



## Cornell University College of Veterinary Medicine

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# Cornell cardiologists offer advanced treatment for horses with atrial fibrillation

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### Cardiologists offer advanced treatment for horses with atrial fibrillation

When medical treatment fails, cardiologists at the Cornell University College of Veterinary Medicine can now offer a procedure that resets the quivering heart of a horse in atrial fibrillation to bring back its normal heartbeat.

Drs. Romain Pariaut, associate professor and section chief of cardiology and Bruce Kornreich, associate director of the Feline Health Center and staff cardiologist, recently performed a transvenous electrical cardioversion (TVEC) to treat a horse diagnosed with atrial fibrillation (AF), a rapid, irregular heart rhythm that causes decreased blood flow from the heart. This procedure, which involves

carefully placing electrodes into the heart to reset its rhythm with an electric shock, is now available at Cornell to treat horses impacted by this condition.

"I'm very excited to be able to offer this procedure," says Kornreich. "AF is a very common condition in horses that we're often asked to diagnose and treat. This is another tool in our toolbox to convert these patients back to a normal heart rhythm."

The Equine Hospital had offered TVEC until about five years ago, when the hospital could no longer purchase the catheters needed for the procedure. The catheters recently came back onto the market, around the same time that Cornell vet students examined On-Star, a 19-year-old mare belonging to the teaching herd. "The students picked up the arrhythmia at the Cornell Equine Park and we diagnosed it as AF," says Dr. Gillian Perkins, medical director of the Equine and Nemo Farm Animal Hospital, who coordinated the procedure. "We figured this was the perfect opportunity to practice on one of our own animals so that we could offer the procedure to clients."



On-Star is prepared for the procedure.



Dr. Romain Pariaut prepares for catheter placement.

AF is the most common cause of an irregular heartbeat in horses, and vets often diagnose the condition in racehorses. AF occurs when the organized electrical signals that normally control heart rate and contraction become disorganized, causing a rapid and erratic heartbeat. Horses can survive for years with AF, but the condition often causes poor performance.

Traditionally, veterinarians have treated AF with quinidine, a drug that can reverse irregular heartbeat

in about 85% of treated horses. The drug has several possible side effects, however, including gastrointestinal problems, low blood pressure, and even sudden death. For horses that don't respond well to quinidine, or that have had AF for several years, TVEC may be a better treatment option.

TVEC works just like the paddles of a defibrillator that doctors routinely use on humans, and even make the horses "jump" from the muscle spasm. In horses, however, the thick chest muscles and lungs make it impossible to shock the heart from the outside, so instead, veterinarians place 3-foot long catheters tipped with electrodes into the heart via the right jugular vein.



Dr. Bruce Kornreich stands with On-Star the horse.

"The most difficult part of the procedure for us is to guide the catheter," says Pariaut. "In horses it's a



long path to the heart from the outside." After sedating the standing horse, they carefully maneuver one catheter into the right atrium, while a second continues its journey down into the right ventricle and up into the pulmonary artery. They use a cardiac ultrasound to monitor their progress and then perform an x-ray to verify that the metal electrodes are sandwiching the right atrium. Finally, they anesthetize the horse, stand back, and apply a carefully timed electric shock to return the heart to a normal rhythm.



Drs. Roberto Santilli and Romain Pariaut observe catheter placement.

On-Star's procedure took approximately four hours and required a veritable village of clinicians, including cardiologists, internists, radiologists, anesthesiologists, and licensed veterinary technicians. Combined with the expense of the catheters, the initial diagnostic evaluation, and hospitalization, the procedure costs about \$3500 to \$4,000.

Of course, TVEC carries its own risks, not the least of which are associated with the general anesthesia. With this in mind, Pariaut and Kornreich tried to reduce the amount of time that On-Star was under anesthesia through careful attention to electrode placement. With both TVEC and quinidine, there is also the possibility that horses will spontaneously go back into AF. One recent study found that between one third and one half of horses successfully converted from AF to normal heart rhythm will revert back after treatment. So far, On-Star is doing well and has had no complications.



Anesthesiologist Dr. Manuel Martin-Flores tends to the anesthetized patient.

Generous funding from the Harry M. Zweig Memorial Fund and the large animal medicine and cardiology sections made TVEC possible for On-Star, and for future patients diagnosed with AF. “We expect that offering this technique will draw cases to our hospital, thereby improving our ability to train large animal medicine and cardiology residents and veterinary students,” says Perkins. “We are very pleased that On-Star, a member of our teaching herd, could help us move forward in this capacity.”

“We’re very thankful to everyone involved for their support,” says Kornreich. “We are excited to have TVEC available once again, and we hope that we’ll now be doing it routinely.”