

Pacific Tide

An informational newsletter

Pacific Veterinary Specialists & Emergency Service
1980 41st Avenue
Capitola, CA 95010
Specialty 831-476-2584 -Emergency 831-476-0667

Pacific Veterinary Specialists Monterey
2 Harris Court Suite A-1
Monterey, CA 93940
Monterey Office 831-717-4834 or Capitola 831-476-2584

www.pacificveterinaryspecialists.com



December 2014
Volume 12, Issue 1



About our Author

Kim Delkener, DVM

Dr. Kim Delkener graduated from UC Davis School of Veterinary Medicine in 2002. The following year she completed a rotating internship in small animal medicine and surgery at the Veterinary Specialty Hospital of San Diego where the large emergency caseload gave her valuable experience in stabilization of the emergent patient, emergency surgery and critical care. She joined PVES in 2003 and has remained a dedicated part of the veterinary team ever since providing outstanding care to the community of Santa Cruz county. Dr. Delkener has a special interest in emergency surgery, enjoys challenging critical care cases and is passionate about all aspects of emergency medicine.

When she is not at work, she can be found enjoying many outdoor activities including mountain biking, volunteering for the Santa Cruz State parks and training her two border collies Pyro and Ari for dog agility com-



Kim Delkener, DVM

RECOVER CPR

Reassessment Campaign On Veterinary Resuscitation

By: Kim Delkener, DVM

A series of special articles presented in the Journal of Veterinary Emergency and Critical Care summarized the collaborative work performed by a committee of veterinary specialists to provide evidence based consensus guidelines on the practical execution of CPR in small animals. Current CPR strategies in veterinary medicine have been adopted from human medicine. Many of our practices that seem standard do not have documentation for their effectiveness in peer reviewed literature. In human medicine the survival rate post CPR is twice as successful then is documented in our veterinary patients. This suggests that there could be room for improvement. Clinical guidelines for CPR in human medicine have led to consistent training. The main goal of the RECOVER initiative was to develop a set of veterinary guidelines based on systematic review of literature. My goal is to summarize the most current recommendations on veterinary CPR, a procedure we all would like to be more proficient at.

RECOVER looked at 5 areas including PREPAREDNESS and PREVENTION, BASIC LIFE SUPPORT, ADVANCED LIFE SUPPORT, MONITORING, and POST-CARDIAC ARREST CARE. They questioned and reviewed 74 topics and made 101 practical recommendations. The overwhelming results of the series of articles is that more research is necessary to improve the quality of the recommendations. The “pearls” of the article are listed below.

Preparedness and Prevention:

Most veterinarians have an organized, well stocked “crash cart” for emergency situations, but does this really help provide better CPR? In respect to preparedness and prevention, it was found that having a pre-stocked arrest station in an area near where patients are anesthetized and resuscitated improved CPR performance. Standardized guideline training and team communication training increased CPR effectiveness. Post CPR debriefing, role playing and practicing also have significant value in a CPR setting.

Basic life support (BLS):

Basic life support includes recognition of cardiopulmonary arrest, airway management, breathing and chest compressions- the “abc’s”. It can be provided by veterinary care professionals or lay people. It is the basis of CPR. The RECOVER initiative showed that it can be difficult to recognize a cardiopulmonary arrest, even in a hospital setting. Palpating a pulse is not always easy or reliable in our veterinary patients. It is important to not spend extended periods of time trying to determine if a pulse is present before initiating chest compressions and other indications of arrest can be useful like unresponsiveness and agonal breathing. Initiation of chest compressions has been found to be the most important component of CPR. Securing an airway and breathing, previously believed to be initiated first, are recommended either simultaneously or secondarily to chest compressions. The RECOVER initiative recommends endotracheal tube intubation with the patient in lateral recumbency so that chest compressions do not need to be interrupted. An algorithm of BLS was created with the RECOVER guidelines and can serve as a good visual aid in the hospital setting. Chest compressions should be at a rate of 100-120/minute and proceed uninterrupted for 2 minute cycles. Compressions should aim to compress the chest by 1/3-1/2 of its width with the patient in lateral recumbency allowing full recoil between compressions. The compressor should be changed every 2 minutes to avoid fatigue. Ventilation should be at a rate of 10 breaths/min without interrupting chest compressions. Inter-cycle interruptions should be minimized allowing time only to reassess return of spontaneous circulation or ECG rhythm abnormalities.

Advanced life support (ALS):

Advanced life support includes drug therapy, defibrillation and correction of identified laboratory abnormalities. It is administered in addition to BLS and usually requires a hospital setting. Chest compressions only

achieve ~25% of cardiac output. The RECOVER initiative investigated several drug therapies believed to be beneficial in combination with BLS. Epinephrine (a vasoconstrictor) appears to be the primary and most reliable drug therapy used to help restore heart function and perfusion. Different dosages of epinephrine have been considered. The current recommendation is for low dose epinephrine at 0.01mg/kg IV repeated every 3-5 minutes. This differs from previously suggested high dose epinephrine (0.1mg/kg) that is believed to cause bigger adrenergic effects and result in more patient harm long term. Vasopressin is a different type of vasoconstrictor that may be beneficial as a substitute or in combination with epinephrine. Another commonly used CPR drug, atropine (a vagolytic) was actually found to have no beneficial effect based on a literature review except in cases of counteracting high vagal tone that may have induced bradycardia and sinus arrest. The consensus is that atropine use is reasonable at standard doses, but it is not included in the most current CPR Emergency Drugs and Doses table. Reversal agents should definitely be considered especially in cases of arrest under anesthesia or when these drugs have been previously given. Naloxone is the only reversal agent that has been evaluated, but flumazenil (to reverse benzodiazepines) and atipamezole (for alpha2 agonists) are also recommended. The committee also recommends correcting major acid-base and electrolyte disturbances. Defibrillation, considered basic life support in people due to the wide availability of public defibrillators, is considered ALS in our veterinary patients. Rapid defibrillation is important when ventricular fibrillation or pulseless ventricular tachycardia are identified. A single shock with a biphasic defibrillator at 4-6 J/kg is recommended followed by another 2 minute cycle of CPR. If a defibrillator is not available, precordial thump could be considered, but there is limited evidence of its efficacy. There is no compelling evidence that anti-arrhythmics are of benefit in resistant ventricular fibrillation or ventricular tachycardia. Amiodarone may be considered. Other ALS practices like open chest CPR should only be considered in select cases with access to post cardiac arrest support.

Monitoring

There are many monitoring devices available that may be helpful both in confirming cardiopulmonary arrest and during or post CPR. The pearls of the monitoring section emphasized identifying cardiopulmonary arrest, initiating chest compressions immediately and planning post arrest care for each individual patient. End tidal capnography was found to be the most useful tool in monitoring response to CPR and determining prognosis. Its use is highly recommended and an EtCO₂ monitor should be included in all crash carts. ECG analysis is essential in determining a treatable heart arrhythmia and may help in the diagnosis of an arrest.

Post cardiac arrest care

Post cardiac arrest clinical studies are difficult to design and therefore significantly lacking. The reasons a patient undergoes a cardiac arrest can be numerous. Post arrest care often involves multi-organ support in addition to treating any pre-existing conditions that may have contributed. Despite these limitations, the committee was still able to make treatment recommendations. Hemodynamic stabilization is recommended with IV fluid therapy and injectable medications being adjusted in order to maintain normal hydration, perfusion and normal to mildly elevated blood pressure. Therapeutic hypothermia is used standardly in human medicine to support neurologic brain function. This practice had not been widely adopted in veterinary medicine but there is evidence to support mild hypothermia and slow rewarming post arrest. Normal oxygen levels are also recommended with the concern that hyperoxemia may be harmful. Transitioning a patient to "room air" as soon as possible is preferred. There is no specific evidence to support routine use of corticosteroids, anticonvulsants, mannitol, hypertonic saline or other medications, but all of these interventions could be considered. Post CPR care provided in a specialty center with advanced monitoring equipment and supportive care may benefit survival rate.

The RECOVER process is a significant ongoing effort that aims to continue to update clinical veterinary CPR guidelines and identify and address knowledge gaps.

Journal of Veterinary Emergency and Critical Care 22 (S1) 2012, pp S4-131.

Our Doctors

Internal Medicine

Kelly Akol, DVM, DACVIM (SAIM)
Merrienne Burtch, DVM, DACVIM(SAIM)
Michelle Pressel, DVM, DACVIM (SAIM)
Bryn Hoffman, MVB (Residency Trained in Internal Medicine)

Surgery

Lisa Metelman, MS, DVM, DACVS
Tom LaHue, DVM, DACVS
Dean Filipowicz, MS, DVM, DACVS

Oncology

Theresa Arteaga, DVM, DACVIM(Oncology)

Critical Care

Colleen Brady, DVM, DACVECC
Lillian Good, DVM, DACVECC

Cardiology

Kristine Yee, DVM, DACVIM(Cardiology)

Radiology (VRS)

Larry Kerr, DVM, DACVR
Mark Lee, DVM, DACVR

Emergency

Christian Robison, DVM
Kim Delkener, DVM
Mark Saphir, DVM
Jessica Kurek, DVM
Sara Heidelberger, DVM

Behavior

Jan Brennan, DVM (practice limited to behavior)

About Our Hospitals

Pacific Veterinary Specialists was founded to provide high quality, specialized medical care to companion animal patients. Our practice is dedicated to serving the veterinary community as a partner in total patient care. We offer comprehensive specialized services including video endoscopy, Doppler ultrasound, surgery, 24-hour ICU care, and emergency and critical care. Our staff is committed to providing compassionate and thorough medical care that meets the needs of the patient, client, and referring veterinarian. In September 2011 we opened PVSM and currently offer internal medicine and oncology, Tuesday through Thursday in Monterey. Behavior consultations by appointment are available on Mondays.

PLEASE
PLACE
STAMP
HERE

Pacific Veterinary Specialists

1980 41st Avenue

