BE(heart a)WARE: Questions You Should be Asking About Tricuspid Valve Dysplasia and Labrador Retrievers

Laurel McCord ~ January 2020

What is tricuspid valve dysplasia?

It is a defect of a valve within the right side of the heart. Valves help blood flow in the correct direction in the heart. The tricuspid valve controls blood flow by the opening and closing of small flaps, leaflets, inside the valve. When the flaps are deformed, dysplastic, some blood can flow back in the wrong direction as the heart pumps. The defect is congenital, meaning present from birth.

Depending on how poorly formed the valve is, dogs with tricuspid valve dysplasia (TVD) may progress to congestive heart failure. Arrhythmia, or irregular heart rhythm, can also be associated with tricuspid valve dysplasia and cause sudden death. Some dogs have normal lifespans if their TVD is mild enough, but shortened lifespan is to be expected for severely affected dogs.

How is TVD found?

Sometimes TVD will produce a murmur, an abnormal heart sound, that can be heard with a stethoscope. Listening with a stethoscope is called auscultation. Generally, the worse the murmur; the worse the TVD. However, some veterinarians can and have missed even significant murmurs in dogs with TVD, mine included. Don't assume that because a dog has had a basic wellness exam it is clear of TVD. Of course, murmurs are not specific to TVD, several other murmur causing conditions, and even "innocent" murmurs are possible.

If a murmur is heard, then an ultrasound of the heart, called an echocardiogram, can be performed to show the cause of the murmur and severity of the heart condition. Auscultations and echocardiograms are best performed by board certified cardiologists because they have the most training and experience in finding and grading heart conditions.

Mild TVD may not produce an audible murmur at all. I know of several affected dogs that were only discovered because an echo was done for breeding screening purposes. It is likely that there are many Labs with "silent" TVD that generates no murmur.

Is TVD curable?

Practically speaking, no. At this time, surgery is extremely costly, risky, and not widely available. A few universities are beginning to offer valve surgeries, but with mixed results.

Most dogs will only receive medication to treat and attempt to delay the symptoms of heart failure.

Is tricuspid valve dysplasia genetic?

Scientists believe so. In a study of a service dog breeding stock population, heritability of TVD was estimated to be 0.71.[1] If so, then TVD is more heritable than hip dysplasia. Several estimates of the heritability of hip dysplasia have been done in Labradors in the UK with none higher than 0.37.[2] However, no one knows exactly which gene or genes control the defect. Genetic research is ongoing. Currently scientists do not know the mode of inheritance (recessive, dominant, etc.). Any breeder who thinks they have somehow cracked the code and know more about the mode of inheritance than several geneticists should be treated with skepticism. Usually such claims are made by the very people who are not screening their breeding stock for TVD.

How many Labs have TVD?

No one knows because the only way to rule out TVD is by echocardiogram, but many breeding dogs and most pets are not tested. A cardiologist who has screened many Labs has estimated that 20% of the Labs who do not have a murmur still show TVD on echocardiogram (which I refer to as silent TVD).

I heard TVD isn't a problem in _____ lines?

TVD has been diagnosed in dogs from A-list field trial pedigrees, top winning show programs, "pointing Lab" lines, backyard breedings, "silver" breeders, and even other breeds so whoever said that either did not understand the problem or was knowingly making up an excuse for not screening their dogs. I have personally communicated with owners of affected dogs from all of the above sorts of breedings who have dogs with TVD.

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[1] T Famula, L Siemens, A Davidson, M Packard. Am J Vet Res. 2002 Jun;63(6):816-20. Evaluation of the genetic basis of tricuspid valve dysplasia in Labrador Retrievers.

[2] BJ Wilson, FW Nicholas, JW James, et al. Heritability and phenotypic variation of canine hip dysplasia radiographic traits in a cohort of Australian German shepherd dogs. PLoS One. 2012;7(6):e39620. doi:10.1371/journal.pone.0039620

Field trialers have thought that the strenuous training and competition program that field trial dogs are subject to would weed out dogs with heart problems because they would be unable to sustain top performances. However, it has begun to spread that one of the top FCs (Field Champions) of recent years is publicly acknowledged to be mildly TVD affected, so hopefully that myth is dispelled. I also know of an active search and rescue dog and other field trial or hunt test dogs that are affected. By and large field breeders have lagged behind show breeders on implementing heart screening of breeding stock, but there are encouraging signs this may be changing.

Breeders who say it isn't a problem in their lines can't know that unless they are checking for it, yet usually the ones who say that are making an excuse for why they don't check. Even if their foundation dogs seemed trouble free, each generation usually incorporates some outside dogs that a breeder simply cannot know everything about. No one is so experienced or smart that they can substitute their educated guesses for actual health screening.

At the center of such excuses is usually the cost and travel inconvenience of screening for TVD. In actuality those factors are a drop in the bucket considering the large sums of money, time, and distance many people spend on competing for their dog sports. When you are told by a breeder that their dogs don't need checked, consider what they have to gain by saying it. They want to be able to sell puppies or stud service without jumping through another health screening "hoop". Those hoops are costly and may even result in a fail for their otherwise outstanding breeding prospect or program.

Some breeders may live in areas where there is no cardiologist within even a day's drive. However, those areas are far fewer than some people would like buyers to believe, and, frankly, other people in the same situation have found ways to get the screenings done. Veterinary cardiologists all over North America can be found through the American College of Veterinary Internal Medicine's locator website.[3]

What can be done to reduce TVD in the breed?

This starts with not breeding affected dogs. Much as with hip and elbow dysplasia, there is no definitive DNA test for TVD. Thus, the only thing that can be done is to screen breeding stock to weed out obviously affected dogs. Radiographs, x-rays, are used for hip and elbow screening, but hearts need an echocardiogram. Auscultation does not catch "silent" TVD affected dogs. Although these silent TVD dogs may never have obvious problems

[3] ACVIM is the entity that certifies veterinary cardiologists. <https://vetspecialists.com>.

themselves, they can pass on any genetic predisposition to TVD to future generations. Just as with hip dysplasia, their offspring may be more severely affected than they.

Currently OFA's general recommendations for all breeds is that if there is no murmur then no echo is needed. However, at least for Labradors that dated recommendation has not kept pace with the experience of owners, breeders, and the actual cardiologists who examine a large number of Labs. Stopping at heart auscultation on breeding stock is like screening for hip dysplasia only by observing whether a dog is visibly lame. A responsible breeder would never assume a dog's hips are normal just because it doesn't limp, yet some otherwise respected breeders would have people assume that no murmur means no TVD.

Dogs with normal echocardiogram results can still produce TVD affected puppies, just as dogs with OFA excellent hips can still produce puppies with hip dysplasia. However, statistics indicate that dogs with normal hips produce fewer puppies with hip dysplasia than dogs with abnormal hips. We would expect, and hope, the same is true of TVD and dogs with normal hearts produce fewer TVD affected puppies than dogs with abnormal hearts.

One cardiologist recommendation is to look for three generations of echo cleared dogs in a pedigree. As more breeders do echos this will begin to be possible, but currently I don't know of any dogs with this complete of background.

In a perfect world all the puppies in a litter would be screened by echo so that breeders could gather complete information about the otherwise unknown carrier status of breeding stock. However, screenings are best accomplished after the heart has reached mature size and few owners have echos done.

In short, echo all breeding stock. Buy puppies only from echo cleared parents. Only use stud dogs who are echo cleared. Only allow stud service to bitches that are echo cleared. The same system has been done with hip dysplasia and over the years the incidence of hip dysplasia has gone down according to OFA statistics. The best we can do is use the same strategy until DNA research provides a more definitive test.

If you don't echo a dog before breeding, you may be breeding a dog with TVD, are you willing to take that risk?

Are you willing to buy a puppy from someone who would take that risk?

More Information

What I have authored here is a result of owning a dog with TVD and a decade of trying to learn more about the disease, but I encourage everyone to do their own research.

TVD in Labrador Retrievers. Facebook Group.

Labrador Retriever Heart Health. <https://www.heartdogs.info/english>

X. Navarro-Cubas, V. Palermo, A. French, S. Sanchis-Mora, and G. Culshaw. Open Vet J. 2017; 7(4): 349–359. Published online 2017 Dec 9. Tricuspid valve dysplasia: A retrospective study of clinical features and outcome in dogs in the UK.