Cardiopulmonary Cerebral Resuscitation (CPR)
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A method used to maintain blood flow and oxygenation to the brain following cardiopulmonary arrest.
Best case scenarios are young otherwise healthy animals that arrest and their underlying disease can be treated quickly; Anesthetic accident, Anaphylactic shock, GDV, Pneumothorax

**Signs of arrest:**
Collapse, Agonal gasping
Weak or irregular pulse
Bradycardia
Gray, cyanotic or white mucous membranes
Hypotension
Hypothermia
*This includes any other significant, sudden change in patient condition. Examples would include sudden or extreme tachycardia, vocalizing (especially cats) etc.

**Be Prepared!**
Crash cart/kit should contain
- Needle/syringe combo, but don’t fill with drug
- Emergency drugs; Atropine, Epinephrine, Lidocaine
- Endotracheal tubes
- Laryngoscope

Arrest station
- Adjustable table or step stool
- Anesthesia machine, ready at all times or ambu bags and oxygen source
- Emergency cart with drugs and doses
- ECG, Defibrillator, EtCO2, SpO2, BP
- O2 Masks
- IV catheters and Supplies
- Supplies to perform immediate thoracocentesis, and cut down kits
- IV fluids that are ready to go
- Colloid or hypertonic IV solutions
*After an arrest it is an important to restock the crash cart or arrest station
Roles  *All Hospital personnel should be trained to help with CPCR. Use CPCR “drills” to maintain skills.
   Resuscitation leader
   Compressions
   Airway/breathing
   Drugs
   Monitoring/Record keeping

How to perform CPR
   Identify that an arrest has occurred
      Agonal breathing is a respiratory arrest as the respirations are not effective
      Auscultate heart AND feel for pulses then acquire an ECG
   Identify an obvious cause and try to correct!
   **ABCD’s**
      Airway, Breathing, Circulation/Compressions, Drugs
   *if alone it is more important to do chest compressions then breathing “CAB” may be more appropriate
A:  Use a laryngoscope – it seriously affects the outcome of CPR if animals are not intubated properly
   After intubation began breathing for the patient with a maximum pressure of 20cmH2O.

B:  2 deep breaths then 10 breaths per minute (1 breath every 6 seconds)
   Over ventilation is associated with decreased cardiac output and decreased cerebral perfusion resulting in decreased survival.

C:  <15kg Cardiac Pump Theory
      Compression directly over the heart 5th intercostal space
      Patient in lateral recumbency rate 100-110 per minute
      Provide breaths without stopping compressions
    >15kg Thoracic Pump Theory
      Compressions at the largest portion of the chest compressing 1/3 of the thorax
      Rate of 100 compressions per minute and breaths of 10 per minute
      Compressions are done in lateral recumbency
*abdominal compressions can increase cerebral perfusion
*Open chest CPCR
D: Drugs
Best route is by IV catheter but if not access drugs can be given IT (Intratracheal) at double the dose and flushed with 5ml saline via a urinary catheter or feeding tube placed into the endotracheal tube.

Fluids – arrest causes widespread vasodilation
Atropine: used in the treatment of bradycardia. Atropine blocks the action of the vagus nerve, a part of the parasympathetic system of the heart whose main action is to decrease heart rate. Therefore, its primary function in this circumstance is to increase the heart rate.
Epinephrine: catecholamine with both A and B adrenergic agonist effects; increased HR, BP, systemic vascular resistance, improves coronary and cerebral blood flow and increased contractility
Vasopressin: non-adrenergic vasopressor – acts on V1a receptors in the vessels to produce vasoconstriction. Last longer than epinephrine and can be repeated every 3-5 minutes.
Lidocaine: Antiarrhythmic drug – can cause animals to defibrillate and make defibrillation non-effective. Need to be aware of toxic limit.

Assessing effectiveness
- Palpate the femoral pulse
- Watch your ECG
- SpO2 of 90% or greater
- EtCO2 = blood flow and oxygenation = gas exchange 20-30%mmHg

Post arrest complications:
- Resuscitation success rate 30-60% of these only 2-14% survive till discharge
- Reperfusion Injuries
- Neurological deficits
- Cardiac Arrhythmias – myocardial trauma

SUGGESTED READING – RECOVER initiative (www.acvecc-recover.org)