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A research tale with a heart to match: Professor looks at cardiovascular disease in dogs

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For more than 15 years, Kansas State University researcher Michele Borgarelli has studied heart diseases in man's best friend.

But there is an interesting twist in his work with mitral valve disease: chronic mitral valve disease in dogs is similar to the same disease affecting humans, making Borgarelli's research beneficial to dog's best friend, too.

Further proof of the bond between owner and dog? Perhaps.

But for Borgarelli, Kansas State University associate professor of cardiology, the heart-filled similarities motivate him to learn more about mitral valve disease, the most common acquired cardiovascular disease in dogs.

The disease is a heart condition where the mitral valve -- one of the four valves in the heart -- deteriorates. As the valve deteriorates, more blood backflows through the valve and can lead to congestive heart failure.

"We know that the disease affects geriatric dogs very commonly," Borgarelli said. "I'm interested to know why some dogs progress faster and die from the disease when other dogs do not."

Small breed dogs, such as Cavalier King Charles spaniels, cocker

spaniels, dachshunds, miniature poodles and Yorkshire terriers are more prone to chronic mitral valve disease. But Borgarelli's research has shown that the disease can also affect large breed dogs, such as German shepherds. He wants to search a list of factors to identify dogs more likely to progress to a severe disease stage.

"Although a lot of these patients never progress to heart failure, you don't want to wait until they get to an age where it is too late," Borgarelli said. "You want to identify these patients as early as possible."

About 70 percent of the dogs that are affected by mitral valve disease are not affected from heart failure and do not die from the disease.

"That's very similar to people," Borgarelli said. "There are some people who don't progress to heart failure even without any treatment. Treatments options are also different between people and dogs. Severely afflicted humans can have their deteriorated valve repaired or replaced. You cannot do that with dogs, yet. But surgery is going to be an option in the future for dogs, and because not every dog will be affected by heart failure, it is important to be able to identify dogs at higher risk for progression of the disease."

During a period of five years, Borgarelli and his research team conducted two population studies that involve more than 300 dogs. One population study, which was published in 2008, involved dogs that had mitral valve disease at different stages, from mild to severe. Another study, which the researchers are preparing for publication, involves dogs with the mild form of the disease.

The researchers found that 70 percent of pre-clinical dogs that have symptoms of the disease are still alive after six years. The dogs that experience heart failure have a median survival time of nine months after severe heart failure to 33 months after moderate heart failure.

Using echocardiographic examination, which creates an ultrasound-like image of the heart, the researchers have already found some indicators for severe forms of the disease. One such indicator is an enlarged left atrium in the heart, while other indicators include biomarkers, which involve evaluating blood samples.

Borgarelli is leading an Italian study of another indicator, called Brain Natriuretic Peptide, or BNP. The study, which started last year and will last until 2015, has two major goals: to evaluate if treatment with a combination of two drugs can delay the onset of clinical signs of mitral valve disease and to evaluate if any biomarker, including the peptide, can be used to identify patient risk.

For a third study, Borgarelli is applying a new noninvasive technique called contrast echocardiography to evaluate noninvasive myocardial perfusion -- an imaging procedure that can evaluate many heart conditions.

The study, sponsored by pharmaceutical company Boehringer Ingelheim, has just begun at Kansas State University's College of Veterinary Medicine Teaching Hospital and will continue until 2012. Researchers plan additional studies using new 3D technology to further evaluate the mitral valve. Their work is evidence of the rapid progress made on the disease in recent years, Borgarelli said.

"This disease was first described in the 1960s. What we knew about the disease in the 1960s was about the same as what we knew up until a few years ago," Borgarelli said. "Many questions have been resolved in just a few years."

But unanswered questions still exist, Borgarelli said, such as whether the disease is genetic and why some dogs progress to a more severe disease while others do not.

"Because it's such a common disease and because dogs are naturally models for studying the disease in humans -- those are reasons why I want to continue studying this disease," Borgarelli said.

Provided by Kansas State University

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