Chronic Otitis in Dogs - a “Déjà-Vu” Challenge

Summary

Chronic otitis externa can be extremely challenging treat. Dogs with chronic otitis externa usually require different diagnostic and treatment plans than dogs with acute otitis. Successful management of chronic otitis is a multifactorial process and requires a strategic plan. The primary, predisposing and perpetuating factors, in addition to secondary infections and proper diagnosis and treatment will be discussed.

Key Points

- Otitis externa is a common problem of dogs that often is a diagnostic and therapeutic challenge.
- It is very important to understand and identify and control the underlying etiologies such as primary and secondary causes and predisposing and perpetuating factors that contribute to chronic otitis externa.
- Even though outwardly the client perceives that the ears seem better, successful treatment can only be determined by otoscopy and follow up with diagnostic cytological examination of material from the ear canal.
- Once the inflammatory process has been initiated by the primary cause of the otitis, there appears to be a common course for the development of chronic otitis externa.
- Otitis media is an important perpetuating cause of recurrent otitis externa.
- The reported incidence of infectious otitis media in dogs with acute otitis externa is 16%, while in dogs with chronic, recurrent otitis externa, the reported incidence is 50–88.9%.
- Usually the only clinical signs of otitis media are those seen with otitis externa.
- The treatment of otitis externa often requires a complete plan that will involve the use of proper cleaning, topical and systemic treatments.

Understanding Otitis - Causes and Factors

The most recently proposed classification for otitis includes primary and secondary causes and predisposing and perpetuating factors.

Primary Causes

Primary causes are usually the actual inciting agent or etiology that directly causes damage or disease in a normal ear canal. These can occur alone and induce otitis externa without any other cause or factor. The primary cause may be very subtle and often go unrecognized by the owner or even the veterinarian until a secondary complicating factor occurs. Once a primary etiology alters the aural environment secondary complicating factors such as infections often develop. Obtaining a complete history can aid the veterinarian in compiling a differential list, in addition to a detailed physical and otic examination. The vast majority of cases will have a primary cause. The most common primary causes are hypersensitivity disorders including atopic dermatitis and food allergy, epithelialization disorders, endocrine diseases, foreign bodies, autoimmune diseases, neoplasia, inflammatory polyps and parasitic diseases such as ear mites. These disorders initiate the inflammatory process within the ear canal. In a retrospective study evaluating 100 dogs with acute
(37%) and chronic-recurrent (63%) otitis externa, the most common primary cause of the otitis was due to allergic dermatitis (n = 43 dogs).

**Secondary Causes**
Secondary causes contribute to or cause disease only in the abnormal ear. As such they occur in combination with primary causes or predisposing factors. The most common secondary causes are infections. Generally, secondary causes of otitis externa are easy to eliminate once identified and when they are chronic it is usually because primary causes or perpetuating factors have not been adequately addressed. Secondary causes include bacteria (e.g., *Staphylococcus* and *Pseudomonas*), fungal or yeast (e.g., *Malassezia* and *Candida*), and overcleaning (excessive moisture and maceration, physical trauma).

**Predisposing Factors**
Predisposing factors alone do not cause otitis externa but increase the risk of development and persistence of chronic infection as they facilitate the inflammation by permitting the external ear canal microenvironment to be altered allowing pathogenic or opportunistic bacteria to become established. These factors work in conjunction with either primary causes or secondary causes to become a significant problem. Examples of predisposing factors include conformation issues (pendulous pinnae, excessive hair in the ear canal, congenital stenosis of the ear canal), primary otitis media, immunosuppression, excessive moisture in ears and side effects than can be a result from previous treatments. It is important to eliminate as many of these factors as possible, realizing that some of these, such as ear conformation, cannot be changed.

**Perpetuating Factors**
Perpetuating factors are changes in the anatomy and physiology of the ear that occur in response to otitis externa. They sustain and aggravate the inflammatory process and prevent resolution or worsen an already present otitis externa. Once present, they accentuate or permit the development of secondary causes such as infection, by providing environments and microscopic niches that favor their persistence. In many cases perpetuating factors prevent the resolution of otitis externa when treatments are only directed at primary and secondary causes. These factors may be subtle at first but over time can develop into the most severe component of chronic ear disease. These factors are not disease specific and are most commonly seen in chronic cases. The most common examples of perpetuating factors include progressive pathologic changes such as altered epithelial migration, ear canal proliferation and hyperplasia, stenosis, otitis media and calcification. Perpetuating factors are the most common reasons for surgery (such as total ear canal ablation).

**Important Diagnostic Procedures**

**Otic Exam:** The ear exam allows the evaluation of the amount and type of exudate in the ear canals, estimate the amount of otic inflammation, hyperplasia (along with palpation of the horizontal and vertical ear canals), and determine the status of the tympanic membrane. Based on the findings, it will be important to decide if medical management is the best course of treatment. In patients with concurrent neurological abnormalities (e.g., facial paralysis, nystagmus, ataxia, head tilt), a detailed neurological examination is indicated.

**Otic Cytology:** Otic cytology establishes if an infection is present in the ears, and assists with the selection of topical otic therapy. A sample of the exudate smeared onto a slide with mineral oil can
be performed to look for mites. The most common pathologic coccoid bacteria from dogs’ ear with otitis externa is *Staphylococcus pseudintermedius*, while the most common pathologic rod bacteria is *Pseudomonas aeruginosa*. *Malassezia* sp or yeast is also an important pathologic organism. It is important to describe the presence of any inflammatory or neoplastic cells as well as some form of quantification of each type of bacteria and yeast to establish severity and allow monitoring at future visits.

**Bacterial Culture and Sensitivity**

Culture and sensitivity (C/S) is indicated if resistant strains of bacteria are suspected (history of chronic oral or topical antibiotic therapy; bacteria persist on cytologic examination in spite of apparently appropriate therapy; if rods are present on cytology) or in the presence of severe proliferative changes or suspected or confirmed otitis media. It has been noted that the spectrum of bacteria seen in the middle ear versus the external canals may differ and that the sensitivity pattern of the same organisms from the canals versus the middle ear may also differ. In one study different organisms were cultured from the middle and external ear and even when *Pseudomonas* spp. was cultured twice from the same ear different strains were seen based on the sensitivity pattern exhibited. When "rods" are seen on cytology (suggesting the presence of *Pseudomonas*), sensitivities to ticarcillin and a third generation cephalosporins should be routinely requested in addition to those routinely offered. The correlation between C/S results and response to topical therapy does not always correspond as well as we would like. This likely has to do with the fact that when resistance is noted on sensitivity testing utilizing the Kirby-Bauer disc diffusion system, it is resistance to microgram/ml concentrations of the antibiotic. Topical antibiotics are routinely used at mg/ml concentrations. These higher concentrations may prove efficacious, even when resistance has been suggested to lower concentrations of antibiotic. It is still recommended to perform cultures when in chronic cases or when you suspect resistance, even if only topical therapy will be instituted. C/S data appears to be of more value in choosing antibiotics when a decision has been made to use systemic therapy for otitis media or deeper, soft-tissue infections of the ear canal. C/S should never be done without cytology. If the cytology reveals suppurative inflammation with rods or no visible organisms and the animal has not responded to appropriate topical and systemic antibiotic therapy then C/S may be indicated.

**Treatment**

Aims of Treatment:
1. Remove debris and discharge
2. Eliminate infection from the ear canals and middle ear
3. Reverse chronic pathological changes
4. Identify and treat the primary cause of the otitis

**Ear Cleaners**

**Drying agents** are used after the ear is cleaned and relatively dry. Most drying agents contain isopropyl alcohol and one or more of the following: acetic acid, boric acid; benzoic acid; malic acid, salicylic acid, silicone dioxide, sulfur. Veterinary products of this type include: CleaRx Treatment Dryer; OticClens; Otic Clear, and MalAcetic otic. These products can be used at home for prophylactic treatment of swimmers ear and as a deodorizer. Alcohol and higher concentrations of the acids may be irritating or cause a burning sensation in ulcerated ears.
**Disinfectants** such as chlorhexidine and iodophors are commonly used but are considered by some investigators contraindicated with ruptured tympanums. However, other studies suggest that clinical concentrations of chlorhexidine may not be as ototoxic as previously thought. Using ceruminolytics and flushing with water or saline may decrease the development of ototoxicity when chlorhexidine is used. Acetic acid is also a very good disinfectant that has been shown to be very effective in the treatment of otitis externa in humans. It is believed that its activity is not completely due to the pH because other acidic products are not as effective in killing *Pseudomonas* and *Staphylococcus*. Products include MalAcetic Otic that is combined with 2% boric acid. Tetrasodium Edetate TrizEDTA has also been used as a potent disinfectant and can be very effective in cases of *Pseudomonas*. It has value when used by itself or in conjunction with other disinfectants and antimicrobials. When combined with low concentrations of chlorhexidine 0.15% it can have synergistic effects to control *Pseudomonas* infections. This combination is available as TrizEDTA Plus. TrizEDTA has also been show to have a sparing effect on the MIC of enrofloxacin against ciprofloxacin resistant *Pseudomonas*. This may benefit treatment with both susceptible and resistant *Pseudomonas* bacteria. This is available commercially as TrizEDTA.

**Combination products** are another group of ear cleansers that also have some drying and/or disinfectant agents. These products are utilized most effectively in the mild waxy and inflamed ears. These products also help ears that have a mild objectionable odor to the client. These products can also be utilized for long-term management of milder cases of recurrent waxy otitis externa after the otitis is controlled. They tend to be modified drying products with less drying ingredients and more antimicrobial properties and mild ceruminolytic agents. Some are primarily mild cleansers with some disinfectant and drying agents added. A variety of ingredients are combined with drying agents to achieve these effects they include: propylene glycol; lanolin; glycerin; lactic acid, and parachlorometaxylol chlorhexidine. Some of the products in this category include: Epi-Otic and Epi-Otic Advanced Ear Cleansers; OtiClens; Oti-Fres. A newer product that utilizes phytosphingosine (0.02%), is available (Douxo®, Micellar Solution) and consists of a micellar solution that enables delivery of phytosphingosine (lipophilic) as well as soothing moisturizing agents (hydrophilic) that removes cellular debris, removes sebum, and has anti-inflammatory and antimicrobial properties. Advantages of these products are the lack of antibiotics or glucocorticoids, which may induce bacterial resistance or adrenal suppression. These products are often used at home as part of maintenance for cases that have higher relapses or as part of other topical and systemic therapy programs.

**Topical Antibacterial Agents**

Topical antibacterial agents are indicated when infection, whether primary or secondary, is present. Most topical antibacterial products also contain glucocorticoids. First line antibiotics most commonly utilized include products containing neomycin or neomycin in combination with other agents (Tresaderm and Panolog), and gentamicin (Gentocin Otic, Otomax, or Mometamox). Ototoxicity is reported with all gentamicin topicals. However, similar to chlorhexidine, this concern may be overstated. One study showed no vestibulotoxic or ototoxic effects from 21 days of otic gentamicin applied BID to ears with ruptured tympanic membranes. Baytril Otic is often ineffective in chronic severe cases. Often homemade products are utilized as an option, using enrofloxacin (Baytril injectable,) as a 25% mixture of injectable enrofloxacin (22.7 mg/ml diluted with water, saline or other active agents with variable concentrations of dexamethasone, not exceeding 0.1-1%). Polymyxin B (Surolan) can be a highly effective topical antibiotic and often is effective in many *Pseudomonas* infections. Polymyxin will be inactivated by purulent exudates. Other more
potent aminoglycosides are occasionally needed for more resistant infections, particular in situations of *Pseudomonas* infections. Selection is often based on culture and sensitivities. Other choices include tobramycin (Tobrex ophthalmic solution), injectable amikacin mixed with saline at a final concentration of 25mg/ml and ticarcillin (Timentin). Care needs to be used with certain topical aminoglycosides as recently ototoxicity based on BAER testing occurred more commonly in dogs treated with amikacin and tobramycin based topicals. The author has also used mupirocin diluted in sterile saline as a topical antibacterial in cases of methicillin-resistant *Staphylococcus* infections in the ear; the product is mixed as one tube of product 30 gm to 30ml of sterile saline. The author avoids using topical fluoroquinolones empirically and usually recommends bacterial culture and sensitivity.

**Topical Antifungal Agents**

Antifungal agents are required in any case complicated or caused by the yeasts, *Malassezia* or *Candida* or dermatophytes. Some products that appear effective *in vitro* are not always effective for *Malassezia* clinically. This can be seen most commonly with nystatin (Panolog) and to a lesser degree Thiaibendazole (Tresaderm). Clotrimazole is one of the most commonly used antifungal/antiyeast agents and is found in many brand name products such as Otomax and Mometamax. It is often highly effective but on occasion there will be non-responsive *Malassezia* cases. The author finds topical 1% miconazole (Conofite lotion) to be very effective. Even more resistant *Malassezia* cases can be treated by adding a crushed 200mg tablet of ketoconazole to the miconazole products. Acetic acid can be an effective treatment for *Malassezia* (MalAcetic Otic). A relatively new product combines TrizEDTA with ketoconazole and can also be used in milder cases and in maintenance situations (Triz-Ultra+Keto).

**Topical Glucocorticoids**

Numerous topical preparations for the external ear canal are available. Most of the ear products contain various combinations of glucocorticoids, antibiotics, antifungals and parasiticides. Active ingredients that are found in these medications are very important. Most cases of chronic otitis externa benefit from topical glucocorticoids. Glucocorticoids have antipruritic, anti-inflammatory effects and decrease exudation and swelling. In addition they cause sebaceous atrophy and decrease glandular secretions. Glucocorticoids may reduce scar tissue and proliferative changes, which helps to promote drainage and ventilation. There are many different types and potencies of topical glucocorticoids available. It is best to choose several products of different potencies and become familiar with them. Otic products containing triamcinolone acetonide (Panolog) and dexamethasone (Tresaderm) are usually effective but can be absorbed systemically, so caution with their use must be used. A more potent glucocorticoid, mometasone (Mometamax) showed no adrenal suppression after one week of therapy. In cases of allergic otitis externa long-term topical glucocorticoids may be required. Products with weaker strength glucocorticoids should be used in these situations such as those containing 1.0% or 0.5% hydrocortisone (Burotic HC). Some hydrocortisone 1% gels and sprays may also be helpful in long-term management (CortiCalm®). A new product contains antimicrobials and hydrocortisone aceponate (Easotic) which is converted to HC17 propionate, is a highly active anti-inflammatory with a potency equivalent to that of dexamethasone. The author often recommends triamcinolone and DMSO (Synotic) and has great results for most chronic, hyperplastic and stenotic otitis cases.
Systemic Therapy

**Systemic antibiotics** may be used whenever otitis media, moderate or marked proliferative changes are present or when appropriate topical therapy and cleansing were not effective. The author usually recommends culture and sensitivity prior to selecting a systemic antibiotic. Usually higher doses are recommended to hopefully achieve a good penetration in the middle ear. Fluoroquinolones are usually prescribed when *Pseudomonas* or other relevant gram-negatives are isolated. The most common fluoroquinolones utilized include: enrofloxacin (Baytril) at 5 mg/kg up to 20 mg/kg q24h, marbofloxacin (Zeniquin) at 5.5 mg/kg q24hr, Orbifloxacin at 5-10mg/kg q24hr. Ciprofloxacin should be avoided as oral absorption and bioavailability are poor and variable in dogs, potentially leading to inefficacy and bacterial resistance. In some cases injectable aminoglycosides are required to eliminate more resistant infections such as *Pseudomonas*. These can be given once daily subcutaneously which has made there use easier by clients. In multi-drug resistant *P. aeruginosa* infections, other systemic B-lactam antibiotics, such as ticarcillin disodium-clavulanate potassium (Timentin), imipenem (Primaxin) and ceftazidime sodium (Fortaz) may be options, but are very expensive, are administered parenterally, and should only be considered after aggressive topical cleaning and other antimicrobial agents have been ineffective. Potential side effects of imipenem include seizures, and should be used cautiously in patients prone to seizures. The aminoglycoside antibiotics have the potential for nephrotoxicity. Animals must be monitored with periodic urinalysis (protein, casts) and serum BUN and creatinine levels.

**Systemic antifungals** can sometimes be used in severe cases of *Malassezia* otitis. Oral antifungals commonly used include ketoconazole (Nizoral), fluconazole (Diflucan) or itraconazole (Sporanox). All are dosed at 5-10 mg/kg once or divided twice daily. Terbinafine (Lamisil)) has also been used with similar success to ketoconazole at 30 mg/kg a day.

**Systemic Glucocorticoids**
Glucocorticoid therapy is indicated in markedly inflamed and painful otitis and when chronic pathologic changes cause marked hyperplasia and stenosis of the canal lumen. Some cases of allergic otitis may be treated with systemic glucocorticoids allowing for the initial topical therapy to be a low potency glucocorticoid product. Oral anti-inflammatory dosages of prednisone or prednisolone (1mg/kg/day) can be used initially and then tapering to the minimum alternate day dosage that controls the symptoms. The author typically recommends oral glucocorticoids for cases of otitis media and post deep ear flushing procedures. Triamcinolone acetonide is particularly effective for inhibiting fibroblasts and reducing collagen. When longer-term treatment is expected then alternate day short acting glucocorticoid therapy is indicated as listed above.

**Cyclosporine**
One study looked at oral cyclosporine as another medical option for cases with severe proliferative otitis externa. In a pilot study, five client-owned dogs were treated with oral cyclosporine at 5 mg/kg twice daily for a minimum period of 12 weeks. All dogs were re-evaluated clinically every four weeks to monitor progress. All five cases showed significant clinical improvement based on owner and clinical assessments. Individual owners also commented on improved disposition, hearing and quality of life. The author has seen limited benefits with oral cyclosporine in end stage disease but has seen moderate responses in cases with less severe disease.
Important: Follow-up visits, Identify and Treat the Underlying Cause

Recheck the patient in three to four weeks to assess response to therapy, by performing an otic examination and otic cytology in addition to the general examination. This step is very critical to the management of otitis. Identifying and managing the underlying cause including allergic diseases and endocrinopathies will also be crucial to prevent recurrences. If the patient is responding, initiate a food trial, if the otitis and pruritus (if present) is non-seasonal. In cases of seasonal otitis and pruritus, where other causes of the otitis and pruritus have been ruled out, a diagnosis of atopic dermatitis may be made, and allergy testing or symptomatic therapy are initiated. If, however, the ears have not responded, then a deep ear flush should be scheduled, to clean the ears and evaluate the patient for concurrent otitis media. In dogs with recurrent ear infections of 6 months or longer, up to 89% of these dogs may have concurrent otitis media, with about 70% having an intact but abnormal tympanic membrane.

Deep Ear flushing
A short course (two to three weeks) of glucocorticoids should be utilized prior to the deep ear flush to decrease inflammation and stenosis of the horizontal and vertical ear canals. The deep ear flushing procedure is best done under general anesthesia in order to completely clean the ear and examine the ear canal and tympanic membrane. Anesthesia also allows for the placement of an endotracheal tube that precludes the aspiration of fluids that may pass through the middle ear into the auditory canal and then into the posterior pharynx. Once the animal is under anesthesia, CT scan imaging of the tympanic bulla should be performed to stage the ear disease. Radiographs may be used, however, remembering that normal radiographs do not rule out otitis media. There are a variety of techniques to clean and flush the ears. Initial evaluation of the canal should be performed to determine the severity of disease and the type and amount of debris in the canal and what the best initial approach to use to remove the debris. Utilizing a combination of cleaning techniques often facilitates more rapid removal of debris from the canals. Alligator forceps and ear curettes can be utilized through a conventional surgical otoscope head to remove larger debris. After examination, the external ear canal is soaked for 10 minutes with a ceruminolytic ear cleaner. The ear is then flushed with warm sterile isotonic saline using a bulb syringe to remove large debris and exudate. This is followed by flushing with warm sterile isotonic saline using a video-otoscope equipment (ideally) or an 8 French polypropylene urinary catheter attached to a 12 cc syringe passed through an otoscopic cone. Once the ear is clean, the tympanic membrane is evaluated with an otoscope or video otoscope. If the tympanic membrane is not intact, cytology and bacterial C/S is performed from the middle ear cavity. This may be performed using the hand-held otoscope or the video otoscope. Using a hand-held otoscope, a sterile otoscopic cone is inserted into the horizontal ear canal and a sterile pediatric-size swab needle is passed into the middle ear cavity. The first swab is used for C/S. A second sample is passed into the middle ear for cytological analysis. If the video otoscope is used, an open-end 3½ French Tom cat catheter attached to a 12 cc syringe is placed through the port of the otoendoscope. Saline is flushed into the middle ear cavity and aspirated back, the first sample for culture, and the second sample for cytology. The video-otoscope channel can also be used for passage of biopsy or grabbing forceps for sample collection.

If the tympanic membrane is intact, appears abnormal, and otitis media is suspected or confirmed with imaging, a myringotomy is needed to obtain samples for cytology and bacterial C/S, and to flush the middle ear cavity. In dogs, an intact tympanic membrane does not rule out the possibility of otitis media. Using a hand-held otoscope, a sterile otoscopic cone is inserted into the horizontal
ear canal and the tympanic membrane is visualized. Using a spinal needle or a special myringotomy knife, an incision is made into the caudoventral quadrant of the tympanic membrane, specifically the pars tensa. The first sample collected is submitted for bacterial C/S. A second swab is inserted into the original incision and the sample obtained is used for cytological analysis. If the video otoscope is used to perform the myringotomy, an open-end 3 1/2 French Tom cat catheter is placed through the port of the otoendoscope, and the Tom cat catheter is used to make the incision. Saline is flushed into the middle ear cavity and aspirated back using a 12 cc syringe attached to the Tom cat catheter, and the first sample is submitted for culture, and the second sample for cytology. The normal tympanum heals in 21 to 35 days. Therefore, if the ear is kept free of infection after the myringotomy procedure, the tympanic membrane should heal within 5 weeks. Possible complications of ear flushing and myringotomy are Horner's syndrome, facial nerve paralysis, vestibular disturbances, and deafness. Owners should understand these complications and sign a consent form prior to the procedure. Topical antibiotic and steroids may be infused inside the middle ear and external ear canal after the ear flushing, if necessary.

After the otic flush, the patient may be sent home on empiric topical and systemic therapy based on cytology, and the treatments may be modified once the cultures have been completed. Otoxicity of most topical otic medications is not known, so if a myringotomy was performed, owners should be instructed to watch for any signs of otoxicity (facial nerve paralysis, Horner's syndrome, vestibular disturbances, deafness) and discontinue the otic medications if they occur. Oral glucocorticoids and pain medication (such as tramadol) may be sent home to reduce discomfort and inflammation associated with the procedure.

Recheck the patient 2-4 weeks after the ear flush to monitor the response to otic treatments. In most cases of chronic otitis externa, where continual inflammation and stenosis have occurred along with increased cerumen production, which may alter epidermal migration, some type of maintenance otic therapy is required, such as a cleaning and drying agent, to keep the ear canal free of wax build up.

References


Books