Chronic Canine Otitis

Robert A. Kennis DVM, MS, DACVD

Canine and feline otitis continues to be one of the most requested topics for continuing education seminars. The multi factorial components make diagnosis and treatment more complicated than other dermatologic diseases. Compounding the difficulty of treatment is the limited number of otic preparations licenced and safe for instillation into the ear canal. The focus of this presentation will center on treatment options for refractory otitis. A brief discussion on the predisposing and primary causes of otitis will also be covered. Because feline otitis and treatment there of can be very different, comparative aspects will be addressed. Finally, surgical options of treating otitis will be reviewed.

Otitis externa is defined as an acute or chronic inflammation of the ear canal and or pinnae. It may be unilateral or bilateral. Otitis media describes inflammation beyond or including the tympanic membrane (ear drum) and bullae. Otitis interna is reserved for cases of documented neurologic symptoms including vestibular signs.

The causes of otitis are best evaluated as predisposing, primary, and perpetuating factors. Usually there are many factors involved and otitis should not be viewed as mainly a bacteria or yeast infection. On physical examination, it is usually these perpetuating factors that get all the attention. Obviously, we need to resolve the bacteria or yeast component but we must ask ourselves "what is a nice healthy dog doing with an ear infection?"

Predisposing factors are those that make the conditions favorable for an otitis situation to occur. Stenotic ear canals are the classic predisposing factor. However, stenotic ear canals can also be considered a perpetuating factor in a chronic infection situation. Inappropriate topical or systemic medications can be predisposing factors. Ear canal maceration due to excessive moisture from swimming or bathing can disrupt the epithelial barrier enough to allow commensal ear organisms to over populate. Predisposing factors can best be diagnosed with a thorough history.

There are many primary causes of otitis. The partial list includes ectoparasites, foreign body, autoimmune disease, neoplasia, adverse drug reaction, viral and protozoal causes. Recurrent otitis is a common occurrence in both food allergy and atopy. I believe that allergy is the most common cause of otitis in adult dogs. In cases of chronic or recurrent otitis, the primary cause must be sought. Usually the search for the primary cause is only possible once the predisposing and primary factors are resolved.

The perpetuating factors include bacterial and yeast infections, and rarely dermatophytosis. Otitis media may be a perpetuating or a primary cause of recurrent (or chronic) otitis. As the perpetuating factors continue to progress, fibrosis and ear canal calcification may develop. These progressive pathologic changes usually result in the necessity of surgical intervention.

After an adequate history if collected, an otoscopic examination is the single most useful diagnostic procedure. A thorough examination of the pinnae, vertical and horizontal ear canal, and status of the tympanum must be documented. A diagnosis of ear mites is best made with an otoscope. Ulcerations and primary lesions can be identified. The status of the tympanic membrane (intact, torn, inflamed, absent) will determine subsequent diagnostic and therapeutic considerations.

After otoscopic examination and before ear cleaning, ear exudate cytology should be

performed. This is done by gently inserting a cotton tipped swab into the ear canal and rolling the contents onto a clean glass slide. The slide should be heat fixed (until warm) and stained with a modified Wright's stain such as Dif-Quik. Once dried, the slide should be viewed under high power (100X) oil immersion objective for the morphology of bacteria or the presence of yeast. This stain is helpful in determining the morphology of the bacteria (rod or cocci) but does not reveal the Gram staining properties. Cocci bacteria are commonly Staphylococcus sp.or Streptococcus sp. Common rod bacteria include E.coli, Pseudomonas, Proteus, Klebsiella, and Corynebacteria although others are occasionally identified. Yeast within the ear canal are almost always Malassezia organisms and as such therapy should be directed at this pathogen. Occasionally Candida are identified based on culture. Morphologically speaking, you cannot tell these two apart on cytology alone. Ectoparasites such as demodex or sarcoptiform mites are occasionally seen on exudate cytology. Once cytology samples are collected, collect a sample from each ear canal for culture They can always be thrown out if culture and sensitivity are not needed, but it is hard to get a good culture after cleaning the ears.

In many cases of chronic otitis the ear canal may be so full of waxy debris or exudation that visualization of the tympanic membrane cannot be determined. When this happens, a thorough ear cleaning must be performed. In mild or acute cases products designed for cleaning and maintenance (Epi Otic, Oticlens, Oticalm, etc.) can be used. In chronic cases anesthesia and a thorough ear flushing may be indicated. Sterile warmed saline is probably the best and safest ear cleaning agent. In severe cases I prefer to use Clear-X cleaning solution. This product must be thoroughly lavaged and should only be used on anesthetized patients. An ear bulb syringe is all that is needed for lavaging the ear canal. Rubber catheters and water-pik devices should be avoided as either can rupture an intact tympanic membrane or damage the oval window. Feeding tubes placed down the ear canal are helpful to remove excess water once cleaning is complete. If oti-liths are present, the gentle use of an ear curette can be beneficial. Chlorhexidine as a cleaning and flushing agent should be avoided due to its ototoxicity potential.

Treatment of otitis includes the complete resolution of all predisposing, primary and perpetuating factors. In many cases the resolution of the perpetuating factors (bacteria and or yeast) can be formidable. For the treatment of bacterial otitis there are many commercially available products. In all cases of canine otitis a topical agent selected to treat a bacterial component is indicated. Selection of a topical agent is based on the morphology of the bacteria and the historical information of what products have been used previously. Neomycin is a good broad spectrum antibiotic effective against rod and cocci bacteria. It is a good first line antibiotic but resistance may be seen with continued usage. Gentamicin is a very strong antibacterial effective against rods and cocci. Products containing this antibiotic are usually more expensive than neomycin containing products and should be reserved for cases of suspected resistance. Gentamicin becomes inactivated in the presence of exudate and should not be placed into an ear canal full of pus. Chloramphenicol containing products are about as "potent" as gentamicin containing products. Idiosyncratic bone marrow hypoplasia of human beings has been reported with this drug and gloves should be worn when working with this product. In cases where resistance is suspected to these topical agents, polymixin B containing products should be used. The human formulation Corticosporin Otic Suspension is an excellent choice. This particular formulation is superior to veterinary otic preparations containing polymixin B because of the fact that the human product has a higher concentration of the antibiotic. Neomycin is added to this product to increase the spectrum of activity. In highly resistant cases silver sulfadiazine may be used. The cream may be diluted with warm water to

make it into a workable otic preparation. This is the only product mentioned so far that does not contain corticosteroids and may be a good choice of a topical agent if avoidance of corticosteroids is indicated. Baytril otic contains both enrofloxacin and silver sulfadiazine and no corticosteroid. It is beneficial in treating Gram negative rod bacteria and highly exudative otitis. Silver sulfadiazine improves re-epithelialization of ulcerated ear canals. I have used ticarcillin prepared as an otic preparation on one occasion with good success. There is a recipe at the end of the notes.

Chlorhexidine has been shown to be highly ototoxic and products containing this ingredient are not labeled for otic usage. The fact that one product was taken off of the market and re-released with the word otic removed from the label should be sufficient warning of the potential harm. Xenodyne is a buffered iodine containing product that is effective against bacteria and yeast and does not contain a corticosteroid. This product is contraindicated in cats because of ototoxicity but I have not been informed of this circumstance in dogs. This is a good time to make the reminder that dog and cat otitis is very different. Tris EDTA is a product that improves the efficacy of an antibiotic against both Gram positive and negative bacteria. There are also commercially available products (Triz-EDTA, T8) that are convenient and excellent. Ten minute contact time is essential. I do not recommend mixing this product with antibiotics as safety and efficacy have not been scientifically demonstrated. A new commercially available product contains both Tris EDTA and ketoconazole.

There are limited numbers of products available for yeast infections. Complicating things even further is the fact that the literature is not consistent with what active ingredients are actually effective. As such, I will be giving my recommendations based on personal experience. Miconazole (Conofite lotion) containing products are the single best anti-yeast agent available. Clotrimazole has very good *in vitro* efficacy against Malassezia organisms, however its clinical effectiveness has not been as consistently good. Nystatin has good efficacy against Candida but poor effectiveness against Malassezia. Thiabendazole is fair to poor against yeast organisms. Iodine products such as Xenodine has good efficacy against yeast but may stain the haircoat. Because yeast enjoy a waxy and greasy environment with a high pH, products that modify the local environment can be fungi static. Most cleaning and drying types of products contain an acidifying agent such as boric acid, salicylic acid, acetic acid, etc. A 2.5% acetic acid solution can be effective against yeast but if it is applied to ulcerated ear canals it may be painful to the patient. I have used Bur-otic with and without hydrocortisone with good success both as a treatment and as a maintenance product for dogs that swim frequently. In refractory cases of Malassezia otitis media, oral ketoconazole at 10mg/kg once daily is an effective adjunct treatment. A new product containing Tris-EDTA and ketoconazole is now available.

Corticosteroids can be very beneficial in treating otitis. These products are anti-inflammatory, anti-pruritic, and reduce the amount of sebum and scale. Because of the beneficial effects of corticosteroids, they are added to virtually all of our otic preparations. There are times, however, when corticosteroids are either not necessary or contraindicated. If a corticosteroid is indicated, but not available in the product you selected, consider using oral prednisolone rather than mixing products together. There are many home concoctions that I have heard about over the years and my only recommendation is to be cautious. Some active ingredients are very unstable, and mixing may precipitate or inactivate them.

For most cases, 14 days of therapy is indicated. If there is inadequate resolution then a recheck cytology should be performed. One of the most common reasons for treatment failure is poor owner compliance. Other possible reasons are resistance of the organism or a different

pathogen may be present because of treatment. It is necessary to keep the ears free of debris prior to treatment. I prefer not to send home a cleaning product simultaneously with a medicating product. The residue from the cleaning product may dilute our drug or pH changes may inactivate the active ingredient. It is usually advised to clean the ears before the patient goes home and have the owner return for a recheck if an excessive amount of debris builds up in the canal.

An oral antibiotic or antifungal agent is always indicated if otitis media is present. This should be selected on the basis of a culture. I rarely culture a sample that contains only yeast organisms. Oral antibiotics are not indicated as a supplemental therapy for otitis externa under most cases. Severe proliferative otitis externa may benefit from oral antibiotics, however by the time these changes are present, otitis media is usually present.

Otitis media with mild or absent otitis externa does occur. On otoscopic exam the tympanum may appear hyperpigmented, erythematous, or billowing outward. Myringotomy is the term referring to surgical excision of the tympanum for a sample collection for culture and sensitivity. The dog should be heavily sedated or anesthetized for this procedure. Clean and disinfect the ear canal as well as possible with an iodine cleaning agent. Insert a sterile otoscope cone into the canal to visualize the tympanum. Gently insert a sterile spinal needle down the cone and through the tympanic membrane, attempting to stay to the ventrolateral aspect of the tympanum. A syringe should be attached to the needle for aspiration of material from the middle ear canal. This sample should be submitted for culture and sensitivity for aerobe and anaerobic bacteria. If the tympanum is highly inflamed, a microtip culturette may be pushed through the tympanum. In normal canine ears, the tympanum may heal in about 3 weeks.
Studies on healing times for inflamed tympanic membranes have not been performed.

Chronic otitis implies an underlying cause. Many chronic ears have been treated with about every steroid and antibiotic imaginable. At first visit careful palpation of the ear canals should be performed to identify calcification. Calcified ears are surgical ears in almost all cases. It is usually recommended to perform a CBC, serum profile, and thyroid profile to identify underlying causes and the effects of chronic therapy. If the patient is currently receiving topical medications containing corticosteroids, T4 levels will likely be lower than normal.

If there is an opportunity to treat the patient medically, then cytology, culture and aggressive ear cleaning under anesthesia is indicated. The selection of a topical medication is based on something stronger than what the patient has already received. A systemic medication is selected on culture and sensitivity. Most chronic ears have highly resistant bacteria and antibacterial therapy can be very expensive. It is always best to pick the right antibiotic the first time. Initial therapy should be for 3 weeks with a mandatory recheck. Under most cases an ear cleaning and culture would be indicated. If all is well, therapy should be continued for an additional 3 weeks. Treatment for chronic otitis is neither cheap nor easy! Success is totally dependent on owner compliance.

There are some basic guidelines for when surgical intervention is indicated. Calcified ear canals are surgical. Calcification is a chronic progressive and irreversible process that causes tremendous pain for the patient. Ear canals that are fibrotic may be surgical. If it is possible to get medication down the ear canal, all hope is not lost. Stenotic ear canals may be a predisposing factor for otitis or may be a result of chronic inflammation. Historical information may be helpful in defining these circumstances. In some cases a vertical ear canal ablation may be a beneficial adjunct to treatment. However, if a underlying primary cause is not found then relapse is likely. Progressive proliferative changes may lead to occlusion of the ear canal.

Surgery is usually indicated to remove this tissue. Pinnal ablation is not the best way to resolve this condition. Ear canal ablation with plastic surgery will yield a cosmetically pleasing result. Because of the difficulty and expense of obtaining diagnostic bulla radiographs, it is usually recommended to allow a specialty hospital to perform this procedure. A C.T is usually more cost effective and a better diagnostic tool than radiology.

Ear canal ablation with bulla osteotomy is reserved for cases of medically intractable infection, calcified ear canals, neoplasia of the ear canal or bulla, or chronic changes of the bullae including calcification or lytic changes. This procedure is difficult and labor intensive after the surgery. It is usually advisable to refer these cases to a reputable surgeon that likes ear surgery. Possible complications include Horner's syndrome due to facial nerve damage and head tilt. Residual sepsis is also a possibility. All dogs with ear canal ablation with bulla osteotomy will have significant hearing loss. Usually they experience substantial hearing deficits prior to surgery and because of the slow progression, most dogs adapt to the handicap easily.

APPENDIX

Ticarcillin Ear Solution:

Concentrate

6g vial of ticarcillin in 12ml of sterile water
Divide into 2ml portions in syringes and freeze

Solution:

mix 2ml concentrate with 40ml sterile saline
divide into four 10ml portions and freeze
once thawed for use it should be refrigerated
discard any solution after 7 days

***Courtesy of Aiden Foster** BVSc, PhD, MRCVS

Foster AP, DeBoer DJ. The role of Pseudomonas in canine ear disease. *The Compendium*, 20(8)1998. 909-919.