

AVIAN MEDICINE - HOW TO GET STARTED

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INTRODUCTION

Incorporating avian patients into your career and practice can be rewarding yet potentially challenging. Avian medicine is poorly represented in the veterinary curriculums. Therefore, most veterinarians wanting to gain basic competence and confidence in avian medicine need to seek opportunities and gain knowledge through self-directed study or formal continuing education events. However, other factors besides the clinician's competence are important to consider before building your avian caseload.

DOES IT MAKE FINANCIAL SENSE TO SEE AVIAN PATIENTS?

Compared to dog and cat patients, appointments for avian patients tend to take up more veterinarian and staff time for various reasons. Birds often require a more detailed collection of the history of husbandry and diet. In addition, many birds present for behavioral issues (e.g., aggression, feather destructive behavior, etc.), all of which require a more in-depth history collection and at-length discussion of behavioral modification techniques, etc. This means that often much time is spent talking to and educating clients. Therefore, many veterinary clinics have longer time slots for avian appointments than dog and cat appointments. However, the veterinary teams' time is rarely appropriately reflected in the fees charged for avian appointments. In addition, routine diagnostics such as fecal parasitology screenings and heartworm testing are not performed in birds, and routine blood work may not be recommended due to the small size of the avian patient (e.g., budgerigars) due to the increased risks of obtaining blood. This results in generally lower average revenue generated for bird appointments. Furthermore, unlike dogs and cats, birds do not get routine vaccinations, and owners do not need to purchase preventative anti-parasite medications, further reducing the revenue earned per avian appointment. Compared to dog and cat appointments, this can lead to a significant negative financial impact if avian appointments are booked instead of dog or cat appointments. Therefore, the appointment fee charged for avian patients should be carefully considered and higher than dog or cat appointments. In addition, clinics may want to limit the number of bird appointments they book per day to avoid negatively impacting the clinic's finances.

BECOME FAMILIAR WITH BIRDS AS PETS AND AS PATIENTS

Most veterinarians are willing or interested in seeing birds as patients usually have an affinity for birds and some basic knowledge about bird behavior and husbandry. If this is not the case, consider getting birds as pets or clinic birds to gain more experience with basic bird husbandry and behavior. It goes a long way to know how to take care of a bird as a pet if you want to talk confidentially to your bird owners. Having clinic birds will also make your support staff more comfortable and knowledgeable about birds, and it signals your clients that your clinic has a sincere interest in seeing birds as patients. Suitable species to consider for gaining bird experience are cockatiels and conures. In addition, you and your staff should be familiar with and able to recognize common pet bird species and provide sound husbandry advice to owners.

Veterinarians interested in treating birds need to make an active effort to gain the basic knowledge and clinical skills needed to see avian patients safely and effectively. This will require much self-motivation to read the available textbooks and online sources, attend continuing education events, and attempt to shadow more experienced avian veterinarians. Becoming a member of the Association of Avian Veterinarians (AAV) is recommended, as it provides access to a large amount of educational material online and continuing education events (virtual and in-person) and includes a subscription to the Journal of Avian Medicine. In addition, many national or regional conference providers have dedicated avian medicine tracks and avian-focused wet labs.

However, shadowing a more experienced avian veterinarian is also beneficial in gaining experience and seeing how the veterinary team works with avian patients. Building relationships with more experienced avian veterinarians and asking for mentorship will allow you to discuss more complex cases and ask for advice when needed. In addition, having the option to refer to a difficult avian case is helpful.

HAVE BIRD-COMPETENT SUPPORT STAFF

As veterinarians, we heavily rely on our support staff, including receptionists, veterinary technicians, and veterinary assistants, to provide care to our patients and services to our clients. Therefore, it is important that the entire team is interested in avian patients and gives new clients willing to bring their pet birds to your clinic the sense that your clinic is competent in dealing with bird patients. Since frequently not all team members may be equally interested or suitable in working with your avian patients, you should have dedicated technicians with a sincere interest and experience in dealing with birds. For the restraint of birds, a competent and experienced technician is critical to allow you to handle your patients, perform complete physical exams and obtain diagnostic samples safely and effectively. Procedural sedation makes these tasks significantly easier and safer and is therefore recommended for inexperienced veterinary teams and large and potentially dangerous bird species (e.g., macaws, Amazon parrots, cockatoos). If your staff requires more experience in handling and restraint birds, consider working with a bird rescue or organizing a handling lab in your clinic to provide your team the opportunity to learn.

Becoming confident in handling and restraining birds is critical for veterinarians too, and these tasks should not be exclusively delegated to veterinary technicians.

Your veterinary technicians also play a critical role in the education of your bird clients. Therefore, they should be knowledgeable about bird husbandry, in particular diets, and bird behavior. Since behavioral, nutritional, and reproductive problems are common in pet birds, your staff needs to be able to provide the correct information to clients. Having educational handouts available for your clients is also an efficient way of delivering and reinforcing information about avian husbandry and behavior.

EQUIPMENT

Avian patients, particularly small ones, require specialized equipment not routinely found in clinics that see dogs and cats. Having gram scales with perches or containers is essential to obtain body weights in birds accurately. Small syringes and needles are needed to obtain blood samples and administer medications and subcutaneous fluids to birds. An incubator or other climate controller environment is essential to house sick birds or recover birds from anesthesia and surgery. Nutritional support in pet birds is usually provided using crop gavage needles, and several different sizes, as well as the appropriate critical care or baby bird formulas, should be in stock. In addition, pelleted and seed-based diets, perches, food and water dishes, and suitable cages should be available to hospitalize avian patients.

For avian anesthesia, smaller endotracheal tubes, non-rebreathing circuits, and appropriate anesthetic monitoring equipment should be available. For avian soft tissue surgery, delicate standard instruments are often suitable. However, for small avian patients, microsurgical instrumentation would be necessary.

BE ABLE TO OBTAIN AND INTERPRET BASIC DIAGNOSTIC TESTS

To successfully manage avian patients, veterinarians and veterinary technicians need to be able to obtain blood samples safely and effectively obtain radiographs, amongst other clinical techniques. Blood collection and evaluation of a complete blood count and biochemistry profile are the most frequently performed diagnostic tests in avian patients. Therefore, safe restraint and blood collection, as well as the correct handling and processing of the obtained blood samples, are critically important. Veterinarians and veterinary technicians should be able to perform an estimated white blood cell count in birds. In addition, being able to interpret CBC and biochemistry values in birds and choosing the appropriate additional tests is essential.

Obtaining diagnostic radiographs in birds is another important skill for the veterinary team to master. Sedation or anesthesia is usually required to obtain diagnostic radiographs safely for the patient and the veterinary team. Obtaining adequately positioned radiographs without any rotational or superimposition artifacts is essential, as otherwise, the obtained radiographs are usually of significantly reduced diagnostic value or non-diagnostic. Becoming familiar with the interpretation of avian radiographs is essential and having the ability to submit radiographs for review by specialists is recommended.

AVIAN NUTRITION

The nutrition of pet birds has substantially improved over the past decades. Historically nutritional deficiencies and associated disorders were very commonly diagnosed and have led to reduced life spans in many pet birds. However, with the increased availability of commercially balanced pelleted diets for pet birds, nutritional disorders have become less common. However, nutrition still plays a key role in keeping pet birds healthy. Several diet-related disorders are still prevalent today. The veterinarian's role in ensuring a balanced diet cannot be overstated, and during an annual examination, the diet should be reviewed in detail and improved whenever possible. Prevention of diet-related disorders is key since, once manifested; many diet-related disorders are challenging or impossible to resolve.

Recommended diets for psittacine pet birds

Pelleted diets

It is generally accepted that psittacines in captivity should be fed a diet consisting of at least 75 % of a commercially available balanced pelleted diet. While several brands of pelleted diets are available, clinician, client, and patient preferences vary widely. As veterinarians, we should recommend diets that publish detailed ingredient lists, and nutritional values for their products as well as are likely to have a high rate of acceptance in avian patients during dietary transition periods. Feeding a single type of pelleted diet is usually recommended, and there is no scientific reason to mix several brands of pelleted diets, as frequently recommended. If < less than 75% of the daily dietary intake consists of pellets, then the risk for dietary deficiencies increases, especially over more extended periods.

Vegetables and fruits

Pelleted diets can make up to 100% of the diet without any concerns. However, for enrichment reasons, more so than nutritional reasons, a variety of fresh vegetables and fruits can be offered. There is no need to offer several types of fresh food daily as it may trigger reproductive activity by simulating the over-availability of food. Consider offering one type of fresh vegetable or fruit daily and rotating daily. Good choices for fresh vegetables include cucumbers, cherry tomatoes, celery, lettuce, and green beans since they are all low in starch, sugars, and fat.

In contrast, fresh or canned corn, beans, other legumes, grains, and other starch or sugar-containing food items should not be offered since they are nutritionally imbalanced and can trigger reproductive activity. Avocado, onions, and garlic should not be offered to pet birds due to their potential or proven toxic effects. Fresh fruits can also be offered, but again small amounts should be given, and fruits high in sugar, such as grapes, ripe pears, etc., should be avoided. Good fruits to offer include apples, watermelon, citrus fruits, and small amounts of berries or bananas. Fruits and vegetables should be offered in limited quantities so that they do not reduce the intake of pellets.

All vegetables and fruits should be offered raw. Not offering cooked vegetables is very important since it would make them nutritionally less valuable due to the increased

digestibility of the contained starch. In addition, the softer consistency may trigger reproductive activity. Raw vegetables and fruits should not be cut too small to promote foraging.

Seeds

Seeds mostly sold commercially as fortified seed mixed for various bird species are generally not recommended for most pet birds. Fortified seed mixes are acceptable in budgerigars and finches since they are fortified with iodine and vitamins. Therefore, if besides the seed mixes, a source of beta carotene (e.g., green or orange vegetables) and a source of calcium (e.g., cuttlefish bone, mineral block) are offered, then the risk of nutritional deficiencies is low. However, seed-based diets will lead to various dietary disorders in other bird species, particularly large ones like Amazon parrots, macaws, and African grey parrots. Seeds are deficient in many nutrients, including calcium and vitamins, and are excessively high in calories. In certain species, like Amazon parrots, seed-based diets are often responsible for fatal hepatic lipidosis, hyperlipidemia, obesity, etc., and should be avoided at all costs. Using seeds for enrichment and as treats is acceptable, but it should not make up more than 5% of the diet.

Nuts

Nuts should only be offered with the shell intact to promote foraging. If a bird cannot open nuts in shells with their beaks, it indicates that this type of nut is not part of its wild diet and should, therefore, not be offered. Birds meant to ingest nuts regularly as part of their diet, such as macaws, have large and powerful beaks to open nuts in their shell without problems. Therefore, macaws should have offered nuts as part of their captive diet daily for dietary and foraging reasons. Amazon parrots and rose-breasted cockatoos should not be offered nuts regularly, as they are prone to lipid metabolism disorders and obesity. Peanuts (which are not nuts but a legume) should never be offered due to the high prevalence of contamination of Aflatoxins as well as fungal spores. If peanuts are offered, they should be fed without a shell. Almonds in shells, walnuts, and hazelnuts are great types of nuts to offer. For macaws, Brazil nuts and macadamia nuts can also be offered. Nuts should be used as a reward and enrichment, not as part of the main diet.

Human foods:

Owners frequently offer processed human foods to pet birds. Even though certain food items may be considered healthy to humans (e.g., whole wheat bread or pasta, eggs, lean meats), these items usually have no nutritional benefit to birds. Instead, they can lead to a variety of problems. Offering carbohydrate-rich food items such as bread, cooked rice, pasta, etc., leads to dietary deficiencies since it reduces the number of pellets ingested and, consequently, essential nutrients contained in the pellets. Carbohydrate-rich human foods can also trigger female reproductive activity and territorial behavior in both sexes.

Animal products such as dairy, meats, and eggs all contain varying degrees of cholesterol. The natural diet of most psittacines is cholesterol free, and therefore, they have not developed mechanisms to deal with large amounts of dietary cholesterol. Consequently, it has been demonstrated in several studies that feeding cholesterol to psittacines leads to various health problems. Most importantly, it induces irreversible

atherosclerosis. Therefore, animal products should never be provided to pet birds, and they should receive a vegan diet.

Dietary supplements

Commercial dietary supplements, particularly vitamin supplements, are rarely indicated in pet birds. They should not be offered to birds eating a balanced pellet-based diet, as it can lead to over-supplementation with potentially toxic vitamins. Commercial bird seed mixes are also fortified and contain various vitamins, making additional supplementation, not a requirement. Bulk powder supplementation of vitamins rarely provides the correct amount needed. Adding vitamin supplements to drinking water may be a more accurate way to provide vitamin supplementation. Still, it is not recommended to supplement vitamins or other nutrients unless a specific dietary deficiency has been identified (e.g., vitamin A deficiency).

A mineral block or cuttlefish bones (cuttlebones) are excellent sources of dietary calcium and can be offered to all birds. Birds with dietary calcium deficiencies will usually readily ingest the calcium sources. Supplementation with bulk calcium powder is generally ineffective and, therefore, not recommended. Calcium supplementation is unnecessary (but does not harm birds) if birds are offered a pelleted diet. However, additional sources of calcium should be provided in egg-laying birds since the amount of calcium in regular pelleted diets does not account for the increased dietary calcium needed in egg-laying female birds.

AVIAN CLINICAL TECHNIQUES

SEDATION

Sedation of dogs and cats in veterinary practice is a daily routine for a variety of procedures, such as radiographs and ultrasonography, or other non-painful but potentially stressful procedures. However, historically for avian patients, either manual restraint of conscious birds or general anesthesia is typically performed to complete most clinical procedures. General anesthesia predisposes birds to cardiovascular and respiratory depression and may cause aspiration of gastric or crop contents and hypothermia. In contrast, manual restraint in conscious birds is simple to perform but can have negative consequences, including stress to the bird and/or handler, negative conditioning to the clinic environment (e.g., the person restraining or the towel used for restraint), hyperthermia, and the predisposition of trauma to the handler and/or bird. Several recent studies demonstrated that manual restraint of birds causes increased body temperature and respiratory rate.¹ In sick, old, or very stressed birds, acute collapse and death secondary to manual restraint have been reported. Therefore, sedation techniques provide a useful alternative for reducing physiologic stress in birds undergoing non-painful clinical procedures. Further sedation in birds provides easier restraint and increases the safety of many clinical procedures (e.g., blood collection, radiography, ultrasonography), and allows for a more complete examination, which would otherwise only be achieved under general anesthesia. Using safe and effective sedative protocols in pet birds

provides substantial benefits to the patients as well as the veterinarian and staff and should be considered for a variety of clinical procedures.

Midazolam is currently the most used drug for the sedation of pet birds and has a wide margin of safety. Midazolam has sedative, muscle-relaxing, anxiolytic, amnestic, and appetite-stimulating properties in birds. The injectable form of midazolam (midazolam hydrochloride (5 mg/ml); Hospira Inc, Lake Forest, IL). Dosages commonly used in pet birds range from 2 - 3 mg/kg. In smaller birds, such as finches or budgerigars, we routinely use 4-6 mg/kg of midazolam if administered alone (which is rarely indicated).

Butorphanol is currently the most used opioid analgesic in birds. Besides its analgesic effects, butorphanol has sedative effects, which are potentiated by benzodiazepines (i.e., midazolam, diazepam). The combined administration of midazolam and butorphanol is recommended in birds for which midazolam alone provides only an insufficient level of sedation or requires deeper sedation for certain clinical procedures such as radiographic positioning. Butorphanol can be given in combination with midazolam, drawn into a single syringe, and can be given parenterally as well as intranasally. No adverse effects of intranasal administration of butorphanol at a dose range of 1 - 3 mg/kg are seen in psittacine birds. At the University of Wisconsin, we routinely use butorphanol 2-3 mg/kg combined with 2-3 mg/kg of midazolam in pet birds administered intranasally or by intramuscular injection.

Dexmedetomidine: Historically alpha-2-agonist have been commonly used for sedation in birds. However, recently its safety and efficacy have been reported in budgerigars. If combined with midazolam (3 mg/kg), dexmedetomidine (10 or 40 ug/kg IM) provided dose-dependent moderate to deep sedation without obvious adverse effects. The reversal was quick following the administration of flumazenil and atipamezole.

Reversal of sedation in pet birds will depend on the patient and the purpose of sedation. Sedation performed to facilitate physical examination, and diagnostic sample collection should always be reversed to have the patient return to normal behavior and food intake as soon as possible. It is important not to discharge sedated patients, as owners do not tend to appreciate having a partially sedated bird, which might be imbalanced, sleepy and refuses to eat.

Birds that underwent sedation for e-collar or bandage placement or that were sedated for control of seizures should not be reversed. In these cases, birds should be carefully monitored, and reversal should be considered if the level of sedation is perceived as too deep or the duration of sedation is prolonged and might interfere with physiological behavior, particularly food intake.

Useful tips for sedation of birds

1. Each bird requires an individual assessment before choosing a suitable sedative drug protocol. Birds, that have no previous experience with manual restraint, may require less or no sedation compared to birds, that had previous negative experiences and become readily stressed or fearful in a veterinary clinic environment.

2. Macaws and African grey parrots usually require a combination of midazolam and butorphanol to achieve a sufficiently deep level of sedation suitable to perform a variety of clinical procedures.
3. Even though a bird might not appear sufficiently deeply sedated while under manual restraint for a clinical procedure, it might become more sedated once stimulation is discontinued, making it unsuitable to be discharged from the hospital. Therefore, every bird, that is intended to be discharged shortly after completion of the procedures performed under sedation, should receive flumazenil.
4. Cockatoos often do not recover completely after the initial dose of flumazenil. A second dose of flumazenil is often necessary.

ANALGESIA

Significant interspecies variations in the analgesic efficacy and safety of various analgesic drugs in birds exist. Butorphanol has been historically the most commonly used opioid analgesic used in birds. Butorphanol is short-acting (2-3 hours) and commonly used at 1-3 mg/kg IM. Amazon parrots should receive 3 mg/kg of butorphanol. In American kestrels, butorphanol does not seem to have analgesic effects at 1-6 mg/kg. Hydromorphone in American kestrels has been shown to provide analgesia for up to 6 hours at a dose of 0.1-0.6 mg/kg IM. At the high end of the dose range, sedation can occur. Tramadol is increasingly used in avian pain management. In Hispaniolan Amazon parrots, 30 mg/kg PO q6h is recommended, while in American kestrels, 5 mg/kg PO may be sufficient to provide analgesia. For psittacines, the author recommends starting at 15 mg/kg PO q8h and increasing to 30 mg/kg if no sedation or analgesic effects were noted. Raptors are more likely to become sedated if higher doses of tramadol are used and 5 mg/kg is the recommended starting dose.⁹

Nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly used in birds. Meloxicam is the most widely used NSAID, and recent research has shown that even at high doses, no clinically relevant adverse effects occur. In Hispaniolan Amazon parrots, administration of 1.6 mg/kg PO q12h for 15 days resulted in no significant side effects.¹¹ The author routinely uses 1-2 mg/kg q12-24h in pet birds. Ensure normal hydration before administration of any NSAID.

MANAGING AVIAN EMERGENCIES

Many avian patients present as emergencies to veterinarians and often require timely assessment and treatment to avoid further decline. Small pet birds, like budgerigars, have a high metabolic rate and limited energy stores, making any period of anorexia potentially life-threatening. Therefore, the veterinary team should ask pertinent questions during phone triage, and any bird which is anorexic, acutely regurgitating, bleeding, has acute cloacal tissue prolapse, is straining, has acute neurological signs, or is in acute respiratory distress, should be seen immediately. Delaying veterinary evaluation in these bird emergency presentations will likely lead to further decline or death of the patient. Since most pet birds are prey species, disease processes are often detected only at advanced

stages because birds hide signs of illness for as long as possible. In addition, the presence of the plumage makes it hard for bird owners to recognize a loss of muscle mass and body weight. An acute decompensation secondary to a chronic problem should be suspected when birds present with a reduced body condition or are emaciated. These cases are associated with a significantly worse prognosis for recovery. On the other hand, true acute emergencies (e.g., trauma) often carry a better prognosis. These birds usually present with a normal body condition, suggesting to the veterinarian that no underlying chronic disorder exists.

Stabilization and initial assessment

The additional stress of transportation to the hospital, handling, and restraint for exams, diagnostics, and treatments can lead to the deterioration or even sudden death in sick bird patients. Therefore, careful visual evaluation, prioritizing the parts of the physical exam which are most important in a particular case, and providing breaks for the bird is critical to avoid decline and death. The patient should initially be only visually evaluated for mentation, respiratory rate and effort, and other externally assessable parameters. Procedural sedation should be considered to attenuate the stress response in birds, in birds presenting with respiratory distress. In these cases, birds should also be placed in oxygen before and in between handling. Sedation protocols must be selected for each patient individually, considering the patient's condition and planned procedures. For example, if radiographs are to be obtained, deeper sedation will be required.

For the physical exam, all needed equipment pieces (e.g., stethoscope, light source, tape strips to open the beak and evaluate the oral cavity) should be readily available to avoid prolonging the manual restraint period. The patient should be carefully monitored during manual restraint for signs of stress or decompensation, such as panting, sudden lack of movement, excessive struggling, etc. If concerned, manual restraint should be aborted. A complete physical exam should be performed if the patient is relatively stable or sedated. However, if unstable, in particular in cases of respiratory distress, a prioritized staged physical exam should be performed instead. For example, auscultation of the heart, airsacs, and lungs, as well as palpation of the coelom for distension, should be the top priorities in respiratory distress cases to allow the formulation of a differential list and diagnostic and empiric treatment plan.

Hospitalization and supportive care

Most critically ill birds and all anorexic birds require hospitalization to prevent further decline and to provide supportive care. Critically ill and, in particular, small anorexic birds should be housed in a climate-controlled incubator with a high environmental temperature (80-85F) to avoid further caloric use for maintaining body temperature. A variety of temperature-controlled incubators are available, and it should be ensured that the devices are bird-proof, particularly if large psittacines like macaws are to be housed in them. It should also be ensured that the incubator is turned on and the air is circulating or the air vents are open any time a bird is placed in an incubator since asphyxiation may occur otherwise.

Fluid therapy

It should be assumed that most critically ill or anorexic birds are dehydrated; therefore, subcutaneous fluids are the most commonly administered initial treatment. Between 30-50 ml/kg (3-5 mg/100 grams) of any available balanced electrolyte solution (e.g., LRS) can quickly and safely be administered in most birds in the subcutaneous space in the knee folds. This can be repeated as needed once the administered fluids have been resorbed. The daily maintenance fluid requirements for birds are presumed to be like other species at around 60 ml/kg/day. The placement of intravenous catheters is challenging to impossible in small birds and bigger psittacines while able to be placed, they are often challenging to maintain. In pet poultry, intravenous catheters are relatively easy to place and maintain in the medial metatarsal vein. For psittacines, placement of intraosseous catheters is usually the most suitable method for intravascular fluid and drug administration. Placement of spinal needles (22 -25G) is recommended in the distal ulna or proximal tibiotarsus. Placement of IO catheters are painful, and local or systemic analgesia should be provided. Intraosseous catheters can be left in place for several days, and birds usually cannot remove them. Still, they may chew the fluid lines, which need to be protected in bigger birds using e-collars.

Nutritional support in the form of gavage feeding a critical care formula or psittacine hand-feeding formula is necessary for all anorexic or significantly hyporexic birds to reverse or at least attenuate the catabolic state the patient is in. Curved ball-tipped crop gavage needles are available in different sizes and should be used for administering food directly into the crop. In birds without a crop (e.g., ducks, geese, owls) or birds with a long neck, red rubber tubes should be used instead to administer food into the crop or directly into the proventriculus if a crop is not developed.

An amount of 30-50 ml/kg (3-5 mg/100 g) body weight can usually be safely administered by crop or gastric gavage. The initial feeding should be at the low end of the range, and the bird should be monitored for regurgitation to avoid aspiration of food material. Crop gavage should be done after all other exam steps, diagnostics, or treatments have been administered, and the bird should be returned to its cage immediately to reduce the risk of regurgitation and aspiration.

Diagnostic testing

The selection of diagnostic tests should be based on the presenting complaint, physical exam findings, and financial limitations. Prioritizing one diagnostic test over another one may often initially appear like a good idea, but often it delays obtaining baseline information usually needed for most critical birds. In most cases of non-specific presenting clinical signs (e.g., lethargy, anorexia, regurgitation), both blood tests (including a complete blood count and plasma biochemistry profile) and survey radiographs are indicated to obtain viable information and rule out common disease conditions that could be responsible for the clinical signs. In cases of obvious trauma (e.g., tibiotarsal fracture) in birds in otherwise good condition, blood work is usually not indicated. Cytology of various samples is a quick and straightforward way to obtain clinically relevant information instantly. Therefore, this should be performed whenever indicated (e.g., crop cytology in regurgitating birds). Other tests such as infectious disease testing, advanced imaging, or

biopsies should be considered when indicated but usually will not provide timely results to affect the initial treatment.

COMMON EMERGENCY PRESENTATIONS

Trauma

Dog and cat bites leading to soft tissue and skeletal trauma are common, and the patient should be carefully assessed for puncture wounds and fractures. If open wounds are present, they should be considered infected and treated with the appropriate antibiotics should be initiated. Frequently this involves parenteral drug administration in a hospital setting until the patient is stable and can receive oral medications in an outpatient setting. Fractures of the long bones of the wing and legs are common. Radiographs should be obtained to rule out underlying pathology (e.g., infection, neoplasia) and to characterize the fracture. In an emergency setting, any fracture should be stabilized either as a temporary measure until definitive treatment (external coaptation, surgical situation, amputation) has been determined and is being performed or desired treatment of choice (e.g., tibiotarsal fractures in smaller birds). Failure to immobilize fractures will lead to continued tissue trauma and potential necrosis, significantly reducing the chance for a positive outcome. In addition, fracture stabilization using splints and bandages will reduce the amount of pain experienced. Open fractures should be treated with a hydrophilic antimicrobial dressing. Any exposed bone should be replaced before applying the external coaptation. Treatment with systemic antibiotics is indicated for all open fractures.

Respiratory signs

A variety of respiratory disorders can cause respiratory distress and tachypnea. Voice changes and moderate-severe dyspnea is often associated with obstruction of the trachea, syrinx, or primary bronchi. Tachypnea can be caused by airsacculitis, pneumonia, or pulmonary edema due to congestive heart failure or inhalation of airborne toxins. It is important to remember that any coelomic distension due to enlargement of organs (e.g., liver, reproductive tract), coelomic neoplasms, or coelomic fluid accumulation will lead to compression of the airsacs and can lead to tachypnea. Therefore, evaluation of the entire coelom and palpation of the coelom to rule out coelomic distension is important in all birds presenting with respiratory signs.

Regurgitation and diarrhea

Acute regurgitation is always an emergency unless there is a clear behavioral component. It can lead to rapid decline due to dehydration and lack of caloric intake, particularly in small avian patients (e.g., budgerigars and cockatiels). Crop cytology, survey radiographs, and, if feasible, blood work are recommended diagnostics. In many cases, overgrowth of bacterial crop flora or yeast overgrowth is diagnosed cytologically, which may be primary or secondary to hypomotility. Overgrowth should be treated with antimicrobials (e.g., amoxicillin/clavulanic acid, nystatin) to correct the overgrowth. The patient should remain hospitalized while regurgitation is treated and receive

subcutaneous fluids and, eventually, nutritional support. Lead intoxication, GI obstruction, and other potential causes for regurgitation should be ruled out. Vomiting is uncommon in birds, but if present gastric outflow obstruction (foreign body, neoplasia) or gastritis (fungal in most cases) should be considered as differentials.

True diarrhea is uncommon in psittacines. In most cases, clients refer to an increased amount of urine in the droppings as diarrhea, but in fact, the fecal portion is normal and formed. If true diarrhea is confirmed, fecal cytology is indicated (wet-mount, diff quick, and potentially fecal flotation). Intestinal parasites are rare in pet psittacines but may be encountered if birds were housed in enclosures with soil or sand bottoms or were obtained from questionable sources. In backyard poultry, intestinal parasites are a common cause of diarrhea.

Cloacal prolapse and straining

Straining to defecate or persistent straining can be caused by various diseases, but pathological egg retention (i.e., dystocia) should always be ruled out radiographically as an initial step. Removal of retained egg(s) should be considered but will depend on the location of the cage and the patient's condition. Cloacal tissue prolapse may be associated with dystocia or be due to cloacal masses, cloacitis, or traumatized and potentially prolapsed cloacal tissue. Careful evaluation of the cloaca is necessary to determine the cause of straining, bleeding, and/or prolapse. If cloacal tissue is prolapsed, temporary single interrupted sutures should be placed to retain the cloacal tissue in the cloaca and avoid further trauma or discomfort. Cockatoos are frequently present with chronic or recurrent cloacal tissue prolapse. In many cases, no underlying cause can be identified, and it is believed to have a behavioral component.

Neurological abnormalities

Various neurological signs can be seen in birds, including seizures, vestibular signs, blindness, depression, leg weakness or lameness, etc. Cardiovascular disorders such as atherosclerosis and hypertension should be considered in older psittacine birds, particularly in African grey parrots or anytime the bird's diet consists of large amounts of animal products since they contain atherosclerosis-inducing cholesterol. Other differentials include intoxication (i.e., lead), viral infections (West Nile virus, Avian Borna virus), or parasitic infections (*Baylisascaris procyonis*). Trauma or metabolic disorders (e.g., hypocalcemia or hypoglycemia) should also be considered.

Lead Intoxication

Ingestion of lead-containing metal pieces is common in pet psittacines and backyard poultry, and these can be easily diagnosed using radiography. Still, it cannot be distinguished if an ingested metal foreign body contains lead or not. In addition, sources of ingested lead can also be lead paint or contaminated soil, which will not be visible radiographically. Therefore, measuring blood lead levels will be necessary to confirm the lead intoxication diagnosis. Point-of-care lead measurement devices are available and can be used in birds. Otherwise, blood lead tests need to be submitted to diagnostic

laboratories. Clinical signs can vary significantly depending on the species, the amount of circulating lead levels, and the chronicity of the disease. Acute neurological signs and GI signs (regurgitation, lack of GI motility) are most commonly seen in acute cases of intoxication. Treatment with intramuscular or subcutaneous Calcium EDTA is highly effective and safe in birds.

Reproductive Disorders

Disorders of the reproductive tract in captive birds are one of the most common reasons for being evaluated by veterinarians. While reproductive disorders such as chronic egg laying, oviductal disease, ovarian disease, and testicular tumors are relatively easy to diagnose in avian patients, the treatment of these disorders remains challenging. Environmental triggers are very important to initiate female reproductive activity in birds. In particular, in pet birds, overstimulation will lead to chronic and excessive egg laying and associated health problems. Exposure to long periods of daylight (> 12 hours) will trigger egg-laying in most bird species. The availability of excessive amounts of food, offering food high in carbohydrates (e.g., corn, bread), fat (nuts), or protein (e.g., beans), will trigger egg laying. In addition to the nutritional content of the food offered, food consistency is also a very important trigger. Warm and soft food simulate the feeding of crop content by a mate, which is commonly performed as part of courtship. Therefore, food should never be offered warm or cooked. The availability of a nesting site, either as a designated nest box or a dark hiding space (e.g., space under the furniture). Oviposition (expulsion of the egg) occurs approximately every 24 hours in chickens and can take up to 48 hours in clutch laying psittacines.