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DIAGNOSIS AND TREATMENT OF OTITIS EXTERNA

THE 4 STEP APPROACH TO OTITIS EXTERNA

OTITIS MEDIA

HISTORY AND CLINICAL SIGNS OF OTITIS MEDIA

THE 4 STEP APPROACH TO OTITIS EXTERNA

1. Examination of Skin and Ears

It is always important to look at the overall patient. Checking the skin for problems may alert the clinician to potential primary causes for the ear disease. Classic signs of atopy may be noted or there may be symmetrical alopecia suggesting hypothyroidism. Then the ear canal should be examined for exudates, growths, or other pathological changes. The eardrum should always be evaluated because the choice of medications and flushing agents will depend on the integrity of the eardrum.

2. Cytological Evaluation of Otic Exudate

The next step in approaching ear disease is examining a cytologic preparation of the otic exudate. Cytological examination of every infected ear should be done routinely.

A sample is obtained with the use of a small tipped cotton applicator. The swab is placed through a disinfected otoscope cone placed into the vertical ear canal near the junction with the horizontal canal. The swab is extended beyond the plastic cone and pressure is applied to the ear canal epithelium as the swab is withdrawn back through the cone. In this manner, packing of wax and exudate is minimal. Every attempt is made to sample only from the horizontal canal epithelium because the vertical canal is often contaminated with a number of commensal organisms unrelated to the ear disease.

The swab is then rolled onto a new, clean microscope slide by rolling the harvested material from the left ear on the left side of the slide and the swab from the right ear on the right side of the slide. The slide is labeled with the patient's name and the date of the sample. The slide is heat fixed and stained with blood stain (Diff-Quick or Wright-Giemsa). After the slide is dried, a drop of slide mounting medium is applied and a coverslip placed over the material. In this manner a permanent slide is made. A drop of mineral oil can be spread on the stained slide and a coverslip placed over the oil if permanent slides are not desired. This standardized approach to making slides allows uniform identification of organisms from each ear and allows comparison of ear cytology from visit to visit.

To look for ear mites under the microscope, the ear swabs are rolled in a drop of mineral oil on a microscope slide and coversliped. Low power (40X-100X) examination reveals mites crawling across the field and/or the typical oblong dark brown Otodectes eggs may be seen.

Evaluation of slides should begin with a low power (100X) overview of cell types. If there are large numbers of epithelial cells and few microorganisms, then noninfectious causes of otitis such as seborrheic diseases and hypothyroidism should be considered. Sheets of epithelial cells may indicate neoplasia as the cause of otitis externa and the presence of

numerous intact non-staining epithelial cells may indicate a seborrheic condition. Inflammatory cells and acantholytic cells may indicate autoimmune disease. High power (400x) examination is needed to characterize bacteria and yeasts. Large numbers of bacteria and/or yeasts indicate secondary invaders. When neutrophils are seen in addition to bacteria or yeasts, deep infection must be considered. Ear mites are not often seen on stained ear swabs, but the eggs may be found on mineral oil preparations.

When infectious organisms are seen on high power (400X) cocci are usually Staphylococci, rods are usually Pseudomonas or Proteus. Budding yeasts of Malassezia may be seen individually in the background on a roll smear, but large numbers of yeasts colonizing on exfoliated epithelial cells are indicative of secondary yeast infection. Staphylococci and Malassezia are often found together in the same ear, and there is evidence to suggest that Malassezia growth is stimulated by Staphylococci.

3. Flushing the Ears

After the class of disease and the type of infection is determined, the next step is to sedate or anesthetize the animal so that a thorough flushing and suctioning of the ear canal can be done. It is imperative that exudates and dried medications that have accumulated in the ear canal are removed so that the canal epithelium can be evaluated. Good visualization of the ear canal after flushing helps to insure that the vertical and horizontal canals are clean and free of debris. The efficacy of otic medications is enhanced when they are applied directly onto the cleaned epithelial surface.

Care must be taken in the selection of a flushing agent, since so many ear cleaners contain materials that are potentially ototoxic when the eardrum is not intact. Prior to using an ear cleaner, read the label to see if it can be used if the eardrum is damaged. Many manufacturers are now placing a warning on their labels.

With so many products available to veterinarians for ear care, it is important to understand that these products often fall into one of three categories. Cerumenolytics emulsify ear wax for easy removal. Ear flushes aid in removing pus, mucus and serum from the ears. Drying agents decrease moisture in the ears and dessicate the surface keratinocytes. Moisture is a predisposing factor allowing growth of organisms in the ear canal.

Until a determination of the intgrity of the eardrum is made, the choice of flushing solutions should be limited to non-detergent, non-alcoholic type of flushing solutions. Physiologic saline and dilute povidone iodine are safe flushing materials to use. When used as warm solutions (98 degrees F.) these solutions act to soften wax and loosen other debris.

Ear curettes are useful for scraping the ear canal to dislodge large pieces of wax and epithelial shreds. They are available in various loop sizes and angles and some have a circular cutting surface (Dermal Curettes). Curettes are also useful for harvesting cells for cytology

when a tumor mass is suspected.

Organisms found as perpetuating factors of otitis externa include bacteria and yeasts. Malassezia, Staphylococci, and Pseudomonas are the most common organisms isolated from the ears of dogs. Corynebacteria, Enterococci, E.coli, Streptococci, and Proteus are also frequently isolated. Malassezia is often found in the ears of cats, but cats rarely have bacterial ear infections. Demodex mites can also be isolated from ceruminous otitis cases. The prevalence of one organism over another is determined by a variety of factors. For example, excessive cerumen production by cerumen gland hyperplasia permits Malassezia growth, while decreased immune function seen with hypothyroidism allows colonization of Staphylococci. Dogs that swim and get water in their ears are much more prone to Pseudomonas infections.

4. Guidelines for Treatment of Otitis Externa

A treatment plan be formulated that is tailored specifically to the patient after the skin and ears are evaluated, the cytology is done, and the ear canal is cleansed.

Corticosteroids have a definite place in the treatment of otitis externa. Systemic corticosteroids reduce the intense pruritis associated with acute otitis externa and reduce the inflammation in the epithelium of the ear canal. Systemic high doses of corticosteroids (1mg per pound Prednisone orally daily) are used for several days to reduce the edema and stenosis that prevents adequate examination of the ear canal. Dexamethasone injection given at a dose of 0.1mg per pound also helps decrease otic inflammation with less side effects. If the ear canal is patent, then a potent topical corticosteroid such as dexamethasone, betamethasone, or fluocinolone may be used to relieve the intense pain and itching. A relatively new corticosteroid, mometasone (Mometamax, Schering), has been introduced to decrease the systemic effects of topical otic corticosteroids.

As the otitis resolves, a less potent corticosteroid such as 1% hydrocortisone may be used in the ear to act as a preventative for inflammation in atopic dogs that may have recurrent otitis. Corticosteroid ear drops do not remove hyperplastic epithelium or glands, so if there is no response to high dose corticosteroids after 7-10 days, the stenosis is probably the result of increased tissue growth rather than inflammation.

Another approach to treat a stenotic ear with steroids is the use of an ear wick. The dehydrated, compressed polyvinyl alcohol wicks have a spongelike architecture. A dry ear wick (Ultracell) can be placed into the stenotic ear canal and then moistened with an aqueous steroid several times daily. The moistened wick will swell to many times its dry diameter and will form fit to the ear canal. These wicks may be purchased to achieve either a 7mm or a 9mm hydrated diameter. In this manner, the corticosteroid medication will be in constant contact with the ear canal. It is left in for 2 weeks and then removed. Often the hyperplasia and inflammation will decrease appreciably, increasing lumen diameter.

Antibiotics that kill Staphylococci, Pseudomonas and other gram negative bacteria are used in many otic preparations. Although antimicrobial therapy may temporarily relieve the symptoms of otitis externa, the symptoms may re-occur unless the underlying disease is identified and treated as well. These infectious organisms are considered to be perpetuating factors in ear disease.

Topical otic formulations are made with combinations of pharmaceuticals such as antifungals, corticosteroids, insecticides, and topical anesthetics. First line antibiotics such as gentamycin, amikacin, neomycin, and polymyxin B are potentially ototoxic, so if there is no tympanic membrane (TM), these antibiotics should be avoided. In addition, neomycin has been implicated as a sensitizer in contact dermatitis in the ear. If the ear becomes worse with neomycin treatment, the antibiotic should be stopped immediately. Tobramycin (0.3% ophthalmic drops) is safer to use instead of other topical aminoglycosides if the status of the TM is unknown.

Baytril Otic (Bayer) has recently been introduced. It is a solution that contains 0.5% enrofloxacin and 1% silver sulfadiazine. The high concentration of enrofloxacin has been demonstrated in-vitro to provide a high enough concentration to be effective against most bacteria. However, there are a number of fluoroquinolone resistant Pseudomonas bacteria being found, and so this product is not recommended for first-line use in Pseudomonas infections. Enrofloxacin may not have a good sensitivity against Streptococci. It's use should be based on demonstration of susceptibility of the organism to enrofloxacin. Silver sulfadiazine may have some use against the yeasts in the ear.

Systemic antibiotics may be useful in some suppurative otitis externa cases as an adjunct to ear cleansing and topical antibiotic therapy. Culture and sensitivity should be reserved for those otitis cases that are unresponsive to topical therapy because the sensitivity results are often misleading, since they are based on BLOOD levels, not topical levels. If there is severe inflammation with inflammatory cells present on otic cytology, then using intracellular antibiotics like fluoroquinolones, azithromycin, or clindamycin may increase the success of systemic treatment by delivering the antibiotic to the site by these cells.

Another useful compound as an adjunct in Gram negative ear infections is tris-EDTA solution (TrizEDTA, Dermapet, Inc.). EDTA chelates metal ions, such as calcium and magnesium, which are necessary to maintain the integrity of the cell membrane. The cell membrane of these bacteria become more porous so that the antibiotic can diffuse into the bacteria and kill it. Tris buffer keeps the ear canal at pH of 8.0, which is optimum for function of the aminoglycosides and fluoroquinolones. Tris-EDTA alone has been shown in vitro to have potent bactericidal effects. It has also been shown to irreversibly bind to the destructive elastase enzyme released from gram negatives. Clinically, tris-EDTA is used as a pre-treatment flush in the external ear 5 minutes prior to the instillation of topical antibiotics.

Usually treatment is done on a twice daily basis. Because of the high pH of tris-EDTA, Malassezia infections may worsen when tris-EDTA is inappropriately used in this infection.

Ear mite treatment can be done using selamectin (Revolution, Pfizer) twice a month or injectible cattle ivermectin (0.1 cc subcutaneously every 2 weeks). In young kittens otic 0.01% ivermectin (Acarexx, Idexx)) or 0.1% milbemycin (Milbemite, Novartis) are safe to use. Many topicals ear mite drops containing insecticides are also available for ear mite treatment.

Alterations in cerumen lipid composition caused by underlying skin diseases such as food sensitivities, atopy or hypothyroidism may play a role in Malassezia otitis externa. Low levels of free fatty acids in surface lipids coupled with increased levels of surface triglycerides favors Malassezia infections. Diseases of the ear cause increases in the amount of sebaceous secretion and increases in the number and amount of lipid secretion from the apocrine (cerumen) glands. It has been shown that over 50% of atopic dogs have elevated Malassezia populations on their skin.

To remove these lipid substrates from the ear and to treat otitis externa complicated by Malassezia, the author prefers to clean the ear in the hospital first and then the home use of an acetic acid/boric acid solution (Malacetic Otic, DermaPet, Inc). Acetic acid degreases the ear canal and boric acid keeps the epithelium relatively dehydrated. A topical solution of miconizole or clotrimizole may be used in the ear canal after cleaning. In addition to ear cleaners , systemic oral ketoconazole or itraconizole are useful for refractory yeast otitis cases or for yeast otitis cases where there is also stenosis. These systemic compounds may reduce the pruritis associated with the yeasts, but they have not been shown to reduce otic yeast numbers.

In mild cases of Malassezia otitis externa, the external canal can be cleaned by the owner at home to facilitate removal of excessive exudate accumulation associated with otitis externa/media. The ear cleaner or flush is used daily for 7-10 days by filling the ear canal to overflowing, massaging the base of the ear, and allowing the solution to remain in the ear canal for 5 minutes. The loosened debris is wiped off of the concave pinnal surface with a dry cotton ball. This procedure is repeated once daily. When the ear canal is clean, the cotton ball will remain fairly white when the solution is wiped away. At that time, home ear cleaning is reduced to once weekly.