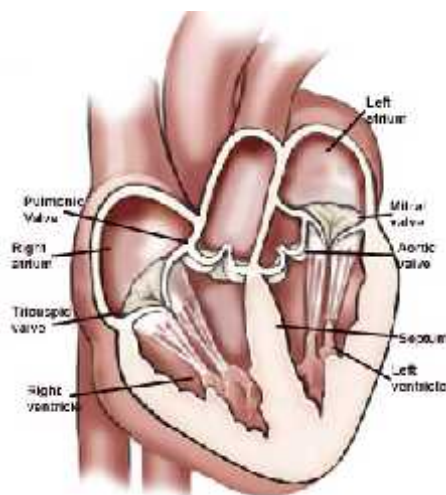


Heart disease in the English Bull Terrier

According to literature English Bull Terriers (EBT) are frequently diagnosed with murmurs and are predisposed to mitral valve abnormalities (valves between the left atrium and left ventricle) and a narrow aorta (left ventricular outflow tract obstruction (LVOTO)). These cardiac disorders could lead to congestive heart failure, syncope and sudden death. In May 2017 we (Mark Dirven and myself as vets and Frank van Steenbeek as geneticist) started a research project on 'Heart disease in the English Bull Terrier'. This project was made possible by AniCura as they gave us a research fund. It took us 3 years and in this time we have obtained a lot of information. I want to thank everybody again who helped us with our project! We couldn't have done it without you!! We are still processing most of the information. This is going to take some time. But I do have information about the research we did in English Bull Terrier puppies.



Aim of the study

We are looking for answers to the following questions:

- Is heart disease a problem in the Bull Terrier Breed (narrow aorta, abnormal mitral valves)?
- If so, how often does this occur?
- Is this heart disease heritable and what is the mode of inheritance?
- Which dog can be used for breeding and how and when do we test this?
- Can we use a bloodtest on biomarker NTproBNP as a screeningstest for heart disease? NTproBNP increases in case of cardiac stress.
- In addition we would like to devise breed specific echocardiographic reference ranges for the EBT breed
- If possible we want to develop a genetic test on narrow aorta's.

What did we do?

- 177 different adult dogs underwent a clinical examination and, after that, echocardiography with concomitant electrocardiography was performed. Blood was taken from all these dogs to determine the genetic profile and to measure the cardiac biomarker NTproBNP
- A cell culture was made from aortic cells of a dog with a normal aorta and a dog with elevated aortic blood velocity (an elevated aortic blood velocity occurs in a narrow aorta).



- The heart of a diseased English Bull Terrier with heart disease was evaluated by a board certified pathologist.

-We examined apparently healthy EBT puppies. At the age of 6,9 and 12 weeks and 6,12 and 18 months all puppies underwent physical examination and echocardiography with concomitant electrocardiography was performed. We started with 57 puppies. Thirty of these puppies were seen at all six time points.

Results

A murmur occurs regularly in the English Bull Terrier (31%) The average blood velocity in the aorta is 2.56 m/s. Only 18% of the dogs that were tested had an aortic blood velocity of less than 2 m/s. An aortic blood velocity of more than 2 m/s occurs in dogs with a narrow aorta. A minimal to mild mitral valve leakage was seen often (74%)

We are currently developing breed specific echocardiographic reference ranges for the EBT.

The use of the NTproBNP bloodtest as a screeningtest is currently being statistically analysed.

The results of the cellcultures and the pathological examination still have to be interpreted.

The results of the genetic tests are also not available yet.

Examination of the puppies

Thirty EBT were fully characterized at all six time points. A murmur was auscultated in 1/30 dogs at 6 weeks, 1/30 dogs at 9 weeks, 1/30 dogs at 12 weeks, 2/30 dogs at 6 months, 5/30 dogs at 12 months and 7/30 (23%) dogs at 18 months with a maximum intensity of 2/6. A minor mitral regurgitation was common (66%), but no mitral valve abnormalities were seen in this group. Four puppies showed an occasional arrhythmia. The average aortic blood velocity was 1.69 m/s at 6 weeks, 1.88 m/s at 9 weeks, 1.95 m/s at 12 weeks, 2.16 m/s at 6 months, 2.39 m/s at 12 months and 2.5 m/s at 18 months. At 18 months 7 dogs had a murmur although 28 of the 30 dogs had an aortic blood velocity > 2.0 m/s. One dog had a murmur 1/6 at two time points while the aortic blood velocity was < 2.0 m/s. No cause of this murmur was found.

In conclusion:

The aortic blood velocity increases from 1.69 m/s to 2.5 m/s during growth between the ages of 6 weeks and 18 months. This suggests that heart-screening for breeding based on aortic blood velocity prior to the age of 18 months is not to be recommended. As in many dogs with aortic blood velocity > 2.0 m/s a murmur was not detected, auscultation with a stethoscope does not seem to be a good screening test for detection of a narrow aorta.

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