

Identifying aural hematoma risk



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Aural hematoma, a diagnosis of dogs and cats in clinical practice, can be frustrating for veterinarians to treat. Several etiologies have been suggested, such as trauma or head shaking secondary to infection, but there is a lack of published research that definitively characterizes the disease or the best method of treatment.

For this article, we examined a large number of aural hematoma cases from the Banfield Medical Database to help identify the Pets most likely to be affected. This article discusses the prevalence, recurrence, signalment and treatment as well as the risk of disease across certain patient characteristics.

Using evidence to communicate risk

Understanding and appropriately applying the results from epidemiologic studies is central to the practice of evidence-based medicine, which de-emphasizes intuition, unsystematic clinical experience, pathophysiologic rationale and medical opinion as sufficient grounds for clinical decision making. Instead,

evidence-based medicine stresses the examination of evidence from clinical research, when it is available, to support medical decision making.

It is critical that veterinarians understand the type of results published from the many study designs that are used in clinical research; these results can then be used to better communicate with clients. Specifically, by using epidemiologic study results concerning disease risk, veterinarians can present compelling rationale for their recommended prevention and treatment strategies. This helps build strong relationships with clients. Communicating Pets' disease risk to clients helps establish trust and respect and provides them with support for medical decision making. Strong client communication about risk requires an exchange of information and is consistent with the practice of evidence-based medicine.

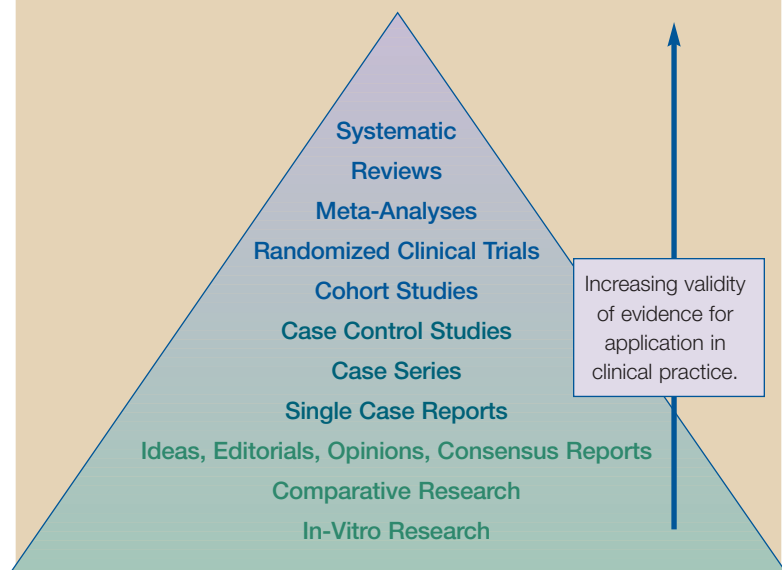
Determining disease risk

A case series, which was used for part of the analysis for this article, is a study design that allows for characterization of a disease or syndrome. Because of the limitations of the design, it is found in the lower half of the evidence hierarchy

DataSavant's mission is to:

- Explore the health and well-being of Pet populations
- Evaluate new clinical treatments
- Monitor Pets as sentinels of zoonotic disease in family environments
- Transform Pet medical data into knowledge, *i.e.*, open new windows into Pet health care using the Banfield medical caseload and database.

Figure 1: Evidence Pyramid by Type of Research Study



group, the results can't be used to estimate the likelihood of being diagnosed with a specific disease or syndrome.

As researchers ascend the evidence pyramid by study design, they can estimate disease risk and make population inferences about disease etiology or treatment efficacy. In addition to a case series, our analysis of aural hematoma includes data from the general Banfield population to help estimate risk for being diagnosed with aural hematoma.

To understand what puts a particular Pet at risk for a certain disease, veterinarians need to know how a characteristic is distributed both in the diseased and nondiseased populations. If a study finds that certain breeds, for example, are more likely to be affected with a disease, veterinarians may be able to understand more about the etiology or offer counsel to Pet owners about expectations for particular dog breeds.

Table 1: Concurrent Diagnoses for Canine Cases of Aural Hematoma*

Concurrent Diagnoses	Prevalence in the Case Series	Prevalence in the General Population
Otitis externa	28.7%	18%
Fleas	3.3%	3.3%
Flea allergy dermatitis	1.6%	0.7%
Flea bite dermatitis	1.4%	0.7%
Hypothyroidism	0.6%	0.03%
Otitis interna	0.6%	0.4%
Otitis media	0.4%	0.3%
Food allergy	0.2%	0.2%
Ear foreign body	0.2%	0.2%
Hyperadrenocorticism	0.01%	0.06%

*The total number of affected dogs was 9,452.

Methods of analysis

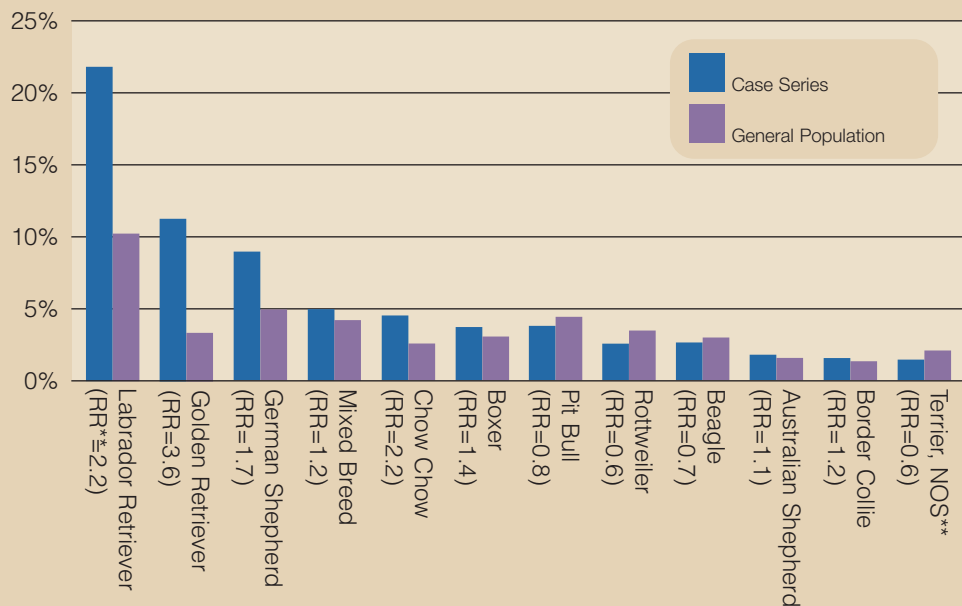
For our case series and analysis of aural hematomas, we considered Banfield hospital records from a five-year period: January 1, 2001, through December 31, 2005. Cases of aural hematomas in Pets were identified in the Banfield Medical Database by using at least one of the following criteria:

- A diagnosis of aural hematoma in the ailment table
- Hematoma found in the right or left pinna in the examination and observations table
- One or more treatments for aural hematoma found in the sales or inventory table.

We characterized disease prevalence; the age, gender and breed of the identified

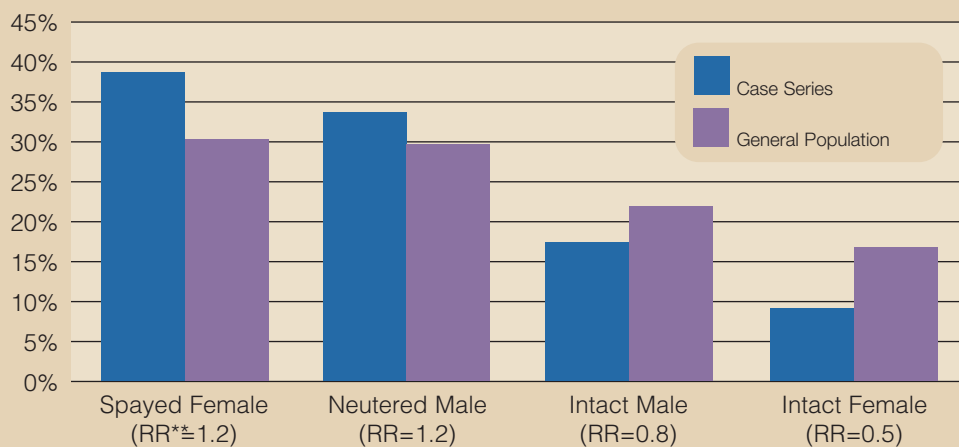
(Figure 1). As a descriptive study, a case series is often the first step in understanding a disease process, which leads to further hypotheses and study. Because a case series lacks a control group or comparison

Figure 2: Top 10 Affected Breeds by Frequency*



*The total number of affected dogs was 9,452.
 **RR=relative risk, NOS=not otherwise specified

Figure 3: Gender Distribution for Canine Cases of Aural Hematoma*



*Total number of affected dogs was 9,452.
 **RR=relative risk

cases; and recurrence, treatment and selective concurrent diagnoses (*Table 1, page 18*). To estimate risk, we calculated the rel-

ative risk for developing aural hematomas using the distribution of potential risk factors in both the case and

general populations. A risk factor is simply an intrinsic or extrinsic factor that is found more often in individuals with a disease. It can be causal (deterministic) or a result of other associations.

A relative risk greater than 1 suggests a positive association between an outcome and a factor, whereas a relative risk equal to 1 reflects no association. A relative risk less than 1 suggests an inverse relationship between a factor under study and a disease outcome.

Prevalence of aural hematomas

For the aforementioned five-year period, there were 2,652,600 dogs seen for in-hospital visits at Banfield. We identified 9,452 dogs with aural hematoma from this dataset for a prevalence of disease (first diagnosis) of 0.36 percent. Over the same five-year period, there were 889,377 cats seen for in-hospital visits. We identified 1,668 cats with aural hematoma from this dataset for a prevalence of disease (first diagnosis) of 0.19 percent. The average age of Pets diagnosed with an aural hematoma was very similar for cats and dogs: 6.9 years of age in canine cases and 7 years of age in feline cases.

(Note that the remaining results discussed in this article were generated for canine Pets only.) The diagnosis was recurrent in 4.8 percent of the canine cases. The canine breeds that are most frequently affected by aural hematomas (in order of decreasing absolute numbers) are listed in *Figure 2* on page 20. However, if we only consider the frequency of occurrence, we would not be able to understand a certain breed's risk for being diagnosed with an aural hematoma compared with the risk for the general population.

Breed risk

To determine breed risk, we need to evaluate the breed distribution (frequency) in both the diseased and general population groups. Here is an example: For Labrador Retrievers, the relative risk for being diagnosed with an aural hematoma is 2.2 (22.0/10.2). This means that Labrador Retrievers are about twice as likely to be diagnosed with an aural hematoma as the general population of all dog breeds. The formula for calculating the relative risk is as follows:

$$\frac{\text{Number of Labrador Retrievers in aural hematoma series}}{\text{Total number of aural hematoma cases}} \div \frac{\text{Number of Labrador Retrievers in the general population}}{\text{Total number of dogs in the general population}}$$

In our analysis, Pit Bulls, Rottweilers, Beagles and Terriers were under-represented (*i.e.*, at less risk for aural hematomas than the general population). For example, Rottweilers' relative risk for aural hematomas was 0.6 (2.0/3.6); Rottweilers were about half as likely to be diagnosed with an aural hematoma as the general population.

We found that spayed female dogs and neutered male dogs were at a slightly increased risk for aural hematomas than the general population (*Figure 3*, page 20). Furthermore, dogs that were also diagnosed with otitis, flea allergy dermatitis, flea bite dermatitis and hypothyroidism were over-represented (*i.e.*, at

increased risk for being diagnosed with aural hematomas).

Specific treatment details from PetWare,[®] Banfield's proprietary software system, were available for 3,780 cases—which is slightly more than one-third of the total cases of canine hematomas. Veterinarians in almost 90 percent of these cases performed surgery, 67.5 percent used a combined surgery/bandage package, 20 percent used a bandage package and 2.6 percent placed an ear hematoma tube. (Pets could have been treated with more than one of these options.) A small percentage of veterinarians (n=46) used sample aspirates to help characterize the hematoma fluid. Of these veterinarians, 65 percent performed cytology and 35 percent submitted a sample for culture.


Discussion

In the “average” Banfield hospital, a canine Pet diagnosed with an aural hematoma is most likely to be almost 7 years old, a neutered male or spayed female and from one of the following breeds: Labrador Retriever, Golden Retriever, German Shepherd, mixed breed, Chow Chow, Boxer, Australian Shepherd and Border Collie. These canine Pets are also at greater risk of experiencing concurrent diseases such as otitis, flea allergy dermatitis, flea bite dermatitis and hypothyroidism.

If veterinarians know the risk factors for aural hematomas, this can help them better counsel the Pet owners in their hospitals about diseases likely to be diagnosed in their Pets. It can also help raise the index of suspicion, prompting diagnostic tests for concurrent diseases like hypothyroidism.

It should be noted, however, that a limitation of the analytic method used to estimate risk is that it considered only one variable at a time (univariate). Therefore, it cannot separate the confounding effects of two variables together on an outcome.

For example, the association among aural hematoma and spayed and neutered dogs and hypothyroidism could be a result of the increased age of the Pets with aural hematomas (relative to the general population) rather than a true association. In future DataSavant articles, we will explain the methods that control for confounding effects and address different study designs as we endeavor to learn more about the health status of our Pet populations.

It is important for veterinarians to understand the results of epidemiologic studies so they can practice the best possible evidence-based medicine. The benefits of this are tangible. First, understanding Pets' risk for a certain disease and communicating it to clients is a powerful tool that fosters strong veterinarian-client bonds. It also helps clients make informed health-care decisions for their Pets. Most importantly though, correctly analyzing and applying epidemiologic study results enhances veterinarians' ability to provide the highest quality care for Pets and their families. 

Elizabeth Lund, DVM, MPH, PhD, joined Banfield in April 2006 as senior director of research for DataSavant. As an epidemiologist, her professional experience over the last 18 years has included research in academia, industry and public health. In addition to her veterinary degree, Dr. Lund has a master's in public health and a PhD in epidemiology/informatics. She and her husband, Jim, have four children (Jessica, Alyssa, Will and Nick) and four Pets (a dog, cat, chinchilla and hamster).