up 2 weeks, it was well maintained without clinical signs.

Conclusions

This case was diagnosed EACA with otitis media using radiography, CT, histopathological examination in a dog. It is considered possible that the ear canal atresia is congenital. However, it could not be completely excluded acquired form because the history before adoption was not exactly known and a small amount of bacteria was isolated.

Conflicts of Interest

The authors have no conflicting interests.

References

1. Anwer C, Schwarz T, Volk SW, Vite C. BAER testing in a dog with bilateral external ear canal atresia. *J Am Anim Hosp Assoc* 2011; 47: 370-374.
2. Béraud R. Surgical management of 2 different presentations of ear canal atresia in dogs. *Can Vet J* 2012; 53: 412-418.
3. Boothe HW, Hobson HP, McDonald DE. Treatment of traumatic separation of the auricular and annular cartilages without ablation: results in five dogs. *Vet Surg* 1996; 25: 376-379.
4. Caine AR, Herrtage ME, Ladlow JF. Imaging diagnosis--ear canal distension following external auditory canal atresia. *Vet Radiol Ultrasound* 2008; 49: 267-269.
5. Chang SO, Min YG, Kim CS, Koh TY. Surgical management of congenital aural atresia. *Laryngoscope* 1994; 104(5 Pt 1): 606-611.
6. Connery NA, McAllister H, Hay CW. Para-aural abscessation following traumatic ear canal separation in a dog. *J Small Anim Pract* 2001; 42: 253-256.
7. Coomer AR, Bacon N. Primary anastomosis of segmental external auditory canal atresia in a cat. *J Feline Med Surg* 2009; 11: 864-868.
8. Drees R. External, middle and inner ear. In: Schwarz T, Saunders J, editors. *Veterinary computed tomography*. West Sussex: Wiley-Blackwell. 2011: 153-160.
9. Gotthelf LN. Factors that predispose the ear to otitis externa. In: Gotthelf LN, editor. *Small animal ear diseases: an illustrated guide*. 2nd ed. St. Louis: Saunders. 2005: 141-171.
10. House A. Atresia of the distal external acoustic meatus in a Bouvier des Flandres. *J Small Anim Pract* 2001; 42: 88-89.
11. Kyles AE. Traumatic separation of the auricular and annular cartilages in two cats. *Vet Rec* 2001; 148: 696-697.
12. Lane J, Watkins P. Para-aural abscess in the dog and cat. *J Small Anim Pract* 1986; 27: 521-531.
13. McCarthy PE, Hosgood G, Pechman RD. Traumatic ear canal separations and para-aural abscessation in three dogs. *J Am Anim Hosp Assoc* 1995; 31: 419-424.
14. Schmidt K, Piaia T, Bertolini G, De Lorenzi D. External auditory canal atresia of probable congenital origin in a dog. *J Small Anim Pract* 2007; 48: 233-236.
15. Simpson D. Atresia of the external acoustic meatus in a dog. *Aust Vet J* 1997; 75: 18-20.
16. Smeak DD. Traumatic separation of the annular cartilage from the external auditory meatus in a cat. *J Am Vet Med Assoc* 1997; 211: 448-450.