Does Your Resuscitation Plan Need CPR?
Developing a Hospital Resuscitation Policy

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What is a resuscitation plan? To different people this has different meanings from developing a simple client form, to specific ways to run a ‘code’, down to the actual ‘how-to’s’ of CPR. In the terms of veterinary emergency and critical care a resuscitation plan encompasses all of these aspects. It is something of vital importance, yet is often forgotten. Keeping up a valid resuscitation plan in an ECC hospital requires forethought, planning, implementation, and regular repeated intervals of training that is ongoing.

Client consent
In human medicine resuscitation plans are also called ‘not-for-resuscitation plans’ or ‘palliative care orders’. Detailed discussions with the patient or family are carried out documenting the clinical condition of the patient and determining what actions they would like taken should their condition deteriorate. In the veterinary setting, even a patient coming in for a ‘routine’ procedure may experience sudden cardiac or respiratory arrest. Patients in the emergency and critical care setting have an even higher risk. It is vital that owners are informed of this risk/potential outcome. Overall recovery rates from CPR in veterinary medicine are very low, with only 6-8% of arrest patients leaving the hospital. This may in part be a result of confusion regarding owner’s wishes for degree of resuscitation. It is crucial that clients are informed of this prior to entry, so that if that patient deteriorates the staff can then be better prepared to administer CPR in the event of arrest, and have equipment ready for open chest compressions or defibrillation (as indicated). Time is a critical factor with CPR and resuscitation procedures must be initiated prior to a call to the owner. Having a present resuscitation authorization form in place that is discussed and signed by every client leaving a pet to stay in hospital eliminates any confusion in this regard and allows veterinary staff to immediately initiate the clients wishes in the event of arrest.

Authorization forms should offer a brief explanation of the form and what it is for. The patient and client information should be clearly indicated on the form as well as the current date and time of authorization. Owners should have to initial each choice made instead of simply checking a box (a checked box can be refuted) as well as sign and date the form. This is an excellent place to document phone numbers for quick access in case these orders actually have to be followed. Sometimes owners ask for different procedure to be followed when actually calling them to inform them of arrest. For example, when called some owners will decide to have CPR discontinued even though they initially authorized it, or after a period of time of performing CPR has elapsed, agree to stop CPR efforts. This is fine and acceptable, but having the form in place allows us to comply initially and rapidly with the clients wishes.

Options on the form may consist of some or all of the following: Electing to have CPR (Advanced-closed chest compressions, intubation, monitoring, drug administration, etc…), Electing to have basic CPR (closed chest compressions and breathing only- no drugs), Electing to have open-chest CPR (not commonly done unless in surgery), given a order to NOT resuscitate or give any CPR efforts, and perhaps even giving authorization for the Doctor to euthanize if they determine their pet is suffering and they are unable to be reached. Additionally space should be provided to confirm the identity of the person as the pet’s owner and to certify that the pet has not bitten anyone recently. Decisions regarding detail and options on these forms should be determined by clientele and comfort levels of veterinary staff.

Once client authorization is obtained it is of utmost importance to document their wishes in a way that is clearly known/seen. One way to do this is by utilizing colored dot labels to place on the patient cage cards and/or charts. The consent form should also be readily available in a uniform place for easy access.

Emergency drug forms
Every patient admitted into the hospital should have emergency drug calculations made, printed out, and attached to their chart or kennel. Forms to make these calculations can be made utilizing Excel spreadsheets or pdf forms. There are also some options available on line to make these calculations and print them (http://www.cvmbs.colostate.edu/clinsci/wing/emdrughp.html). The following is a list of items/drugs that may be desirable to have readymade calculations done on this form:

- Epinephrine (low and high dose)
- Atropine
- Vasopressin
- Lidocaine (canine and feline dose)
- Dextrose
- Naloxone
- Yohimbine
• Valium  
• Mannitol  
• External thoracic defibrillation  
• Lasix (0.7mg/kg)  
• Hypertonic saline  
• Calcium gluconate  
• Sodium bicarbonate  
• Propranol (0.02mg/kg)  
• Hetastarch (5ml/kg)  
• Crystalloids (20ml/kg)

What’s next??

So everyone knows what the client wants. The patient’s drug dose charts are ready. The forms are clear and signed and everyone knows where they are. Everything is labeled. Everyone knows what they are doing. Or do they??

What is next? How prepared is your staff to run a code? What do we really need to do to get ready? You need to be sure your hospital and everyone in it is prepared. ACVECC RECOVER Initiative has been working the past several years to make clear evidence based guidelines to standardize CPR efforts.

The first thing to do is be sure your hospital has what it needs. Do you have a crash cart or code area? There should be a pre-stocked arrest station with everything there that may be needed. Charts, checklists and aids such as CPR algorithms must be made and put into place in this area. Forms that make it easy to document treatments administered throughout a code should be readily available. The equipment in this location should be checked regularly and inspected to be in good working order (Have the drugs expired??). Items used in this area should be restocked immediately after a code is completed. All items should be checked and restocked continually. CPR won’t be very effective if someone has to keep running to the supply room to get needed items! Give careful thought to the location of the code area. Cardiopulmonary arrest (CPA) associated with anesthesia have much higher rates of survivability than other causes. Be sure your location and equipment will provide the best chances possible for all patients.

A crash cart or code area should be stocked with the following: IV catheters of various sizes and lengths, tape, t-ports, male adapters, IV fluid administration sets, burettes, all sizes of syringes and needles, crystalloids, colloids, pressure bag, drugs (as listed above but also including dobutamine, dopamine with CRI charts) red rubber catheters or polypropylene catheter (to administer drugs IT and for suctioning), ET tubes (all sizes), laryngoscope, ties for ET tubes, syringes to inflate ET tube cuffs, ambu-bags (2 sizes), oxygen hookup, ECG, SPO2, direct or indirect blood pressure monitor, ‘kits’ with items needed for thoracocentesis, disinfectant scrub/solutions, ultrasound gel (limit use of alcohol in this area in case defibrillation is needed), a defibrillator, calculator, scissors, scalpel blades, chest tubes, small surgical pack, tracheostomy ‘kits’/tubes, suction, sterile gloves, exam gloves, point-of-care testing (glucometer, lactate meter, HCT tubes), large catheters (16, 14g- long- for pericardiocentesis), etc…..

CPR training

Now that everything is in place and ready to go it is vital to be sure that all staff knows what to do in the event of a code. Instruction should be provided in both a didactic and with hands-on simulations, or practice ‘codes’. This is not a onetime training. Instruction should be repeated every 6 months in the form of ‘refresher’ courses. In human medicine it has been found that personnel forget or slow down in their response times during CPR if it has been longer than 6 months since their training.

How many people are needed? While we are awaiting detailed RECOVER initiative guidelines, typically four key positions are needed during CPR. The first ‘position’ is the CPR or Code Leader. This is the person that leads the CPR team, providing guidance, instruction, and assessment of effectiveness. The RECOVER initiative states that both veterinarians and technicians may be CPR leaders. The lead person may also be one that is recording what has been done during the code and times. The additional positions involve chest compressions, airway/breathing, and an IV access/drug administration person. If additional personnel are available they may be utilized to attach additional monitoring equipment during a code, prepare items for needed procedures (thoracocentesis, tracheostomy), run diagnostics, or give interposed abdominal compressions (in large patients, if not contraindicated). Veterinarians and advanced technicians should be trained in all positions of a code. Less advanced technicians or assistants may be trained in all but the leader positions. It is vital that all personnel be both familiar and comfortable with the positions/duties involved with CPR. This allows the next person running to aid to automatically start with the ‘next’ needed position. Cross-training is also vital because the chest compression position must be rotated every 2 minutes throughout a code due to fatigue. If the person doing chest compressions is not rotated regularly this decreases effectiveness of the compressions, which will subsequently decrease the patients chances for survival.
**CPR - what to do**

The majority of the following information will reflect recommendations as currently listed on the RECOVER website. All CPR/codes should start with basic life support. Remember your ‘ABC’s’? Well, current recommendations deviate a bit from those……

1. **Start chest compressions!** The majority of dogs and cats should be done in lateral recumbency, compressing the chest to 1/3-1/2 of its depth with each compression. Compressions in small dogs or cats may be applied circumferentially. In large/giant breed dogs- compressions should be done over the widest part of their chest. In keel-chested dogs compressions may be done with hands directly over the heart. Sternal compressions in dorsal recumbency should be considered in barrel chested dogs. Compression rates should be 100-120 per minute regardless of being a cat or dog, or size. Remember to allow the chest to fully recoil between compressions. Do not lean on the chest between compressions. **Rotate this position every 2 minutes!!** Cycles of compression should not be otherwise interrupted.

2. **Ventilation- Intubate if not already intubated- and more than one person is available to resuscitate.** Recommended ventilation rates for intubated dogs and cats are 10bpm at a tidal volume of 10ml/kg and an inspiratory time of 1 second. If there is only a single rescuer- then a compression:ventilation ratio of 30:2 should be followed.

3. **Interposed abdominal compressions may be started if there are sufficient personnel.**

The above is a summary of basic life support/CPR. Advanced life support includes use of oxygen (100% FiO2 is acceptable), use of drugs as indicated, IV fluid administration, defibrillation, and possible use of a threshold impedance device (ITD) if patient is >10kg.

**Drug therapy**

Drugs may be administered by intraosseous (IO), intravenous (IV), or intratracheal (IT) routes. Administration IT can be used when IV or IO access is not possible. Drugs that may be given IT are epinephrine, atropine, and vasopressin. The drugs should be diluted with saline and given through a catheter that is longer than the ET tube. Patients that are euvoletic or hypervolemic should not be given IV fluids during CPR. After 10-15 minutes of CPR and continued CPA, there may be a need for alkalization therapy by administering sodium bicarbonate (NaHCO3- 1mEq/kg). NaHCO3 should NEVER be administered IT! Corticosteroids are not recommended during CPR.

Epinephrine is commonly the first drug reached for in CPA. Use of low dose epinephrine (0.01mg/kg), given every 3-5 minutes is recommended. Next typically is atropine. Routine use of atropine during CPR has been considered to be acceptable therapy in dogs and cats. Vasopressin (0.8 U/kg) may be given in combination with epinephrine, or as a substitute for it, every 3-5 minutes. Other drugs may be utilized depending on the condition present in the patient- if hyperkalemia is present this should be treated with calcium gluconate and dextrose (+/- insulin); opioids may need to be reversed with naloxone; amiodarone or lidocaine may be considered in cases with pulseless ventricular tachycardia or fibrillation that are resistant to defibrillation.

**References**

Resuscitation Plans; www.chess.sa.edu.au; 1/21/09; Government of South Australia.
RECOVER Initiative. Acvecc-recover.org