

# Facts

- Permanent brain injury may result after 4 minutes following a Cardio pulmonary Arrest (CPA) event.
- In cats and dogs that have had a CPA event, the survival rate to discharge from the hospital was about 6-7%
- Human medicine research data = 20% survival rates

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## Why?

- Lack of standardization
- Lack of training
- Poor outcomes

Led to the development of the RECOVER Initiative



# **CPA Risk Factors**

- Cardiac failure
  Unstable cardiac arrhythmias
  Respiratory disorders
- Traumatic brain injury
- Sepsis
- Hemorrhage
  Electrolyte and acid & base disorders
  Anesthetic complications

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## **Optimizing Successful Outcomes**

- 1. Prevention & Preparedness
- Basic Life Support
   Advanced Life Support
- 4. Post Arrest Monitoring
- 5. Neonatal Resuscitation





Prepared Environment	
Directives	Designated Area with Checklists
ODR CPR Open Chest	
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# Basic Life Support (BLS)

Early recognition & response to the unresponsive, apneic patient (CPA) has proven to be the most significant factor in successful outcomes

- Life check
   Attempt to rouse the patient with noise and movement.
   The traditional circulation, airway, and breathing (CAB) assessment takes ano longer than 10 seconds.
   Minimal negative consequences if chest compressions are initiated and the patient still has a pulse
   Negative consequences are maximized if CPR is delayed
   Call for help!

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## Basic Life Support (BLS)

2) ChestCompressions (C)

Begin immediately
A pulse can be difficult to assess and may take too long to determine

3) Airway Management (A, B)

- Assess airway patency
- Listen and look
   Intubate to establish an airway and provide O2 by breathing for the patient

# Basic Life Support: CAB Approach

#### **Chest Compressions**

- Begin immediately! Lateral recumbency in all dogs and cats except barrel chested dogs (bulldogs) – benefit from dorsal recumbency
- Compress 1/3 1/2 widthof the chest Compression rate is 100-120 compression s/minute
- Allow full chest recoil
- Full uninterrupted 2 minute cycle

# Breathing "PPV"

- Intubated patients; 1 breath /6 se conds = 10 breaths/minute
   Inspiratory time = 1 second
   Tidal Volume = 10 ml/kg
   Full uninterrupted 2 minute cycles for all patients
   If by theters is not near the packets
- If in tubation is not possible, apply a In intubation is not possible; apprising apprising a signal ambuilt by a following every 30 compressions.
   Mouth-to-snout ventilation is

- conside ral last-resort due to risk of zo ono tic disease-expensive Cornell University Veterinary Specialists

Basic Life Support: Body Position	
Han d Position	Body Position
	Directly over the patient with the spine towards the compressor     Brown below
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# Basic Life Support: Ventilation Multiple Rescuers Single Rescuer • Ambu bag or reservoir bag with • 30 compressions: 2 brea Amou bag of reservoir bag with anesthesia machine Administer 1 PPV every 6 seconds Monitor the rise of the chest wall Do not stop breathing at the end of 2 minute cycle, unless patient is breathing









# Advanced Life Support: Situational Monitoring

#### Chest Compressions

- Pulses = Quality effective
- chises Quality en ective
   chest compressions
   ETCO2 = 18 mmHg
   only 30% of normal Cardia c Output at best
- 1/2 chest wall compression • Rescuer fatigue = poor quality compressions

# Ventilation (PPV)

- 10 breaths per minute:
- 1 o breaths per minute:
   1 every 6 seconds
   Inspiratory time = 1 second
   Avoid hyperventilation to prevent vasoconstriction from low CO2 levels = poor cerebral perfusion.

# Advanced Life Support: Establish IV Access

- Venous Access; drug administration and blood sampling

   Jugular catheterization is preferred access site, but difficult to access
   during CPR (chest compressions); shortestroute to the heart
   Peripheral IV access
   Intraoseous access (IO); femoral trochanteric fossa, proximal
   humerus, tibial crest; wing of ileum
   Intratracheal route (IT)

  - Drugs (NAVEL)
    - Naloxone

    - Atropine
      Vaso pressin
    - Epinephrine
    - Lidocaine
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# Advanced Life Support: Pharmacological Therapy

- Epinephrine (catecholamine): vasopressor, positive inotropic and chronotropic effects
   Standard dose 0.01 mg/kg
- Vasopressions e out singrag
   Vasopressions potential vasoconstriction
   EffectisNOT limited by patient's pH
   Standardose.0.8.u/g
   Atropine (parasympatholytic/anticholinergic): give only ONCE as early as possible
   Meteorealteen High vagal ton e
  Standard do se ~0.05mg/kg



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## Advanced Life Support: Pharmacological Therapy

CPA under anesthesia

- Turn off inhalant
- Reverse your drugs!
  - Benzodia ze pines (midazola m, diazepam): reversed with Flumozenil
  - 0.01mg/kg IV Opioids (i.e methadone, hydromorphone, fentanyl): reversed with •
  - •
  - Nalowa o 0.04mg/kg (V Alpha-2 agonists (dexme de tomidine, medet omidine): reversed with Atipamezole 100mcg/kg $\,$  IV
- · Reversal agents must also be administered to patients experiencing CPA in the postoperative period

# Advanced Life Support: Defibrillation

An electrical countershock delivered to the heart that completely depolarizes the myocardium, and induces a brief asystole. The aim is to let the sinoatrial node recover control of the heart's electrical activity.



# Monophasic: electrical current travels in one direction, from one electrode or paddle through the heart to the other electrode.

Biphasic: electrical current travels through the heart in two directions. The first phase is the same as in conventional defibrillation, the second phase, the current reverses flowing through the heart again and back to the first electrode. Cornell University Veterinary Specialists

Advanced Life Support: Defibrillation

- Technique
  - · Set joules to the desired energy level according to guidelines
  - Apply contact gel (electrolyte gel) to paddle Do NOT use alcohol •

  - Apply paddles to the patient
  - Disconnect oxygen from the patient
    Clear the area

  - Defibrillate then restart CPR 2 min cycle



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## Advanced Life Support: Open Chest CPR

- Direct cardiac massage
- Indicated in certain patients
   Medium-large breed dogs > 15 kg
   Bypass closed-chest CPR if the hospital can support open-chest CPR and permission is previously obtained from the client Shown to improve outcome Pleural space disease, thoracic trauma, pericardial effusion

  - In surgery (open abdomen or open thorax)
- Technique
  - Right lateral recumbency; rapid shave and scrub; left side thoracotomy at the 5-6 intercostal space



# Post Resuscitative Care

- Re-arrest is common due to multi-organ failure
   Identify cause of initial arrest
   Mild hy pothermia improves outcome by decreasing cerebral oxygen
   demand
- demand Intense monitoring: ECG, ETCO2, BP, UO Brain in jury DIC Renal failure G li njury



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- Fetal d epression following d ystocia or c-section
   Due to a nesthetics administ gred to mom
   Hypoxia is common: provide flow-by or mask oxygen
   Resuscitate or der

- Resuscitate order A: suction airway with bub syringe B: wrap in warm towel, rubbing to stimulate ventilation; Jen Chung technique C: ccardias stimulation D: drugs; naloxone 1 unit, sublingual or IT D: Dowgram Isno binger recommended

- "Swinging" puppies: no longer performed as it is dan gerous to the
  - neonate!
     Suffer from brain hemorrhage

# Helpful Links

- To review the latest 2024 RECOVER guidelines

  https://recoverinitiative.org/2024-guidelines/

  To download pdfs of the RECOVER CPR algorithm and drug chart

  https://recoverinitiative.org/2024-guidelines/arg-charts/

  To become a RECOVER rescuer

  https://recoverinitiative.org/veterinary-professionals/rescuer-certification-workshops/

  To become a RECOVER instructor

  thtps://recoverinitiative.org/veterinary-professionals/rescuer-instrudor-certification/

