Chronic Otitis Externa in a Labrador Retriever

A 5-year-old, intact male yellow Labrador retriever was presented with chronic otitis externa.

**History.** The patient, an outdoor farm dog that enjoyed swimming in ponds, had been treated for recurrent bacterial otitis externa for 2 years. Previous cultures revealed moderate growth of *Staphylococcus intermedius* (*S. pseudointermedius*) that was determined to be sensitive to all antibiotics tested. On 4 occasions, treatment with a compounded combination of enrofloxacin and fluocinolone/DMSO had provided temporary relief but the ear infections returned when treatment was discontinued.

According to the owner, the dog was mildly pruritic in the winter (itch score, 3/10) but worse in the summer (itch score, 6/10), licking its front feet and rubbing its ears. The dog’s diet of good-quality dry kibble had remained unchanged for several years.

**ASK YOURSELF…**

- What diagnostics would have yielded a more accurate diagnosis when the dog was initially presented to the referring veterinarian?
- What is the cytologic diagnosis?
- What clinical findings are highly suggestive of the primary cause of the dog’s ear problem?
Physical Examination. The dog was in good body condition with a bright attitude. Mild hyperpigmentation of the concave pinnae indicated probable chronic inflammation. The dog’s ears were mildly painful when manipulated, and otoscopic examination revealed wax-filled canals and an overall red appearance. The palmar aspect and interdigital areas of both front feet were mildly erythematous, with obvious reddish discoloration of the hairs.

Diagnostics. A cytology sample (Figure 1) retrieved from each ear using a cotton-tipped swab was heat-fixed and stained with a modified Wright’s stain (DipQuick, jorvet.com) using a 1-minute immersion. After the slide was heat-dried, half was coverslipped using a slide-mounting medium. The other half of the slide remained uncovered to allow oil immersion examination, if needed.

CONTINUES
DIAGNOSIS:
Mixed infection of cocci (*S. pseudointermedius*) and yeast (*Malassezia pachydermatis*)

Otic cytology can provide information quickly to assist in selecting appropriate therapy. In some instances, cytology results will pinpoint different rods, cocci, or yeasts infecting each ear, thereby guiding therapeutic decisions accordingly.

Cytology. On cytology, bacteria are characterized as rods or cocci. The most common rods found in dogs’ ears are *Pseudomonas, Escherichia coli, Proteus*, and *Klebsiella*, all gram-negative organisms. *Staphylococcus* organisms, the most common cocci found in dogs’ ears, are often visualized as bunching clumps of small blue coccoid bodies. *Streptococcus* is also commonly found in dogs’ ears.

The presence of neutrophils on ear cytology indicates denuding of the epithelium and leakage of blood cells into the lumen of the ear canal, suggesting a severe infection that is deeper than simple overgrowth of bacteria or yeast on the surface of the ear canal. Neutrophils are most commonly seen in gram-negative rod infections, which can release many membrane-bound enzymes that dissolve superficial epithelial cells, thereby creating an ulcerated, inflamed ear canal surface that promotes infection of deeper tissues.

**Sample Collection.** Cytology samples are most representative when obtained from the entire ear canal. Surface contamination of cytology samples by sampling the upper part of the vertical ear canal can lead to misinterpretation, especially of the bacterial component. To collect representative material from the ear, a dry cotton swab is inserted into the external ear canal and advanced slowly and gently. The goal is to reach the horizontal

DID YOU ANSWER...

- Treatment of otitis externa based on the results of a bacterial culture is often misleading. Therefore, bacterial culture results should always be confirmed by cytology. In this patient, the aerobic bacterial culture grew *S. pseudointermedius*, but most laboratories do not culture *Malassezia*. Therefore, the presence of *M. pachydermatis* was missed. If cytology had been conducted, appropriate combination therapy could have been initiated.

- Cytologic results [Figure 1] showed a mixed population of clumps of cocci (*S. pseudointermedius*) as well as numerous yeast organisms (*M. pachydermatis*). Background cellular components were mostly noncornified epithelial cells. White blood cells were not seen in any of the fields examined.

- The inflammation and erythema on the palmar aspect of the feet, along with otitis externa, are highly suggestive of canine atopic dermatitis as the primary cause of the dog’s ear problems. The dog’s history notes the nonseasonal nature of the infection; however, atopic dermatitis should still be high on the differential list. Allergies had not been considered in the previous treatments but should be considered as a possible contributing factor.

Because this dog swims quite often, moisture in the ears must be considered a predisposing factor that makes the ear microenvironment conducive to microbial growth and proliferation. Excessive moisture in the ears results in maceration of the ear canals, most often detected by seeing mature cornified epithelial cells on cytology. Since noncornified cells were present in abundance, sebaceous secretions were the most likely reason. Therefore, being able to identify cornified versus noncornified cells is important.

The cytologic findings of a mixed cocci/yeast infection would explain why the combination antibiotic/steroid therapy helped only for short periods as *M. pachydermatis* infection had not been identified during the dog’s 2-year course of therapy.
component of the canal. This is made easier by grasping the pinna and gently pulling the ear out and downward. The swab is slowly rotated during the process to help collect debris and exudate. The swab is then rolled out on a slide.

To sample the deeper part of the vertical canal, a clean, medium-sized otoscope cone can be inserted part-way into the upper vertical canal. To retrieve the sample, the cotton-tipped applicator is placed into the speculum and advanced until it touches the ear canal, then immediately removed. Damage to the ear canal can occur when using cotton-tipped applicators, including packing wax further into the horizontal ear canal, perforating the eardrum, and causing abrasion to an already friable epithelial surface, which can result in ulceration.

Cotton swabs should be labeled to identify left from right ear swab samples so that the ear canal and sample are correctly matched. Swab samples should then be rolled (not smeared) onto a clean microscope slide, placing the left ear sample on the left side and the right ear sample on the right side, followed by using a wax pencil or crayon to draw a lengthwise line to divide the slide in half. The client and patient names should be recorded at the top of the slide.

**Slide Examination.** Each side of the slide should be examined independently. With the cover-slipped part of the slide under the microscope objective, the examination should begin using the 10× low-power lens to locate clumps and clusters of cells. Then the 40× high-dry lens should be used to characterize the presence or absence of microbial cells. Recording cytology findings in the patient chart can be helpful (Figure 2).

The goal is to confirm the presence of infectious organisms and identify them accordingly. *M. pachydermatis* is easily seen as dark-blue peanut-shaped, oval budding organisms. In general, this yeast is a normal commensal when found in small numbers (<8 per HPF), but are considered to be pathogens when attached to epithelial cells in numbers >15 per HPF. However, determining the significance of yeast numbers can depend on several factors. For example, having few yeast organisms in an ear that is erythematous and pruritic could have significance, whereas large numbers of yeast in a clinically normal ear, such as occurs in basset hounds, could be considered insignificant. Clinicians must, therefore, combine cytology results with clinical and examination findings to determine the importance of specific findings.

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### Variable | Left Ear Cytology | Right Ear Cytology
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Cocci (per oil field) | | |
Rods (per oil field) | | |
Yeasts (per HPF) | | |
Neutrophils | | |
Cornified (%) | | |
Noncornified (%) | | |

HPF = high-power field