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Penn/Cornell research spearheads the development of new guidelines for veterinary CPR



For nearly 50 years, the American Heart Association, with the help of researchers and physicians from across the nation, has developed and disseminated guidelines on how best to perform cardiopulmonary resuscitation on patients experiencing cardiac arrest. But no such evidence-based guidelines existed in the veterinary world. Perhaps as a result, while more than 20 percent of human patients who suffer cardiac arrests in the hospital survive to go home to their families, the equivalent figure for dogs and cats is less than 6 percent.

Now the Reassessment Campaign on Veterinary Resuscitation, or RECOVER, a collaborative effort of the American College of Veterinary Emergency and Critical Care and the Veterinary Emergency and Critical Care Society has arrived at the first evidence-based recommendations to resuscitate dogs and cats in cardiac arrest. The RECOVER initiative was spearheaded by Manuel Boller, DVM, MTR and Daniel J. Fletcher, PhD, DVM both specialists in veterinary emergency and critical care. RECOVER aims to standardize treatment of cardiac arrest in pets, ultimately leading to improved outcomes.

Boller, a senior research investigator in Penn's School of Veterinary Medicine and the Center for Resuscitation Science of Penn's Perelman School of Medicine, co-chaired the effort with Fletcher, an assistant professor in veterinary emergency and critical care at Cornell University's College of Veterinary Medicine.

In a special issue of the **Journal of Veterinary Emergency and Critical Care** to be published today, a series of articles outlines the new guidelines as well as the method by which they were identified. The articles also include algorithms and drug-dose charts for practitioners to follow.

The need for pet-CPR guidelines became obvious when Boller and colleagues surveyed veterinarians on how they treated dogs and cats in cardiac arrest. The results, compiled from more than 600 practitioners, showed a large amount of variation.

"What we found was that there was really no consensus on how to do that best," Boller said. "There may have been a cohort, for example, that recommended 60-80 compressions per minute and another that thought 120-150 compressions per minute was the right thing."

Boller and Fletcher recruited more than 100 board-certified veterinary specialists from around the world who systematically reviewed more than 1,000 scientific papers related to CPR. Weighting the studies by their rigor and relevance to dogs and cats, the committee ended up with 101 specific clinical guidelines. Each has a rating based on the strength of the evidence backing it.

Among the recommended practices:

- Perform 100-120 chest compressions per minute of one-third to one-half of the chest width, with the animal lying on its side.
- Ventilate intubated dogs and cats at a rate of 10 breaths per minute, or at a compression to ventilation ratio of 30 to 2 for mouth-to-snout ventilation.
- Perform CPR in 2-minute cycles, switching the “compressor” each cycle.
- Administer vasopressors every 3–5 minutes during CPR.



Other guidelines pertain to how clinicians should be trained, how to perform CPR on dogs of different breeds and sizes, what drugs to give when and what follow-up care to provide.

“We identified two overarching goals for our research: first to devise clinical guidelines establishing how to best treat cardiopulmonary arrest in dogs and cats, and second to identify important knowledge gaps in veterinary CPR that need to be filled in order to improve the quality of recommendations, and thus the quality of patient care in the future,” said Fletcher. “With this knowledge we can construct and implement educational initiatives that are evidence-based.”

The RECOVER guidelines represent a unique partnership between veterinary experts and physician-scientists who study and treat cardiac arrest in humans. The initiative exemplifies an effort to provide the same evidence-based care for family pets that physicians employ to save human victims of cardiac arrest, which remains one of the nation’s leading killers.



“When you look at guidelines for human CPR, they have been heavily informed by research done with animals, which forms the fundamental concepts to build clinical trials on,” said Boller, who works closely with leaders of Penn Medicine’s Center for Resuscitation Science to develop new techniques for cardiac arrest treatment. “Now, what we’re doing is turning things around by using the clinical research that was conducted in humans to inform how we should do CPR to help our animals. It’s really getting something back from this process of helping humans.”

By identifying the gaps in knowledge of how to best perform CPR, Boller said, RECOVER should inspire new research.

“Ultimately I hope RECOVER will lead to novel interventions and really move the field forward,” he said.

Using the new guidelines, the RECOVER team is developing an Internet-based training curriculum to certify clinicians in veterinary CPR. This certification is being peer-reviewed by the American College of Veterinary Emergency and Critical Care, much as the training materials for human CPR are accredited by the American Heart Association. The guidelines will be updated regularly, with the next RECOVER planned for 2017.

Images credited to the Journal of Veterinary Emergency and Critical Care.