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

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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.

NOTE

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 × 10^3/µl (normal value: 6–10 × 10^3/µl), RBC 7.0 × 10^6/µl (normal value: 5.5–8.5 × 10^6/µl), Hgb 15.1 g/dl (normal value: 12.0–18.0 g/dl), HCT 47.6% (normal value: 32.0–36.0 g/dl), MCH 21.6 pf (normal value: 20–30 IU/l), ALT 104 mg/dl (normal value: 0.5–0.9 mg/dl), total bilirubin<0.2 mg/dl (normal value: 0.2–0.3 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 bacterical 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,
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.1](image1.png)

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

![Day 1](image2.png)

**Day 1**

![Day 5](image3.png)

**Day 5**

![Day 15](image4.png)

**Day 15**

![Day 21](image5.png)

**Day 21**

**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 therapya) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Diode laserb) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Bacterial culturesc) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

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.

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.

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