

## A canine case of otitis media examined and cured using a video otoscope

Reiko USUI<sup>1,2)\*</sup>, Yuki OKADA<sup>2)</sup>, Emiko FUKUI<sup>3)</sup> and Atsuhiko HASEGAWA<sup>4)</sup>

<sup>1)</sup>Usui Animal Hospital, 4–5 Midorino, Utsunomiya, Tochigi 321-0136, Japan

<sup>2)</sup>Nippon Veterinary and Life Science University, 1–7–1 Kyonan, Musashino, Tokyo 180-8602, Japan

<sup>3)</sup>Laboratory of Animal Breeding Reproduction, Faculty of Agriculture, Utsunomiya University, 350 Mine-machi, Utsunomiya 321-8505, Japan

<sup>4)</sup>Teikyo University Institute of Medical Mycology, 359 Otsuka, Hachioji, Tokyo 192-0395, Japan

(Received 11 February 2014/Accepted 1 October 2014/Published online in J-STAGE 16 October 2014)

**ABSTRACT.** Otitis media of the left ear was diagnosed by video otoscopic examination in a 7-year-old, intact male Shih-tzu dog (weight, 5.1 kg), that also had three complex ceruminous adenomas and a *Pseudomonas aeruginosa* infection in the left ear canal. In such cases, total ear canal ablation is usually required. However, a complete cure was achieved in the present case without total ear canal ablation. The complex ceruminous adenomas were excised using a diode laser, and repeated cleansing of the tympanic cavity and ear canal was implemented using a video otoscope. As a result, the ear canal was closed in a U-form, and the otitis media was cured.

**KEY WORDS:** complex ceruminous adenoma, diode laser, otitis media, *pseudomonas*, video otoscope

doi: 10.1292/jvms.14-0072; *J. Vet. Med. Sci.* 77(2): 237–239, 2015

The present case was an intact male, 7-year-old, Shih-tzu dog, weighing 5.1 kg. Previous medical history included otitis of the left ear, for which he had received treatment at other clinics for 5 years. During that time, a hand-held otoscope had been used for the examinations, and local and systemic treatments were performed. The local treatment involved the conventional method of instilling a cleaning solution in the ear canal, massaging the base of the ear and then draining the solution, followed by instillation of ear drops [3, 4]. Systemic treatment involved continued administration of antibiotics. Various ear drops were used, and antibiotics were administered systemically, but remission was not obtained. These treatments were continued as the owners took the dog from clinic to clinic, and the dog had become aggressive with respect to treatments. This made treatment difficult, and he was brought to the author's veterinary hospital for examination. Other than otitis externa, he had no notable medical history.

On general examination, the dog showed a lack of energy and dullness, as well as aggression, because of the pain. His appetite was decreased. No other physical abnormalities were detected, and the right ear was normal. Foul-smelling purulent exudate containing blood drained from his left ear canal and flowed from the left cheek down to the neck (Fig. 1). The vertical canal was filled with blood and fluid, and masses of ceruminous gland adenomas were noted in the horizontal canal.

Blood examination results included an elevated WBC of  $14.3 \times 10^3/\mu\text{l}$  (normal value:  $6\text{--}10 \times 10^3/\mu\text{l}$ ), RBC  $7.0 \times 10^6/\mu\text{l}$  (normal value:  $5.5\text{--}8.5 \times 10^6/\mu\text{l}$ ), Hgb 15.1 g/dl (normal value: 12.0–18.0 g/dl), HCT 47.6% (normal value: 37.0–55.0%), MCV 68.0 fl (60.0–77.0 fl), MCH 21.6 pg

(normal value: 19.5–24.5 pg), MCHC 31.7l g/dl (normal value: 32.0–36.0 g/dl) and PLT  $475 \times 10^3/\mu\text{l}$  (normal value:  $200\text{--}500 \times 10^3/\mu\text{l}$ ). Biochemical results included Glu 104 mg/dl (normal value: 76–112 mg/dl), total cholesterol 244 mg/dl (normal value: 81–157 mg/dl), BUN 20 mg/dl (normal value: less than 22 mg/dl), total bilirubin <0.2 mg/dl (normal value: 0.2–0.3 mg/dl), AST 10 IU/l (normal value: 20–30 IU/l), ALT 30 IU/l (normal value: 20–46 IU/l) and Cre 1.0 mg/dl (normal value: 0.5–0.9 mg/dl). There was no anemia, nor any specific kidney or liver abnormalities. There were no abnormalities on urinalysis. No other physical abnormalities were seen.

The examination of the ear canal using a video otoscope (MediPack; Karl Storz Endoscopy Japan, K.K., Tokyo, Japan) under general anesthesia with isoflurane revealed a tympanic membrane defect and otitis media on the video otoscope monitor at a magnification of more than 10x [10, 11].

The three masses were noted in the ear canal. Cytological examination was performed at the time of each treatment. The bacterial culture and susceptibility tests were performed on 3 separate days.

Treatment was done locally using a video otoscope [10, 11]. The video otoscope was inserted into the ear canal, and tissue was extracted using 3-Fr straight grasping forceps via the forceps channel. Subsequently, 3-Fr and 4-Fr feeding tubes (Atom Medical, Tokyo, Japan) were mounted in a 5-ml syringe, and a cleaning solution was injected repeatedly to cleanse the ear canal. The cleansing solution used was polyoxyethylene octylphenyl ether 0.5% (Nolvasan Otic, Kirikan, Ltd., Tokyo, Japan).

While cleaning the ear canal in this way, a diode laser (Asuka Medical, Inc., Kyoto, Japan) was used to resect and remove the three masses. These masses were excised one at a time, on three separate occasions, with the diode laser inserted from the forceps channel of the video otoscope (Table 1). The factors listed below contributed to our decision to perform excisions at 3 different occasions: because (1) Laser reflects diffusely (2) of possible adverse effect on nerves,

\*CORRESPONDENCE TO: USUI, R., Usui Animal Hospital, 4–5 Midorino, Utsunomiya, Tochigi 321-0136, Japan. e-mail: rei@u-a-h.com

©2015 The Japanese Society of Veterinary Science

This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial No Derivatives (by-nc-nd) License <<http://creativecommons.org/licenses/by-nc-nd/3.0/>>.



Fig.1. Foul-smelling purulent exudate containing blood drains from the left ear canal.

and (3) frequent future anesthetic procedures were already in line. Buprenorphine 0.02 mg/kg was administered for pain relief during the laser procedure.

On histopathology [7], three masses in the horizontal canal were complex ceruminous adenomas, and they showed proliferation of glandular epithelial and myoepithelial tumor cells with a few mitotic figures without cellular atypia, associated with intense inflammation.

After resecting and removing the complex ceruminous adenomas, the tympanic cavity and ear canal were cleaned, again using the video otoscope. The ear canal posterior (proximal) to the complex ceruminous adenomas was ulcerated, and a large amount of purulent exudate was seen. The tympanic cavity was filled with purulent exudate. This purulent exudate was drained thoroughly using a tube. After cleaning, amikacin eardrops (20 mg/ml, injectable amikacin diluted 5-fold with artificial tear mytear ophthalmic solution; Senju Pharmaceutical Co., Ltd., Osaka, Japan,) were injected and removed twice.

Bacilli were detected on cytological examination. The bacterial examination showed *Pseudomonas aeruginosa* at the time of the initial examination and *Escherichia coli* on hospital day 12. Based on these results, amikacin was in-

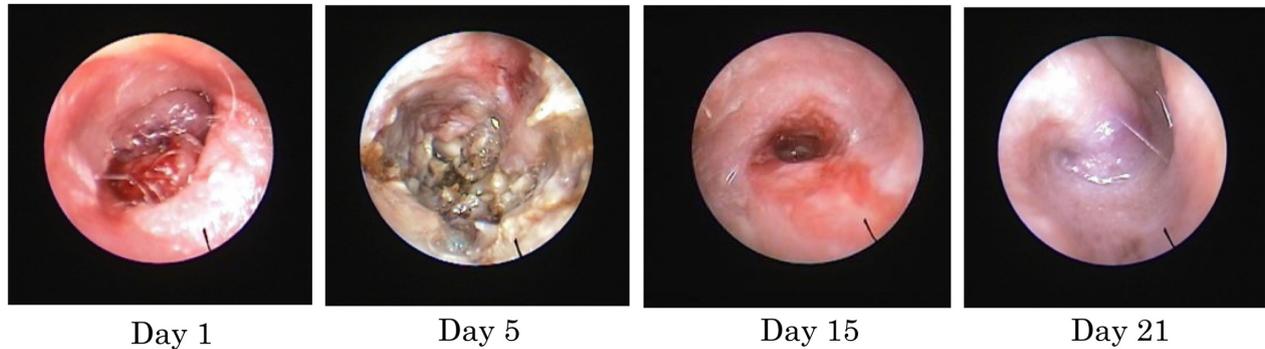


Fig. 2. The process of recovery after treatment. Day 1: After the first complex ceruminous gland adenoma has been excised, the second and third complex ceruminous gland adenomas are visible. Day 5: Tympanic cavity after the resection and removal of the complex ceruminous adenomas. (After resecting and removing the complex ceruminous adenomas using a diode laser, the tympanic cavity has been cleaned using a video otoscope.) Day 15: A narrowed ear canal opening to the point where only a 4-Fr tube can be inserted. Day 21: The ear canal has closed completely in a U-form (complete recovery).

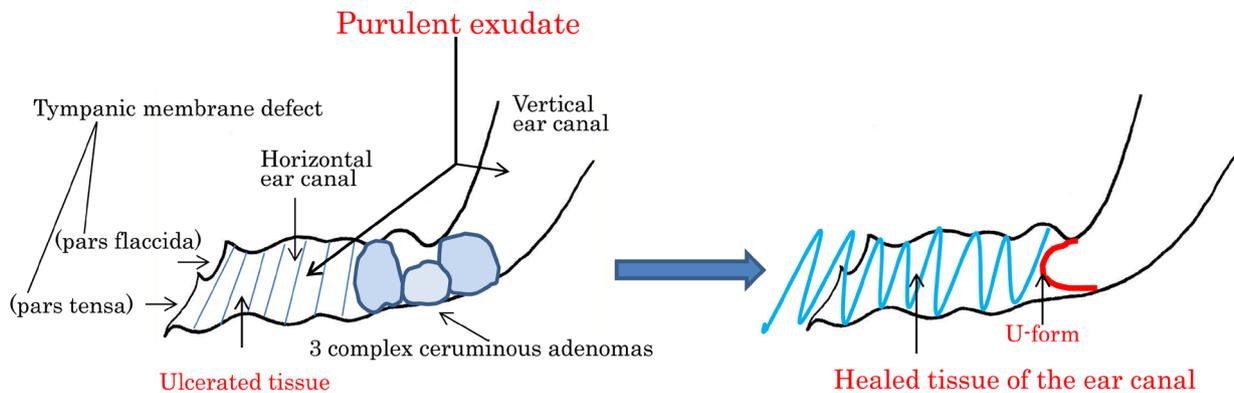


Fig. 3. Schematic diagram before (left) and after (right) treatment. Three complex ceruminous adenomas are present in the left ear canal (left). By the 21st day, the ear canal is closed completely in a U-form, and the refractory otitis media is completely cured (right).

Table 1. Local treatment schedule

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Video-otoscopic therapy <sup>a)</sup>	○		○	○	○		○	○		○	○	○		○	○		○		○		○
Diode laser <sup>b)</sup>	○		○	○																	
Bacterial cultures <sup>c)</sup>	○											○									○

a) Video-otoscopic therapy was performed on days 1, 3, 4, 5, 7, 8, 10, 11, 12, 14, 15, 17, 19 and 21, for a total of 14 times. b) Excision of complex ceruminous adenomas by semi-conductor laser was performed on days 1, 3 and 4, for a total of 3 times. c) Bacterial cultures were performed on days 1, 12 and 21. ○: Treatment is performed.

jected systemically. The dose was 4 mg/kg IV q12hr from day 1 to day 10, and 2 mg/kg IV q12hr from day 11 to day 21 (Table 1). On day 21, the bacterial cultures were negative. Continuous intravenous fluid therapy (Soldem1, TERUMO, Tokyo, Japan) was performed for 21 days, at 20 ml/hr, 120 ml/day, to maintain adequate renal blood flow to avoid acute renal failure and eighth cranial nerve damage [4, 6, 8].

Reported adverse effects of amikacin were hearing loss due to 8th cranial nerve injury and acute renal failure [4, 8]. However, no adverse effects were reported when amikacin was administered at the dosage of 14 mg/kg.

In the present case, amikacin was used at a dosage of 2–4 mg/kg.

The treatment using the video otoscope was performed a total of 14 times over 21 days (Table 1). The tympanic cavity and ear canal were cleaned by this frequently repeated treatment. As the cleaning progressed, the healing began from the tympanic cavity and extended gradually to the opening of the ear canal. By 15 days, the ear canal had become a narrow tunnel, and only a 4-Fr tube could be inserted, and after 21 days, the ear canal was closed completely in a U-form, as shown (Fig. 2, Day 21 and Fig. 3, right). Looking down from the opening of the ear canal, the lining of the ear canal was smooth. Finally, the refractory otitis media was completely resolved (Figs. 2 and 3). Since the inflammatory substances, such as ulcerated tissue and purulent exudate, that had accumulated in the ear canal and the tympanic cavity were removed using the video otoscope after excision of the complex tumors, complications, such as infection and facial nerve injury, were prevented. Histopathological examination of the biopsied U-shaped tissues revealed that the tissues consisted of stratified squamous epithelium. There has been no recurrence as of 2 years. The infection was cured using the video otoscope, showing its usefulness for eliminating foreign substances, performing tumor biopsy, assessing the tympanic membrane and deciding the method of treatment, including myringotomy [1, 2].

Thus, the present case shows that video otoscope can be useful for the treatment of otitis media. Conventional management of otitis has been carried out using hand-held otoscopes. For local treatment, cleansing solution is injected into the ear canal, the base of the ear is massaged and washed, and eardrops are instilled into the ear canal to eliminate bacteria and microorganisms. For systemic treatment, antibacterial and antifungal agents are administered based on cytology and bacterial culture results [3, 5]. With these treatments, however, there are many cases of recurrence after remission. Finally, surgical treatment with total

ear canal ablation is selected [9].

In the present case, the otitis was not cured with conventional treatment, and tumors were discovered in the ear canal. In such cases, total ear canal ablation would generally be indicated. However, there are many problems with total ear canal ablation, such as disfigurement of the ear and the risk of complications, which include facial nerve injury and secondary complications. But, no alternative methods have been reported. Therefore, a method of treating otitis media using a video otoscope and diode laser was selected instead of total ear canal ablation in the present case.

**ACKNOWLEDGMENT.** The authors would like to thank Prof. Shuichi Tsuchida of the Nippon Veterinary and Life Science University for valuable advice.

#### REFERENCES

1. Angus, J. C. and Campbell, K. L. 2001. Uses and indications for video-otoscopy in small animal practice. *Vet. Clin. North Am. Small Anim. Pract.* **31**: 809–828. [Medline]
2. Cole, L. K. 2004. Otosopic evaluation of the ear canal. *Vet. Clin. North Am. Small Anim. Pract.* **34**: 397–410. [Medline] [CrossRef]
3. Medleau, L. and Hnilica, K. A. 2006. Otitis Externa. pp. 376–388. *In: Small Animal Dermatology: A Color Atlas and Therapeutic Guide*, 2nd ed. (Winkel, A. ed.), Saunders, Philadelphia.
4. Mingeot-Leclercq, M. P. and Tulkens, P. M. 1999. Aminoglycosides: nephrotoxicity. *Antimicrob. Agents Chemother.* **43**: 1003–1012. [Medline]
5. Morris, D. O. 2004. Medical therapy of otitis externa and otitis media. *Vet. Clin. North Am. Small Anim. Pract.* **34**: 541–555, vii–viii. [Medline] [CrossRef]
6. Papich, G. M. 2011. Amikacin. pp. 24–25. *In: Saunders Handbook of Veterinary Drugs: Small and Large Animal*, 3rd ed. Saunders, St. Louis.
7. Scott, D. W., Miller, W. H. and Griffin, C. E. 2001. Diagnostic Method, pp. 127–129. *In: Muller & Kirk's Small Animal Dermatology*, 6th ed. W.B. Saunders, New York.
8. Selimoglu, E. 2007. Aminoglycoside-induced ototoxicity. *Curr. Pharm. Des.* **13**: 119–126. [Medline] [CrossRef]
9. Smeak, D. D. 2011. Management of complications associated with total ear canal ablation and bulla osteotomy in dogs and cats. *Vet. Clin. North Am. Small Anim. Pract.* **41**: 981–994, vii. [Medline] [CrossRef]
10. Usui, R., Usui, R. and Fukuda, M. 2009. Obstruction of Ear Canals in an American Cocker Spaniel Successfully Treated Using a Video Otoscope. *Jpn. Vet. Dermatol.* **15**: 207–210 (in Japanese). [CrossRef]
11. Usui, R., Usui, R., Fukuda, M., Fukui, E. and Hasegawa, A. 2011. Treatment of canine otitis externa using video otoscopy. *J. Vet. Med. Sci.* **73**: 1249–1252. [Medline] [CrossRef]