

# Systemic Therapy for Otitis Externa and Media

Otitis externa is defined as inflammation of the external ear canal that may also involve the pinna. It is the most common disease of the external ear canal of the dog and cat. The reported prevalence in the dog ranges from 10% to 20% of the population; in the cat otitis externa is less common, ranging from 2% to 10%, and is usually caused by a parasitic etiology.

## **Etiologies of Otitis Externa**

The etiologies of otitis externa may be broken down into predisposing factors, primary causes, and perpetuating factors. If these factors and causes are not diagnosed, treated, and controlled, the otitis externa may become chronic and recurrent. Predisposing factors alone do not cause the otitis externa, but they increase the risk of development of the disease. These predisposing factors include otic conformation (stenotic canals, hair in canal, pendulous pinnae) excessive moisture (swimmer's ear), and treatment effects (trauma from cotton-tipped applicators, irritant topical solution, inappropriate use of combination topical therapy). Primary causes directly cause the otitis externa and include parasites (*Otodectes cynotis*, demodicosis, *Otobius megnini*), hypersensitivity disorders (atopic dermatitis, cutaneous adverse food reaction, allergic contact dermatitis), keratinization disorders (primary idiopathic seborrhea, hypothyroidism), neoplasms, polyps, and autoimmune diseases. Perpetuating factors are factors that prevent the resolution of the otitis externa and include bacteria, yeast, otitis media, and progressive pathologic changes.

## **Otitis Media**

Otitis media is defined as inflammation of the middle ear cavity. The most common cause of otitis media is an extension of an infectious otitis externa into the middle ear cavity through a ruptured tympanic membrane. In dogs otitis media occurs in 16% of acute otitis cases, whereas in cases of chronic otitis externa 50% to 89% may have concurrent otitis media. An intact tympanic membrane does not rule out otitis media because the defect may heal over the infection.

## **Management of Otitis**

### *Goals of Medical Management of Otitis*

The goals of medical management of otitis externa and otitis media are to reduce inflammation and resolve infection. Successful long-term medical management of otitis externa and otitis media requires identification and control of the primary underlying disease and the predisposing and perpetuating factors. Topical therapy is recommended for all cases of otitis externa and otitis media and may include ear cleaning and drying agents, glucocorticoids, antibiotics, antifungals, or antiparasiticidals.

Systemic therapies used for medical management of otitis externa and otitis media are similar and include glucocorticoids, antibiotics, antifungals, and antiparasiticidals. However, systemic therapy is not always required in the management of otitis.

### **Systemic Glucocorticoids**

Systemic glucocorticoids are used to help alleviate the pain and inflammation associated with otitis externa. Glucocorticoids are antipruritic, antiinflammatory, and antiproliferative and decrease sebaceous and apocrine secretions in the ear. In addition, in patients with severe hyperplasia and stenosis of the ear canal, systemic glucocorticoids are warranted to reduce the inflammation to allow examination of the ear and otic flushing if required. If on reevaluation the hyperplasia and stenosis have not decreased to allow the otic examination, surgical management of the otitis may be indicated.

Short-acting systemic glucocorticoids such as prednisone or prednisolone are administered orally at 0.05 to 1 mg/kg every 24 hours for up to 14 days. This treatment course may be extended if initial improvement is noted, but moderate proliferation of the ear canal is still present. The dosage remains the same, but the frequency is tapered to every other day. In cases with marked hyperplasia and stenosis, initial doses up to 2 mg/kg every 24 hours for the first 3 to 5 days, reduced to 1 mg/kg every 24 hours, may be required. When there is only vertical ear canal stenosis, intralesional triamcinolone acetonide (Vetalog) may be effective. It is injected using a spinal needle or 25-gauge needle in a ring pattern around the vertical ear canal, injecting approximately three or four locations with a total dose of no more than 0.1 mg/kg. Short-term side effects of glucocorticoids include polyuria, polydipsia, polyphagia, and panting. Longer use of glucocorticoids may induce additional side effects such as iatrogenic hyperadrenocorticism, steroid hepatopathy, gastric ulcers, alopecia, cutaneous atrophy, hypertension, demodicosis, and urinary tract infections.

### **Systemic Antimicrobial Therapy**

#### **Indications for Systemic Treatment of Bacterial Otitis**

Systemic antimicrobial therapy for infectious otitis externa and otitis media is controversial. In dogs with endstage otitis externa and concurrent otitis media, bacterial organisms may be isolated from the exudate in the lumen of the vertical ear canal (Cole et al., 2005a) and middle ear cavity (Cole et al., 2005b), as well as from the tissue from these sites. Therefore most agree that systemic antibiotics are indicated in patients with otitis media, with severe proliferative chronic otitis externa, with ulcerative otitis externa, when inflammatory cells are seen cytologically (indicating deeper skin involvement), and when owners cannot administer topical therapy. The selection of a systemic antimicrobial agent must be made based on culture and susceptibility (C/S) testing from the external ear (for otitis externa) and middle ear (for otitis media). However, therapy may be initiated based on cytologic results while awaiting the C/S results.

### **Systemic Therapy for Staphylococcal Otitis**

The most common coccoid bacteria isolated from dogs with otitis externa or otitis media is *Staphylococcus intermedius*. Good empiric choices while waiting on C/S results include cephalexin (22 mg/kg q12h, orally [PO]) or amoxicillin trihydrate-clavulanate potassium (Clavamox, Pfizer Animal Health, 13.75 to 22 mg/kg q12h, PO).

### **Systemic Therapy for Pseudomonas Otitis**

Probably the most challenging bacterial otic infections are those infected with *Pseudomonas aeruginosa*. Systemic treatment options may be limited because of antibiotic resistance. At the present time the fluoroquinolones are the only oral systemic antibiotic available for the treatment of *P. aeruginosa*. Most veterinary dermatologists recommend starting an oral fluoroquinolone while waiting on the C/S results. When using the fluoroquinolones in the dog, the upper end of the dose should be administered. Rare reports of blindness caused by retinal degeneration have been reported in cats administered enrofloxacin; therefore the low end of the dose of an oral fluoroquinolone should be administered in the cat.

In multidrug-resistant *P. aeruginosa* infections, systemic  $\beta$ -lactam antibiotics such as ticarcillin disodiumclavulanate potassium (Timentin, GlaxoSmithKline), imipenem (Primaxin, Merck), meropenem (Merrem, AstraZeneca LP), and ceftazidime sodium (Fortaz, GlaxoSmithKline) may be options but are very expensive, must be administered parenterally, and should only be considered after topical cleaning and antimicrobial agents have been ineffective. A potential side effect of imipenem and meropenem is seizures, and they should be used cautiously in patients prone to seizure disorders.

Aminoglycoside antibiotics such as gentamicin and amikacin are less commonly prescribed but remain potentially efficacious drugs for the treatment of *P. aeruginosa* otic infections. These drugs are also administered parenterally and have the potential for nephrotoxicity. Animals must be monitored with periodic urinalysis for increased protein or tubular casts and serum blood urea analysis and creatinine.

### **Indications for Systemic Treatment of Yeast Otitis**

Indications for systemic antifungal agents are similar to those mentioned previously for bacterial infections and include patients with yeast otitis media, patients with severe yeast otitis externa, or owners who cannot administer topical therapy. In one study neither pulse-dose or daily-dose itraconazole alone significantly decreased yeast organisms identified cytologically from otic exudate in dogs with yeast otitis externa, suggesting that otic yeast infections may require topical therapy in addition to systemic therapy for resolution (Pinchbeck et al., 2002). Both ketoconazole (5 mg/kg q24h) and itraconazole ([Sporanox, Janssen Pharmaceutica Products, LP], 5 mg/kg PO q24h or pulse-dosed 2 days on and 5 days off) have been used in dogs, whereas itraconazole (5 mg/kg PO q24h) is recommended for use in the cat.

### **Systemic Antiparasiticial Therapy**

Treatment of *O. cynotis* in the dog or cat requires treatment of all in contact animals, as well as the affected animal. Selamectin (Revolution, Pfizer Animal Health) is a semisynthetic avermectin topical endectocide approved by the Food and Drug Administration for the treatment of *O. cynotis* in the dog and cat (two treatments at 30-day intervals). Even though selamectin is applied topically to the skin, it is quickly absorbed into the bloodstream, forming reservoirs in the sebaceous glands. Ivermectin (0.2 to 0.3 mg/kg q2weeks, subcutaneously for three treatments) is effective against *O. cynotis* in the dog and cat. Side effects from ivermectin may include ataxia, hypermetria, disorientation, hyperesthesia, tremors, hyperreflexia, mydriasis, hypersalivation, depression, blindness, coma, and death. Nonspecific signs include vomiting, diarrhea, and anorexia. Ivermectin should not be administered to collies and collie-crosses, Australian shepherds, Shetland sheepdogs, Old English sheepdogs, English shepherds, long-haired whippets, and silken windhounds due to profound adverse reactions or to heartworm-positive dogs. The use of ivermectin for the treatment of *O. cynotis* is off label; therefore a consent form should be signed by the owner before administration.