

**EMERGENCY LIFE-SAVING  
PROCEDURES FOR THE SAR  
K-9: A HANDS-ON APPROACH**

**BY**

**CAROL J. SHAPIRO, R.N.**

**CALIFORNIA RESCUE DOG ASSOCIATION**

**AUBURN, CALIFORNIA**

## **Airway Emergencies**

Impaired respiration from any cause decreases oxygenation of the blood and results in inadequate oxygen delivery to the tissues. **Severe airway obstruction** is recognized by noisy or stridorous breathing, choking or retching, dyspnea, pawing or clawing at the face, coughing, unequal chest expansion, increased salivating, or cyanosis (a late sign) (2, 7).

Follow the standard step-by-step method: If the airway appears obstructed, give 4 chest blows on the side of the chest with an open hand. Next, administer a modified Heimlich maneuver by straddling the standing dog and squeezing the stomach just below the ribs pressing upward. Repeat chest blows and abdominal thrust-- until the dog can breathe, you can sweep the mouth for a possible dislodged object, or the dog becomes unconscious.

For the unconscious dog, attempt to ventilate by pulling the tongue forward and to the side, close the mouth with both hand-and attempt gentle mouth-to-nose breathing. If the chest does not rise, continue blows, thrusts and attempts to ventilate until the airway becomes clear. Check for a heartbeat on the lower left chest just behind the elbow (dog is on his right side). If there is no pulse, you can follow the same sequence of CPR as for people, with some exceptions on the location of checking for heartbeat and pulse and positioning of the dog. The ABC's of CPR will be reviewed in detail in the skill stations.

## **Breathing Emergencies**

Pneumothorax is a condition in which the lung itself (or a portion of the two halves) has lost it's integrity, either through penetrating trauma (Open Pneumothorax, also

called "sucking chest wound"), tears in the internal lining (closed pneumothorax), or being compressed onto itself by pressure from air or blood entering the chest cavity (tension pneumothorax). All three types can be medical emergencies requiring urgent treatment in the field (thoracocentesis) prior to hospitalization.

Clinically significant pneumothorax can be detected by difficulty breathing at rest, cyanosis (pale or bluish mucous membranes), abduction of the forelimbs (holding legs outward), reluctance to lie down, coughing, pain, apprehension, increased work to breathe, shock, diminished *lung* sounds, subcutaneous emphysema (feels like packing bubbles under the skin), muffled heart sounds and a barrel-chest appearance.

Lung contusions and pneumothorax are often associated with rib fractures and/or flail chest (2 or more fractures in 2 or more consecutive ribs). Flail chests move paradoxically -- drawn inward with inspiration, and forced outward with expiration. Treatment involves placing a soft, padded wrap around the chest (Saran wrap for cats) (7) and possibly splinting the chest nonconstrictively. Place dog in lateral recumbent position with flail side down.

Treatment for open Pneumothorax/penetrating injury involve-stabilizing the Penetrating object, then placing an occlusive pressure dressing with wet gauze (with or without petrolatum jelly) over the wound. A bandaging technique which utilizes a one-way valve dressing allowing air to escape on exhalation will be practiced in the skill stations.

Tension pneumothorax occurs when air or blood is trapped in the chest cavity on inhalation and cannot escape on exhalation. This is a rapidly fatal condition which may

require tapping into the chest with a needle to remove the fluids and relieve the pressure. Chest taps (called thoracocentesis) are done with an 18 to 22-gauge needle, three-way stopcock and 20-cc syringe. Air is best aspirated dorsally at the 7-9th intercostal spaces, fluid ventrally at 7-8th intercostal space halfway tip the side of the dog (1,2,6,7).

Techniques will be demonstrated in the skill stations.

Be aware that there is a high correlation between forelimb and/or rib fractures and chest/lung injuries. It may take 2-12 hours after injury for a dog to show signs of distress (1).

In all cases of breathing emergencies, provide high-flow oxygen with an Ambu bag and face mask, if available. Treat for pain and anxiety. Depending on the mechanism of injury, maintain spinal precautions with the dog on a flat board, head in neutral position (45-degree angle). Turn the animal on it's other side every 2 hours (to prevent fluid from accumulating in the lung). Protect from extremes of heat and cold with blankets or ensolite pads.

### **Circulatory Emergencies**

Shock refers to any condition in which there is inadequate tissue perfusion leading to cellular hypoxia, acidosis and cell death (6). Hypovolemic shock results from traumatic loss of blood volume -- severe laceration, ruptured abdominal organs, severe vomiting, burns or crushing injuries. The body normally compensates by 1) restricting blood flow to non-essential organs like the GI tract, 2) constricting vessel size to increase perfusion pressure, and 3) increasing heart rate to increase cardiac output.

Internal hemorrhage may be seen as a red or bluish bruise or ecchymotic area

around the umbilicus or inguinal areas(1). Look for other signs on internal bleeding -- increasing abdominal girth, abdominal rigidity and/or tenderness, fluid waves on percussion, or palpable masses. The other signs of shock -- pale mucous membranes, increased respirations, weak femoral pulse, altered mentation, hypothermia -- may be present. Pulses are palpable at blood pressures > 70 mm (6).

For internal hemorrhage, the placement of an equivalent of mast trousers can slow the rate of hemorrhage. Any wide bandage material can be used to wrap the hindlimbs and the tail from the tips upward over the pelvis and the entire abdomen. This causes an elevation in blood pressure to maintain perfusion until rapid IV fluid volume replacement is started. If You've wrapped too tight., breathing will become difficult.

In acute situations of internal bleeding, Dr. J. Anderson of San Diego suggests that placing your fist on the center of the abdomen and pressing in hard is a form of counterpressure on the internal organs that may buy you 30 minutes or more (1).

### **External Hemorrhage/Fracture**

Pads placed right over the bleeder and pressure bandages are the first line of treatment. Arterial bleeding can be dramatic, but natural body defenses tend to promote clotting rapidly. Venous bleeding is less dramatic but can clot more slowly. Pressure point occlusion of superficial arteries is similar to man -- over temporal, carotid, brachial, and femoral arteries.

Initial emergency management of musculoskeletal trauma and fractures can be critical in ensuring maximal early recovery with the fewest complications. Minimizing pain can prevent additional displacement at fracture sites which further damages soft

tissues, or can turn a closed fracture into an open one. Immediately bandage open fractures and joints to minimize hemorrhage and prevent bacterial contamination. Don't pull open bone ends back into the skin. Don't excessively handle, Probe, push or soak the wound.

When the fracture is below the level of the elbow (stifle joint), apply an immobilization bandage device (like a Robert Jones bandage). When the fracture is above this area, use an over-the-shoulder or over-the-hip coaptation splint (Veterinary Bandaging Techniques. Pittman Moore, 1996). Treat for pain and anxiety.

### **Neurologic/Spinal Emergencies**

Brain trauma can be classified as concussion, contusion or laceration.

Concussion, the least severe, is loss of consciousness in the absence of any physical damage. Contusion and laceration involve damage to the brain tissue itself, and may result in hemorrhage, edema and increased intracranial pressure (ICP). Fear, pain, excitement, fever and seizure are contributing factors that can worsen an already elevated ICP.

Assess the level of consciousness (LOC) by observing the dog's recognition of handler or response to toe-pinching. Examine any fluid coming out of the nose or ears for cerebrospinal fluid (called the Halo sign). Look at the pupils for size, position, movement, and response to light. Watch for a rhythmic waxing and waning respiratory patterns called Cheyne-Stokes breathing which can indicate cerebral cortex damage. Hyperventilation or irregular breathing can indicate brain stem damage.

Assess limb posture and any apparent paralysis, flaccidity or rigidity and the

ability to stand or walk. Abnormal motor function includes head tilts, spontaneous eye-twitching (nystagmus), abnormal gaits. The presence of Schiff-Sherrington syndrome (extensor rigidity of the forelimbs, flaccid paraplegia of the hindlimbs, and intact spinal reflexes distal to the break) indicates the potential presence of severe spinal trauma (compression or transaction) somewhere between T3 to L3 (7). Postures involving abnormal rigid extensions (decrerbate) or rigid flexions (decrerbellate) of the limbs have a grave prognosis, flexion worst (5).

Treatment for head trauma and spinal cord damage involve-- first managing the ABC'S. Maintain a patent airway and watch the tongue position. Provide oxygen by mask. Then, immobilize on a padded board with the head in a normal 45 degree angle, level with the body. Turn the dog every two hours to prevent lung congestion. Give analgesics for pain and regulate body temperature. Document vital signs for the veterinarian.

## **Environmental Emergencies**

### **Hypothermia**

Frostbite (body temperatures less than 93) is common on the pinnae, tail, external genitalia and footpads. Clinical signs include pale and cool skin. Apply warm compresses to affected areas or immerse into warm (102-104) water. Do not rub, apply pressure dressings or ointment-. Gently dry areas and apply cotton bandages. Treat for pain, a-- thawed tissues will become reddened and swell. Over the next month, dead tissues will become discolored, lose their hair and slough off.

The progression to hypothermia (body temperature less than 89) is accompanied

by mental status deterioration, slow and/or irregular heart beat, low blood pressure, shivering, and slow respirations.

Most authors (2, 7) state that dogs can survive mild hypothermia (86-90 deg) for 24-36 hours. They usually do not survive 4-24 hours of 72-77 deg. Maximum survival time less than 60 deg is 6 hours. Bistner (2) states that irreversible damage occurs at 75 degrees.

Treat hypothermia by rapid rewarming to 98-100 body temperature (slower thereafter) in a warm environment, warm blankets, and water bottles (85 deg) on the jugular veins and abdomen until hospitalization. Treat gently, turn side to side every two hours.

Treat for Pain. Watch for what is called "after-drop", an acute Peripheral vasodilation brought on by warming techniques that brings cold blood from the extremities back to the body core, and may cause cardiac arrhythmias and a further decrease in temperature.

### **Hyperthermia/Heat Stroke**

When dogs achieve rectal temperatures of 105-110 through the inability to effectively cool the body, cell proteins die and all body organs can become effected within minutes.

Dogs with heat stroke pant excessively, have dry mucous membranes, may have bloody vomit, diarrhea, urine or nasal discharge. Seizures and coma are late signs.

**MUST COOL BODY QUICKLY TO 103 DEGREES.** Reach 103 degrees in 10 minutes (6) by complete immersion in cold water, alcohol wipes, or cold water enemas.

Use ice if no response. Continuously monitor rectal temperatures.

Then, use moderate techniques to reach 102 deg. in 30-60 minutes (lowering body temperature too quickly at this point may result in a condition called disseminated intravascular coagulation (2)). Concentrate on jugular veins and abdomen with cool water or alcohol (6). Monitor rectal temperatures every 5 minutes. Treat the ABC's, provide oxygen, look for shock.

### **Poisoning**

Toxicity depends on ingested amount relative to the size of the animal and how quickly emergency treatment is administered. The general rules are:

DO NOT INDUCE VOMITING FOR CORROSIVE SUBSTANCES (ACID OR ALKALI) OR PETROLEUM SUBSTANCES (KEROSENE OR TURPENTINE). Give milk or water instead, only if the animal is conscious (2,5,6,7). This includes household cleansers, bleach, disinfectants, drain cleaners, toilet bowl cleaners, ammonia, and pool chemicals.

INDUCE VOMITING ONLY IF NOT SEIZING, and not in mental or respiratory depression with:

Apomorphine 1 tablet, conjunctivaal membrane

table salt 1-3 tsp. (2)

Hydrogen peroxide (3% solution) 5cc/10 lb (max to 2 tbs.).

If no vomiting within 5 minutes, give 2.5 cc/10 lb once (7).

OR 1-2 cc/kg, may repeat once (2)

Induce vomiting for these common poisons (7):

Tylenol (toxic at 150 mg/kg), aspirin (toxic at 50mg/kg), rodenticides, anticides, rat poisons, insecticides, chocolate (theobromine), antifreeze (toxic at 4-6 cc/kg), ibuprofen (causes gastric ulceration at 150 mg/kg, causes renal failure at 300 mg/kg), strychnine, symptomatic plant ingestions.

### References

1. Anderson, J. 1995. Field Trauma in the Search and Rescue Canine. Sixth International Search and Rescue Conference, Boulder, Colorado, p. 1-12.
2. Bistner, S. and Ford, R. 1995. Handbook of Veterinary Procedures and Emergency Treatment. W.B. Saunders Co.
3. Crowe, D. Pet First Aid and Cardiopulmonary Resuscitation, a course outline. University of Georgia, College of Veterinary Medicine, Athens.
4. Ettinger, S. and Feldman, E. 1995. Textbook of Veterinary Internal Medicine, vol. I-II. W.B. Saunders Co.
5. Houlton, J. and Taylor, P. 1987. Trauma Management in the Dog and Cat. IOP Publishing, Bristol.
6. Morgan, R. 1985. Manual of Small Animal Emergencies. Churchill Livingstone, New York.
7. Plunkett, S. 1993. Emergency Procedures for the Small Animal Veterinarian. W.B. Saunders Co.