# CARDIOPULMONARY CEREBRAL RESUSCITATION (CPCR): PART ONE

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Cardiopulmonary arrest (CPA) is, fortunately, a rare occurrence in general veterinary practice and typically occurs unexpectedly. Because it is infrequent and unanticipated, most veterinarians find it difficult to approach CPCR in an organized and focused manner. In these two sequential updates, I will present a set of simple guidelines that will help to make CPCR as straight-forward and effective as possible.

First, be prepared! A recent study found that 55% of CPA events in dogs and cats are associated with anesthesia. Put together a 'crash kit' containing all the materials and drugs needed for CPCR. Have it readily available in the area where anesthesia is performed. Ensure that your staff members are fully versed in the CPCR protocol. Also, post a simple, clear flow-chart of the CPCR protocol in your anesthesia and treatment areas. A quick reference chart for drug dosages is also helpful.

Next, familiarize yourself and your staff with the signs of impending CPA: deterioration in mentation, hypothermia, bradycardia, hypotension, dilated/unresponsive pupils, and changes in respiratory rate, depth, or rhythm. Cardiopulmonary arrest is confirmed by findings of: loss of consciousness, absence of spontaneous ventilation, absence of palpable pulses, and absence of heart sounds on auscultation. Remember, electrical activity on ECG can be detected in an animal that has no functional heart beat.

Once CPA is identified, call for help. Effective CPCR requires 3 people. Assign each person a task: 1) the airway person, 2) the compression person, and 3) the drugs/recording person. If the patient does not have an intravenous catheter, person 3 should be assigned to gaining IV access. Recalling the ABC's of CPCR, the **airway** should first be accessed via endotracheal intubation. It is essential to ensure that the ET tube is in place. Visualize its placement with a laryngoscope, palpate the ventral neck to ensure you only feel one tube (a ET tube in the trachea, not the ET tube in the esophagus beside the trachea), inflate the cuff and observe for chest wall movement when ventilated with an Ambu bag or anesthesia ventilation circuit. If you are using an anesthesia system, ensure that all the anesthetic gas has been flushed from the system and deliver 100% oxygen. **Breathing**: give only 10 – 12 breaths per minute (patients with severe hypoxia prior to arrest should receive a higher rate, eg. 12 – 15 brpm).

In patients with cardiac arrest, **circulation** is re-established with chest compressions. Provide continuous chest compressions at a rate of 100 compressions per minute for 2 minutes before pausing to reassess the patient. Place one palm over the other and keep your elbows straight. Dogs larger than 15kg should be compressed using the 'thoracic pump technique': compress the widest point of the chest (not over the heart). Dogs smaller than 15kg should be compressed with the 'cardiac pump technique': compress over the apex of the heart. Very small dogs and cats can be compressed with one hand: the thumb on one side of the precordium and the flat fingers on the other side. The chest should be compressed to approximately 1/3 of its total diameter. Always remember to completely release the chest from the compression. It is during this recoil phase that blood returns to the thorax and becomes available to be pumped forward. There is no need to synchronize compressions with ventilation. Every 2 minutes, the compression person should trade off with someone else to avoid fatigue and ineffective compressions. In Part Two, drug therapy and internal cardiac massage will be discussed.