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# Online Veterinary Nurse and Technician Conference 2020

## HBC ENTERS YOUR CLINIC: A STEP-BY-STEP APPROACH

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### A 10 Step Approach

***Immediately upon a HBC pet arriving a veterinarian should be notified of arrival. This does not mean that initial treatment should be put on hold. Instead benign, non-invasive treatments should begin by the team.***

#### STEPS DO NOT ALWAYS OCCUR IN A LINEAR FASHION

- 1) Triage using R.A.P.
- 2) Notify the owner of WHY, WHAT, HOW MUCH
- 3) Obtain blood pressure, pulse ox and attach ECG
- 4) Administer oxygen if needed
- 5) Obtain official set of vitals (T, P, R) if there is time and if it is appropriate
- 6) Place IV catheter(s) & run blood
- 7) Start fluid therapy and consider pain medication
- 8) Obtain approval for other treatments (radiographs, ultrasound, medications)
  - Update owner on pet's status
- 9) Veterinarian should speak to owner on prognosis
- 10) Continue to work on stabilizing pet
  - Prepare pet for hospitalization and further treatments

***Initiate CPR immediately at any point if pet arrests***

### Steps Explained

All HBC pets are emergencies. Adrenaline is usually released in large amounts when the pet experiences blunt trauma. Adrenaline acts as a pain reliever and helps to elevate the heart rate. Because of this, the pet may get hit and then immediately act as if nothing happened. Unfortunately, this can mask underlying signs such as pulmonary contusions or internal bleeding.

It's important to note that not all steps occur in a linear fashion. If the patient arrives deceased you may need to start CPR immediately instead of obtaining a blood pressure.

#### *Triage Using R.A.P.*

One of the fastest and most effective ways to triage is by using the RAP system: Respiration, Alertness, Perfusion. Most times the pet is experiencing some type of shock and will need emergency treatment.

#### RESPIRATORY

Any change in an animal's breathing is an emergency. Owners often mistake labored breathing as "panting" or shallow breathing as "sniffing." When performing a physical exam it is important to step back and simply look at how the patient is breathing. Your sight will be important at determining if the patient is having difficulty breathing or not.

Mucous membrane color is also an important tool in determining respiratory function. Though not completely accurate (because lighting, anemia or icterus hides the appearance of cyanotic membranes) any presence of cyanosis issue which needs to be addressed immediately. Severely anemic patients may mask the "blue" color of cyanosis because at least 5g/dl of hemoglobin is required in order for patients to physically show the color "blue". This is also true is patients that are extremely icteric or in severe shock. If the patient is severely white or jaundice it may mask the cyanosis.

Should you question if the animal is having respiratory problems, you should immediately obtain a pulse oximetry level. A pulse oximetry machine measures the oxygen saturation of hemoglobin, which is a very insensitive measure of oxygenation. Normally animals should have a range from 98-100% on room air. The drawback to a pulse oximetry machine is that, at times, it is not very accurate. Patient movement, poor perfusion, hair, or any color other than pink mucous membranes (icterus, cyanosis, anemia) can cause the reading to be inaccurate. However, the pulse oximetry machine continues to be a fairly quick and easy test to use to determine overall oxygenation.

If there is any question on the degree of respiratory dysfunction the patient should be given oxygen supplementation until treatment and diagnostics can begin.

## ALERTNESS

Upon initial presentation the level of consciousness (LOC) should be assessed. There are many different methods to classify LOC. Depending on the text you read there may be some minor changes to the LOC levels.

An animal may be conscious, but have abnormal mentation such as slow or inappropriate response to stimuli.

When a patient presents to the clinic it is important to simply observe the animal initially to see how mentally appropriate it is. You should observe the animal and ask yourself:

- Does the animal know where it is?
- Can it visually focus on its surrounding?
- Is the pet walking normally or is it ataxic?
- Are the pupils the same size and responsive to light?
- Are there any abnormal breathing patterns?
- Is there any seizure activity?
- Does the animal respond to painful stimuli?

It is important to note the patient's LOC upon presentation. Any patient that has a declining LOC is an emergency and the overall prognosis of the patient worsens.

## PERFUSION

It is important to be able to identify early indicators of failure in the cardiovascular system so that the patient does not decline further.

During a physical exam mucous membrane color may be altered from a normal healthy pink to a muddy, grey or pale color. Any change in mucous membrane color is a life-threatening emergency. Capillary refill time should always be under two seconds. During cardiovascular collapse you may see an increase to three seconds or greater.

Heart rate may be either increased or decreased. Pulse strength may be either bounding or weak. Both the heart rate and pulse rate may be irregular or nonsynchronous. During auscultation an arrhythmia or murmur may be detected. Typically in cats their response to trauma is to have a low heart rate. This is more concerning than a tachycardic response because it's an indication that the heart is not being up with the demand.

If during the physical exam a heart arrhythmia is auscultated, the patient should have an electrocardiogram (ECG) performed. An ECG strip should be performed for five minutes and a strip should be recorded and placed in the patient's record.

### *Notify the Owner of WHY, WHAT, HOW MUCH*

Client reaction can be completely unexpected. It's important to remember to not become emotionally involved yourself. Maintain a calm and professional attitude at all times.

- Owners of these pets should be informed in a clear concise manner of WHY, WHAT and HOW MUCH.
  - WHY their pet needs emergency treatment
  - WHAT is going to be done to their pet
  - HOW MUCH it is going to cost (rough estimate)

Having them sign a consent form to treat and explaining exactly the procedures that are going to take place will help to avoid confusion as well as help to protect the practice and staff involved.

### *Obtain Blood Pressure, Pulse Ox and Attach ECG*

Depending on the nature of the emergency it may not be able to get a full set of vitals right away. The importance of obtaining a temperature or capillary refill time may not be as important as initiating CPR. When appropriate all vitals should be obtained at some point. In addition to performing a full physical exam all HBC patients should receive a blood pressure, an ECG and a pulse ox.

It's easy to quickly place an ECG then to periodically auscultate the patient. Placing an ECG will give you real time cardiac information. A blood pressure may not be done right away because it may be obvious the patient is not perfusing well, but at some point one should be obtained. If the patient presents in respiratory distress you do not need to obtain a pulse oximeter. The patient's respiratory system is compromised and you don't need a number on a pulse ox to instruct you to administer oxygen.

### *Administer Oxygen if Needed*

Providing oxygen is important for any patient in any type of shock or respiratory distress. If you are unsure whether the pet needs oxygen, it is better to give it than to not. The goal is to administer oxygen the most effective and least stressful way to the patient. Most patients who have been hit by a motor vehicle can benefit from oxygen supplementation.

#### *Obtain Official Set of Vitals If There is Time and if it is Appropriate*

- Temperature
- Heart Rate With Pulses
- Respiratory Rate With Effort
- Mucous Membranes
- Mentation
- Capillary Refill Time

Obtaining a full set of vitals is only appropriate if the patient is in an early stage of shock. If the patient is very critical it does not matter what its body temperature is. Attaching an ECG quickly will give you a heart rate. Starting treatment may be more important than taking the time to perform a full physical exam. That can occur when the pet is more stable.

#### *Place IV Catheter(s) & Run Blood*

Gaining venous access is important in all HBC pets. Studies have shown that short, large diameter catheters allow for higher fluid flows and increasing the diameter of the catheter by one size can cut the time it takes to bolus a liter of fluids by half. This may mean the difference between life and death to a patient. When a pet is hemodynamically unstable you may have to choose a smaller gauge catheter because of smaller-than-normal vein size or poor integrity of the vessels. If venous access is too difficult to obtain attempting a cut-down or placing an intra-osseous catheter should be considered.

When you place the peripheral catheter, you should attempt to draw blood from it first before you flush or start any fluids. This is the fastest way to obtain blood without performing another venipuncture stick. All emergency patients should have a PCV, TS and blood glucose performed. Based on findings the veterinarian may prescribe other bloodwork for the pet (CBC, Chemistry, blood gas). If blood cannot be obtained through the IV catheter, IV fluids should be initiated. Once the patient is stable it may be easier to obtain blood from another peripheral vein.

#### *Start Fluid Therapy and Consider Pain Medication*

Pain can increase and even cause shock, so it is important to treat the pain. Opioids are great because they have limited effects on hemodynamics. There continue to be many false thoughts about the benefits of pain (helps to inhibit patient movement, can't fully assess the patient, etc). It has been proven that recovery time is greatly reduced when pets experience less pain.

There are two types of fluids that can be given: Crystalloids (the most common) and Colloids. Interestingly enough there is no clear consensus that proves one type of fluid reduces mortality.

There are three types of crystalloids: Isotonic (LRS, Norm-R, P-Lyte, Hypertonic (7-7.5% NaCl), Hypotonic (0.45% NaCl). Isotonic crystalloids are still the most common used. They are similar to the body's extracellular fluid by containing similar electrolyte concentrations (sodium, chloride, potassium, magnesium, calcium and bicarbonate-like anions). Isotonic crystalloids will distribute rapidly. Within 30 minutes 75-98% of the fluids shift into the extravascular space. You need large volumes in order to make a difference and the infusion must be continuous.

Hypertonic fluids contain a higher osmotic pressure than isotonic. Useful when large volumes cannot be given fast enough. Hypertonic saline causes fluid to shift from the intracellular space to the extracellular space, which causes improved venous return and cardiac output. One dose equals four times the volume of isotonic saline. The use of hypertonic saline is also known as limited-volume resuscitation and is currently recommended in head trauma cases. It helps to reduce cerebral swelling without worsening edema.

Hypotonic fluids contain a lower osmotic pressure than isotonic (5% Dextrose in Water, 0.45% NaCl). Hypotonic fluids should NOT be used to treat shock because they contain too much water and will redistribute too quickly.

Colloids (hetastarch, albumin, plasma, blood) are high molecular weight fluids that do not pass readily through the capillary membranes. Colloids help to increase oncotic pressure because they keep fluids in the intravascular space. Roughly 50-80% of the infused volume stays in the intravascular space. Most veterinarians reach for colloids when crystalloids fail.

#### *Obtain Approval for Other Treatments*

There are very few other treatments that need to be performed that are emergent. Permission from the owner should be obtained for any other diagnostics. While obtaining radiographs or an ultrasound may yield a better diagnostic picture, it is

always important to stabilize the patient first. An owner may not have the funds to proceed so it's important to ask permission before suturing wounds, taking radiographs or casting a broken leg. A team member should alert the owner as to the pet's status, what is being done to help the pet and how long it will be until the veterinarian is able to speak with them.

#### *Veterinarian Should Speak to Owner on Prognosis*

While it seems like it may take awhile to perform all the above steps, it will likely have only been a few minutes. The pet arrived after being hit by a car and was triaged quickly. The pet was in shock and taken to the treatment area. An ECG was placed on the pet while someone started to shave down the leg for an IV catheter. Another team member placed a face mask of flow by oxygen on the pet's nose. A catheter was placed, 1.0mls of blood was drawn from it and a bag of fluids was started. A team member started to run a PCV/TS and a blood glucose. The veterinarian took the time to perform a full physical exam while another hospital team member obtained a blood pressure and attempted to get a pulse ox reading. The veterinarian gave the pet pain medication.

At this point, further diagnostics may be requested like radiographs. The owner should have been consulted with to ensure they want to continue with treatment. After all diagnostics have been completed the veterinarian must speak to the owner on the progress and diagnosis of the pet.

#### *Continue to Work on Stabilizing Pet*

It may take hours or even more than a day to stabilize a pet that has been hit by a car. Stabilization is defined as all vital parameters returning to normal. This is defined by normal blood pressure, appropriate mentation, normal heart and respiratory rate, pink mucous membrane color, normal capillary refill time and normal temperature. You may need to administer blood pressure medication or place nasal lines in the patient to obtain stabilization. The hit by car patient turns into a hospitalized patient after the patient is stabilized. Most pets that have been hit by car are in need of emergency care.

#### CONCLUSION

It is important to be organized and take a step-by-step approach with any emergency. Failure to do so can cause added stress to the situation and may delay patient care. Having all members of the team understand what steps need to be taken can mean the difference between life and death for the patient.