Emergency and Critical Care of Birds

Angela M. Lennox, DVM Dipl. ABVP-Avian

Avian and Exotic Animal Clinic of Indianapolis,
9330 Waldemar Road Indianapolis IN 46268

IDENTIFICATION OF THE CRITICAL PATIENT

Clinic staff must be trained in over-the-phone recognition of patients that are likely to qualify as true emergencies, and direct the client to bring the patient in for immediate care (Table 1). Most ill patients benefit from transportation in a small, dark container with the provision of gentle heat. Many clients have access to instant chemical warming devices or hot water bottles. Other potential sources of warmth include a potato or dried beans in a sock heated in the microwave.

Clients with patients who are actively bleeding should be instructed on how to safely restraint the bird and apply direct pressure. If care is delayed, conscious patients able to swallow can benefit from administration of small amounts of sugar syrup diluted in water and administered by syringe or eyedropper.

Veterinary reception staff and technicians/nurses must be trained to visually identify the critical patient and admit it directly into the hospital for immediate evaluation and care. (Table 1).

EXAMINATION OF THE CRITICAL PATIENT

Every exotic patient should be examined carefully from a distance before beginning restraint. Patients that are weak or in respiratory distress should be transported back into the hospital for stabilization and full physical examination delayed until the patient is stable. Some cursory information can be gleaned from these patients during placement into an oxygenated incubator. Quickly palpate the pectoral muscle mass to judge overall patient conditioning and the coelomic space for the presence of fluid or a mass. This information can help plan the next diagnostic or therapeutic step.

In many cases, critical status becomes apparent during examination. Patients exhibiting increased respiratory effort and dyspnoea, sudden weakness, and failure to grasp should be released immediately back to the examination table or enclosure, and steps taken for emergency stabilization.

DECISION MAKING FOR THE CRITICAL PATIENT

In many cases, the clinician is faced with a number of difficult decisions. In any single case, aggressive emergency procedures may result in the death of the patient. In contrast, failure to utilize aggressive emergency procedures may result in the death of the patient.

In the author’s experience, patients in serious condition can be placed into two categories: those with acute critical presentations and those in critical condition because of chronic, long-term disease processes. As a rule, those in the later category tend to respond least favourably to rapid, aggressive intervention. These birds can often be identified on cursory physical examination by the presence of moderate to severe loss of pectoral muscle mass. Poor overall feather condition may also accompany chronic disease.

The difficult job of determining which patients can tolerate aggressive therapy (placement of venous access, acquisition of diagnostic testing) requires considerable experience and apparently in many cases, plain good fortune. In the author's experience, patients in critical condition due to long-term, chronic disease do not tolerate aggressive therapy, and benefit from a much more conservative approach, for example, 24 hours of heat, fluids administered subcutaneously, antimicrobial therapy and support feeding. Examples include young unweaned or recently weaned psittacine birds in extreme states of cachexia, and older patients with chronic renal failure. Patients with more acute disease conditions, for example, trauma, may respond to a more aggressive therapeutic approach.

TREATMENT OF THE CRITICAL PATIENT

Airway Support

Birds in respiratory distress should be placed in a warmed oxygenated chamber (Bowles 2007). The author has found administration of medications with anti-anxiety properties, e.g., butorphanol 1-2 mg/kg IM q2-3h; midazolam 0.25 mg/kg IM, beneficial in many cases. These drugs work synergistically to reduce anxiety with minimal respiratory depression.

Airway support for birds in respiratory arrest is generally straightforward as intubation is, with few exceptions, relatively easy. The glottis is positioned at the base of the tongue and is generally easily accessible, except in particularly small species, or those with unusual anatomic variations. Airway support is complicated in those patients with upper airway obstruction. For those patients with obstruction of the glottis or rostral trachea, tracheotomy can be considered. However, airway support via the avian coelomic air sac system is an extremely useful and superior alternative (Chavez and Echols 2007).

Ventilation is provided either via endotracheal or air sac tube, and safe ventilation volume is judged by visual observation of the inspiratory excursion.

It birds, dyspnoea is often a result of diseases not of respiratory origin. Any disease producing a mass effect (organomegaly, masses, fluid) can severely affect respiration in birds. Cardiac disease also can produce exercise intolerance and dyspnoea.

Bronchodilators such as terbutaline at 0.01 mg/kg IM q6-8h can be effective in cases of suspected bronchoconstriction, for example exposure to airborne toxin or hypersensitivity syndrome of macaws (Bowles 2007).

Cardiovascular Support

Vascular access in birds can be performed via two routes: intravenous and intraosseous. IV catheterization with 24-26 g IV catheters is possible in larger birds (conure size and larger), but is technically more difficult in terms of placement and ability to secure the catheter. Choices of site include the right jugular, basilic and medial metatarsal veins. Jugular and basilic catheters are more difficult to secure and access. For example, the figure of eight bandage required to prevent the bird from dislodging the basilic catheter during flapping precludes easy access for intermittent use. In the author's experience, the medial metatarsal vein provides optimal security and easiest access post placement.

Intraosseous catheterization is well described in birds, and can be performed in patients as small as a finch. Sites include the proximal tibiotarsus at the tibial crest, and the distal ulna. The relatively soft bone cortex of most birds allows the use of standard injection needles as intraosseous catheters, and size in pet birds ranges from 22 to 27 g. Placement in much larger birds can be facilitated with the use of short 20-22 g spinal needles (Bowles 2007).

Correct placement can be confirmed in several ways. Injection of fluids into a correctly placed catheter does not result in accumulation of fluids into the associated soft tissues, with the exception of leakage of fluids from the entry site into the bone in a poorly seated catheter. Absolute confirmation may require evaluation of radiographs in two views. Proper placement of an ulnar catheter often results in blanching of the basilic vein during fluid administration (Bowles 2007).

The IO catheter can be capped with a standard IV injection cap and the catheter secured by taping it to the limb. Some clinicians prefer to apply tape “wings” to the catheter hub, which are then sutured to adjacent skin (Bowles 2007).

Use of IO catheters in pet birds is mostly anecdotal. However, studies in human patients indicate IO vascular access can be considered equivalent to IV access in terms of onset of action of therapeutic agents, and time to establishment of peak drug levels. Recommendations for physicians include maintenance of the catheter no more than 72 hours. Complications in humans are rare (less than 1%) and include local cellulitis and infection, fracture, and leakage of administered drugs/fluids into adjacent soft tissues (Tay and Hafeez 2008; Buck 2008).

The author is unaware of a single severe complication in an avian patient after nearly 10 years of use of this technique in clinical practice, with the exception of inadvertent passage of the needle through both bone cortices. The author has also found the placement of an IO catheter in female birds with hormone-induced hyperostosis of long bones difficult to impossible due to accumulation of mineral in the marrow space.

Fluid choices, volume and rates depend on patient condition and the goal of fluid therapy. Fluids should be warmed appropriately prior to administration.

Hypovolaemia

The bird in hypovolaemic shock is usually weak and often unable to stand. Other indicators may be poor surface vein turgor, in particular the jugular or basilic vein. Ultimate confirmation of the presence of hypovolaemia is documentation of below normal blood pressure.

Treatment of hypovolaemic shock has been described by Lichtenberger, and relies on restoration of normal indirect systolic blood pressure (Lichtenberger 2008). While difficult in very small patients, acquisition of blood pressure is relatively easy in larger birds. Assessment of blood pressure in birds requires a sphygmometer, pediatric cuff and an ultrasonic doppler. Placement requires practice. In most birds, normal blood pressure is above 120 mm Hg, with readings under anaesthesia from 90-140 mm Hg (Lichtenberger 2007). It should be kept in mind that a number of variables can affect blood pressure readings, and the best use may be as a trend monitor. In other words, improvement of blood pressure in a bird that progresses from weak to standing and resisting is an indication of normovolaemia, even if blood pressure readings do not exceed 120 mmHg. The author has encountered numerous cases where blood pressure readings could not be obtained, but were readily detected after initiation of fluid therapy.

Fluid choices for birds in hypovolaemic shock include crytalloids (lactated Ringer’s and other similar solutions), and colloids (Hetastarch, Braun Medical Inc. Irvine California, USA; and Oxyglobin, Biopure, Cambridge Massachusetts, USA). A suggested flow chart for fluid resuscitation in the bird is presented in Table 2.

Dehydration

Dehydration deficits are calculated after correction of hypovolaemia, if present. Determination of percent dehydration can be subjective in birds, and is estimated by observing degree of loss of body weight, dryness of mucus membranes, presence of sunken eyes and altered mentation (Lichtenberger 2007). Information can also be gleaned from PCV and measurement of blood proteins.

Volume of fluids for correction of dehydration is calculated using the formula: Volume (ml) = hydration deficit x body weight (kg) x 1000 ml. Add hydration deficits to daily maintenance needs (3-4 ml/kg/h) and administer over 24 hours (Lichtenberger 2007). It is also useful to add projected ongoing losses (polyuria and vomiting) to the total as well. Ongoing needs are adjusted during treatment, and re-evaluated after 24 hours.

Control of Haemorrhage

The most common source of bleeding in pet psittacine birds is damage to growing primary or secondary remiges and retrices. In most cases, effective clotting mechanisms and efficient compensatory mechanisms prevent fatal haemorrhage. However, birds on sub-optimal diets or with other underlying illness may be at greater risk for a fatal haemorrhage. Other common sources of bleeding include traumatic wounds (including self-trauma), superficial neoplasms and bleeding from the gastrointestinal or reproductive tract.

Restoration of Normothermia

Measurement of body temperature in birds is problematic, but most sources agree the most accurate measurement is via a flexible temperature probe inserted deep into the crop. Methods of active rewarming include forced air (incubator, Bair Hugger [Arizant Inc. Eden Prairie, Minnesota, USA]) and administration of warmed intravenous fluids.

Table 1. Selected Signs and Symptoms Commonly Associated with the Critical Avian Patient

Sign/Symptom	Comments
Active bleeding	
Respiratory distress	
Seizure	
Depression	Often exhibited as non-interest in surroundings
Weakness	Especially birds unwilling to perch
Prolapse from vent	

Table 2. Flow Chart for Fluid Resuscitation of the Bird with Hypovolaemia and Shock, and Subsequent Calculation of Fluids Needs (Lichtenberger 2007).

Step	Comments
Determine starting blood pressure, and measure periodically throughout treatment	Use starting number as a baseline and monitor trends during treatment. Due to numerous factors, actual numbers may vary significantly from those reported in the literature. Note that in severely hypovolaemic bird, BP may not initially be detected.
Administer Crystalloids	10 ml/kg IV or IO 1-2 boluses
Administer Colloids (Hetastarch, Oxyglobin)	3-5 ml/kg IV or IO over 10 minutes 1-2 boluses
If patient condition and BP measurements are not improving:	Administer third dose of cystalloids and colloids.
If no improvement:	Administer Oxyglobin at 5 ml/kg IV or IO 1-2 boluses
If Oxyglobin unavailable:	Administer hypertonic saline 7.5% a 5 ml/kg bolus slowly over 10 minutes
If no improvement:	Continue fluid administration via infusion pump and monitor for response to therapy
Once normovolaemia is established, calculate hydration deficits	V (ml) = hydration deficit x body weight (kg) x 1000 ml.
Add daily maintenance needs	3-4 ml/kg/h
Add to total estimated ongoing losses in excess of normal	Losses can stem from polyuria or regurgitation; ideally, these should be measured and added to the calculation.
Administer total over 24 hours and then re-evaluate	

References

Anderson NL (1995). Intraosseous fluid therapy in small exotic animals. In Kirk RW, Bonagura JD: Current Veterinary Therapy XII, Small animal practice. Philadelphia, PA, W.B. Saunders, pp. 1331-1335.

Bowles H, Lichtenberger M and Lennox A (2007). Emergency and critical care of pet birds. *Vet Clin Exot Anim* **10:**345-394.

Buck ML (2006). Intraosseous administration of drugs in infants and children. *Pediatr Pharm* 12: 2006. Medicine Journal (serial online) 2008. Available at http://www.medscape.com/viewarticle/552022 Accessed 4/08.

Chavez W and Echols MS (2007). Bandaging, Endoscopy and Surgery in the Emergency Avian Patient. *Vet Clin Exot Anim* **10:** 419-436.

Lichtenberger M. (2007) Shock and cardiopulmonary-cerebral resuscitation in small mammals and birds. *Vet Clin Exot Anim* **10**: 275-291.

Otto CM and Crowe Jr. DT (1992). Intraosseous resuscitation techniques and applications. In Kirk RW, Bonagura JD: "Current Veterinary Therapy XI, Small animal practice". Philadelphia PA, W.B. Saunders, pp. 107-112.

Tein Tay E, Hafeez W. Intraosseous access. EMedicine Journal, 2008. Available at: http://www.emedicine.com/proc/TOPIC80431.HTM. Accessed 4/08.