Advanced Monitoring and Procedures for Small Animal Emergency and Critical Care
SECTION I

Introduction
The concept of triage finds its origin in the French military. The word comes from the French verb *trier*, meaning to sort. In human medicine the goals of triage have varied over the years depending upon the situation. After World War II triage came to mean the process of identifying those soldiers most likely to return to battle after medical care. Following the Korean and Vietnam conflicts the goals of triage came to mean the greatest good for the greatest number of wounded. In times of disaster, the goals of triage are similar to the military. Daily human emergency room triage began in the 1960s and has evolved into a method to separate efficiently those patients stable enough to wait for treatment from those who require immediate medical attention. In veterinary medicine we have adopted the goals of our counterparts in the human emergency room. Thus, we prioritize cases by medical urgency when presented with multiple emergencies at the same time.

Triage occurs both by telephone and in the hospital. A client often calls the hospital seeking advice for the care of his or her pet; the receptionist or veterinary technician must ascertain useful information about the pet in a short period of time. In addition the receptionist or technician should have the knowledge required to provide the appropriate advice. The information obtained during the telephone conversation will also be useful in preparing for the arrival of the patient at the hospital. On initial presentation to the hospital the veterinary technician is usually first to receive the patient and therefore to perform basic triage. This person must determine whether the patient needs immediate care and, in the case of simultaneous patient arrivals, prioritize treatment based on medical need.

**Telephone triage**

In theory, telephone triage requires clinic staff to determine the urgency of a pet’s problem and to provide advice based on that determination. However, because the client may not possess the training to give an accurate account of the pet’s problem(s), it is generally safest to recommend the client take the pet to a veterinarian for evaluation. Particularly, any patient experiencing breathing difficulty, seizures, inability or unwillingness to rise, or traumatic injury should be seen by a veterinarian without question.

At the beginning of the telephone conversation staff should establish the animal’s signalment (breed, sex, age, and weight) if possible. Questions asked of the owner should be basic and straightforward. They should address the patient’s level of consciousness, whether or not the patient is breathing, experiencing seizures, or has obviously broken or exposed bones (see Table 1.1). Based on the owner’s responses, advice can be given on first aid, assuming that the problem can be clearly defined and is simple. See Table 1.2 for a list of problems requiring attention by the veterinary health care team without delay.

Information gathered during the phone conversation can aid the veterinary technician in preparation for the arrival of the patient at the hospital. Simply knowing the animal’s breed or approximate weight can enable the technician to pre-select appropriate sizes for vascular catheters, fluid bags, and endotracheal tubes.

Owners should be instructed on safe transport for the animal. Animals that have suffered trauma are often in pain, and owners should be instructed on how to
Three major body systems are assessed during the initial triage: respiratory, cardiovascular, and neurological. Triage begins when approaching the patient. Visually assess breathing effort and pattern; presence of blood or other foreign material on or around the patient; and the patient’s posture and level of consciousness (LOC). Note if there are airway sounds audible without a stethoscope. Note whether or not the animal responds as you approach. If the animal is conscious, ask the owner about the patient’s temperament and take the appropriate precautions regarding physical restraint or muzzling.

Physical restraint and muzzling should be performed with extreme caution in patients with respiratory distress, as such steps can cause acute decompensation and respiratory arrest. If time permits, a brief history should be obtained.

### Table 1.1 Questions useful in telephone triage, and suggested responses

<table>
<thead>
<tr>
<th>Question</th>
<th>Suggested Response</th>
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<tr>
<td>Is the animal breathing and conscious?</td>
<td>a. If neither, institute mouth-to-snout; if yes to either of these, do not.</td>
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<tr>
<td>Is the animal actively experiencing a seizure?</td>
<td>a. If yes, remove from danger of falling or any sharp objects. Take to veterinarian immediately after seizure ends, or if it lasts longer than 1–2 minutes, bring during seizure. Watch out for the mouth; don’t get bit.</td>
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<td>For people who live a distance from medical assistance or cannot/will not come in: Has the animal ingested something that you know or suspect is poisonous in the last 2 hours?</td>
<td>a. In some situations, at-home emesis may be recommended.</td>
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<tr>
<td>Is there active bleeding, an obvious fracture, or exposed bone?</td>
<td>a. Recommend clean towel over the site, pressure if spurring blood. Warn clients to be VERY CAREFUL not to get bitten.</td>
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### Table 1.2 Problems requiring immediate attention by the veterinary health care team

<table>
<thead>
<tr>
<th>Problem</th>
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<tr>
<td>Respiratory distress</td>
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<tr>
<td>Bleeding from body orifices</td>
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<td>Pale mucous membranes</td>
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<tr>
<td>Weakness</td>
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<tr>
<td>Neurological abnormalities</td>
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<td>Rapid abdominal distension</td>
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<td>Protracted vomiting</td>
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<td>Inability to urinate</td>
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<tr>
<td>Severe coughing</td>
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<tr>
<td>Ingestion of toxins</td>
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### Hospital triage

Three major body systems are assessed during the initial triage: respiratory, cardiovascular, and neurological. Triage begins when approaching the patient. Visually assess breathing effort and pattern; presence of blood or other foreign material on or around the patient; and the patient’s posture and level of consciousness (LOC). Note if there are airway sounds audible without a stethoscope. Note whether or not the animal responds as you approach. If the animal is conscious, ask the owner about the patient’s temperament and take the appropriate precautions regarding physical restraint or muzzling. The veterinary technician cannot rely on the client’s statement that an animal “never bites,” but if he or she is told that the patient is aggressive, the patient should definitely be muzzled. Physical restraint and muzzling should be performed with extreme caution in patients with respiratory distress, as such steps can cause acute decompensation and respiratory arrest. If time permits, a brief history should be obtained.

### The ABCDEs

A reasonable and systematic approach to triage is the use of the ABCDEs of emergency care, which are: (A) airway,
lead to life-threatening hypovolemia. The following is a list of problems that also require immediate medical attention:

- Exposure to toxins (ingested or topical)
- Excessive bleeding
- Open fractures
- Snake bite
- Burns
- Prolapsed organs
- Wound dehiscence
- Dystocia
- Trauma
**Airway and breathing**

Expedient respiratory system assessment and rapid correction of abnormalities is critical. First, patency of airway and breathing effort should be assessed. This is done by visualization, auscultation, and palpation. When looking at the animal, an experienced individual can determine if the animal has increased breathing rate or effort. Some animals with respiratory distress may assume a posture with the head and neck extended and the elbows abducted (held away from the body). Additional concerning signs include absent chest wall motion, exaggerated breathing effort, flaring of the nares, open mouth breathing and paradoxical breathing. When sustained high breathing effort leads to respiratory fatigue, paradoxical breathing can occur, which is characterized by opposing movements of the chest and abdominal walls during inspiration and expiration. Cyanosis, a blue or purplish tint to the mucous membranes, usually indicates hypoxemia and warrants immediate medical intervention. The chest wall may be palpated to assess chest wall integrity. Crepitus about the body may indicate subcutaneous emphysema, which can be caused by tracheal tears or chest wall defects.

Some assessment questions the triage technician should consider:

- Is the patient having difficulty breathing?
- Are breath sounds auscultable?
- Are facial injuries interfering with the airway?
- Has a bite wound disrupted the larynx or trachea?
- Is subcutaneous emphysema present?
- What color are the mucous membranes?
- Does respiratory distress get worse with patient position change?
- Is there evidence of thoracic penetration or a flail chest?

**Circulation**

Many of the signs suggestive of decreased cardiac output are a result of a compensatory sympathetic reflex, which helps maintain arterial blood pressure. Clinical signs suggestive of decreased cardiac output include: tachycardia, pale or gray mucous membranes, prolonged capillary refill time, poor pulse quality, cool extremities, and decreased mentation. Decreased cardiac output may be due to hypovolemia as a result of blood or other fluid loss (internally or externally; active or historical), trauma, or cardiac disease.

Circulation is assessed by visualization, palpation, and auscultation. The focus of the cardiovascular assessment is the six perfusion parameters (see Table 1.3).

**Table 1.3** The six perfusion parameters

<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Mucous membrane color</td>
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<tr>
<td>Capillary refill time</td>
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<tr>
<td>Heart rate</td>
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<tr>
<td>Pulse quality</td>
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<tr>
<td>Extremity temperature</td>
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<tr>
<td>Mentation</td>
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**Mucous membrane color**

After assuring it is safe to do so, evaluate the mucous membranes by examining the color of the gums (see Fig. 1.3). As an alternative in the fractious animal or patients with pigmented gums examine the conjunctiva, penis, or the vulva. The normal color of pink is a result of oxygenated hemoglobin in red blood cells in the capillary bed. Mucous membrane color may vary with circulatory related problems. Mucous membrane color may be pale or white due to blood loss anemia or vasoconstriction. Brick red or injected mucous membranes are a result of vasodilation and can be seen with hyperthermia or sepsis. Cyanotic or blue mucous membranes are an indicator of severe hypoxemia. The absence of cyanosis does not rule out hypoxemia. Icteric or yellow mucous membranes are due to the breakdown of red cells (hemolysis) or liver disease. Methemoglobinemia results in brown or chocolate-colored mucous membranes.

**Capillary refill time (CRT)**

Evaluation of CRT is done by applying digital pressure to the surface of the mucous membranes and forcing the blood from the capillary bed and observing the return
of color. Normal CRT is 1–2 seconds. A shortened CRT (<1/2 second) is suggestive of vasodilation. A prolonged capillary refill time (>2 seconds) is also a result of peripheral vasoconstriction and causes decreased peripheral perfusion.

**Heart rate**

Heart rate is a nonspecific parameter. It is usually measured by auscultation of the heart, palpation of the apex beat, or palpation of an artery. Increase in heart rate (tachycardia) may be caused by hypovolemia (the tachycardia is a compensatory mechanism), hypoxemia, hypotension, drugs, fever, excitement, exercise, and pain. Tachycardia is generally defined as a heart rate >160 beats per minutes (bpm) in the dog or 200bpm in the cat. Decrease in heart rate (bradycardia) may be caused by increased vagal tone, severe electrolyte disturbances and hypothermia, drugs, or disturbances of the cardiac conduction system. Bradycardia is generally defined as a heart rate <60bpm in the dog and 140bpm in the cat. Auscultation of the heart also provides information about rhythm and murmurs. Auscultation of the heart and palpation of an artery should occur simultaneously, so that pulse deficits (the difference between heart and pulse rate; they should be the same) can be determined. Pulse deficits are suggestive of arrhythmias.

**Pulse quality**

Palpation of the artery provides information about the animal’s heart rate and rhythm. The femoral or dorsal pedal arteries are the commonly palpated arteries. In addition, pulse quality is an indicator of stroke volume, the amount of blood pumped out of the heart with each beat. Palpating a peripheral pulse is feeling the difference between the systolic and diastolic pressures and duration of the waveform. Ideally, the pulse should be full, regular, and strong, indicating a normal stroke volume. A thready pulse is defined as a narrow waveform and a weak pulse refers to a small amplitude pulse difference, both of which are indicative of a decreased stroke volume. Bounding pulses have a large pulse pressure difference and wide waveforms usually associated with increased stroke volume and vasodilation.

**Extremity temperature**

The paws, limbs, or ears should normally feel warm to the touch. Cool extremities are a result of vasoconstriction.

**Mentation**

As previously mentioned, evaluation of mentation starts from afar. Observe the attitude of the patient without stimulation. If the patient has an altered mental state, it is assessed for its response to touch, sound, and painful stimuli. An inappropriate mental state can be a result of inadequate perfusion or a primary brain problem.

Some assessment questions the triage technician should consider:

- Is the patient’s mentation normal?
- Is there evidence of hemorrhage?
- Is there swelling associated with an extremity or evidence of a fracture?
- Are the mucous membranes pale?
- Is the capillary refill time prolonged?
- Are the pulses weak and rapid?
- Is the heart rate abnormal?
- Are the extremities cold?

**Dysfunction or disability of the neurological system**

Dysfunction or disability refers to the neurological status of the patient. This may be assessed through visualization and palpation. A cursory neurologic exam is performed focusing on the patient’s LOC, pupillary light reflex, posture, and response to pain (superficial and deep). Depressed mentation may be a result of poor oxygen delivery or trauma to the brain. Seizure activity may be due to intra- or extracranial causes.

A patient that is recumbent, has an abnormal posture, or is not seen to ambulate or make voluntary movements should be assumed to have spinal trauma and stabilized on a backboard (see Fig. 1.4) until proven otherwise.

![Figure 1.4](image-url) A patient with suspected head and spinal trauma restrained on a backboard. The cranial end of the board is elevated slightly because of suspected increased intracranial pressure.
Some assessment questions the triage technician should consider:

- Is the animal bright, alert, and responsive or obtunded (depressed but rousable), stuporous (roused only with painful stimulation), or comatose?
- Are the pupils dilated, constricted, of equal size, and responsive to light?
- What is the posture of the animal?
- Are there any abnormal breathing patterns?
- Does the animal respond to painful stimuli?
- Is there obvious seizure activity?

**Examination**

Finally, a rapid whole-body examination is performed. The goal is to determine and address any additional problems.

Some assessment questions the triage technician should consider:

- Are there lacerations, wounds, or punctures?
- Is there bruising and is it getting worse?
- Are there any fractures?
- Is the abdomen painful or distended?
- Is there evidence of debilitation or other signs of disease?

**Summary**

In some emergencies, minutes count. The triage performed by the veterinary technician should be rapid and efficient. The goal is rapid recognition of and intervention for life-threatening conditions such as hypoxemia and inadequate perfusion. A systematic approach to patient assessment is essential for the best possible patient outcome.

**Reference**