

Basic Avian Techniques

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Capture and restraint of small birds - Budgies, finches and canaries are usually captured bare-handed. If inexperienced, a paper towel can be used to restrain these birds until you are comfortable to restrain them bare-handed.

Basically reach into the cage and when you are easily able to, grab the bird behind the head and neck. Cup your hand around it while attempting to hold the head with your thumb and index finger on the temporomandibular joints. Remember not to close your fingers around the chest, but do provide enough firm restraint so that the wings are unable to flutter freely. If a towel is used you can drop it over the bird, locate the position of the head, grasp it firmly and gently enclose the body into the towel, encompassing the wings and feet, but no undue pressure on the chest. When removing the bird from the cage remove it head first through the door for if the wings did work free there would be less likelihood for injury moving the bird in this direction.

There are four basic means of holding a birds head. 1) Extend the head between the index and middle finger 2) Grasp the head with the thumb and index finger on either side of the head at the temporomandibular joint 3) Using three fingers place the thumb and middle finger just below the eyes and the index finger over the head 4) Crook your index finger behind the back of the head and gently place your thumb behind the lower mandible, with gentle pressure you can adequately restrain the head. Technique 4) is my preferred method as it is not very stressful for the bird and provides complete exposure of the head facilitating examination. Practice each technique and implement the one that is most effective for you. In each of these techniques remember that the body should be held loosely in the palm of your hand. If you are having difficulty with the restraint of the wings and feet do not hesitate to use a towel.

Capture and restraint of large birds - Lovebirds, cockatiels, conures and mynah birds may be restrained bare-handed but my personal preference is to handle them with a paper towel or a small washcloth due to the fact that they can impart a painful bite. These birds can still be examined by a single person. Birds larger than these, amazons, cockatoos, macaws, etc. require the help of an assistant, particularly when it is time to examine the wings and legs. It is possible to examine even large birds without assistance if restrained in a towel but the examination is not as effective. If you do not have a technician to help you then you could employ the aid of the bird owner to hold the feet while you complete the examination, however caution them.

The capture technique is fairly simple but of course requires practice. An appropriately sized towel for the variety of bird is essential. Tame birds can be easily caught, some will allow you to wrap the towel around them; others you may be able to drape the towel over them while they are standing on the exam table or on the arm of the owner. If you capture the bird off of the owner be careful as the bird may clamp down with the beak or nails if frightened. Once the towel has been draped over the bird locate the head and grasp it from behind through the towel. While holding the head with one hand use the other to lightly wrap the towel around the body, to restrain the wings and feet. Lift the body with both hands and rest the bird in the towel on the inside of your forearm or on the exam table, which will free your other hand for manipulation/palpation during the exam. Restraint of the head can be with one of the four techniques described earlier. With large birds I still prefer technique 4) especially since holding birds on the side of the face may cause bruising. You will require assistance as your exam moves down from the head as the towel will need to be unwrapped and the assistant can restrain the feet while you control the head.

Untamed birds are more difficult to capture. If you capture a bird from inside the cage be patient; do not create a rodeo atmosphere. What you must do is wait for the right opportunity, which is when the bird is facing away from you or climbing on the cage bars which will enable you to grab the head from behind. If you are able to accomplish that then you will be able to wrap the towel around the body. If the bird is difficult to capture then remove the

perches from the cage. A bird that will not stop facing you or rolls over on its back is a challenge and you will need to develop your own style. What I try to do is to distract the bird so that it will turn its head, but if all else fails then I will use two hands holding the towel and try to scoop the bird up quickly trying to gain control of the head. It is important to recognize that your technique will improve over time so do not give up. I suffered through my share of bites before I developed my expertise.

Physical Examination

Once the bird has been adequately restrained then the actual hands on physical examination can begin. There are many variations of performing the exam but I prefer to start with the head and work downward.

Head- I initially begin by evaluating the feathers on the head, looking for normal feather development and good quality feathers. If there are bare patches or poor feather development nutritional, metabolic or systemic disease may be responsible. Trauma could cause feather loss. If the feathers are being plucked on the head, you can determine this by the presence of black stumps where blood feathers were picked, which would indicate domination by another bird in the cage/household. Abnormal crest feathers on cockatoos may sometimes be the first indication of Psittacine Beak and Feather Disease. The skin is paper thin and will be slightly flaky. Excessive flakiness could indicate a nutritional condition such as a vitamin A deficiency.

Cere/Nares- The cere and nares are then evaluated. The cere is usually dry and may be slightly flaky. There should be no unusual swellings noted. The color of the cere is used to determine sex in budgies: blue in males, light blue or brown to dark brown in females. Unfortunately this is not always reliable especially with the color mutations and it also varies with age. A female in breeding condition may undergo brown hypertrophy of the cere and in severe cases may occlude the nares. It can also be seen in males with testicular tumors that secrete estrogen.

The nares should be symmetrically placed in the cere and similar in size and shape. The nostrils should be open with no discharge noted. As mentioned earlier sometimes discharge may be seen only as staining above the feathers indicating rhinitis. In some instances thick, flowing discharges may be noted. On occasion the nostrils are blocked and removal of the plug will free the discharge. Evaluate the discharge microscopically. Very enlarged nostrils may have been the result of chronic rhinitis or injury. Chronic nasal discharge may produce grooves in the beak.

Beak- The beak should be relatively smooth and clean. A small degree of flakiness is normal, if the bird is a poor chewer the beak may appear rough as the older beak does not wear away with beak usage. Excessive flakiness of the beak or dullness could indicate a nutritional problem.

For reasons not yet determined, in fatty liver disease the beak will grow abnormally rapidly and irregularly. Particularly in parakeets and some cockatiels with fatty liver disease there may be black/brown areas of hemorrhage on the beak and toenails coupled with some deterioration of the beak. These birds should be handled with extreme caution as their systems are extremely compromised.

Malocclusions are frequently noted, particularly twisting of the upper beak. The causes are uncertain but heredity, trauma, malnutrition or systemic disease have been implicated. The only means of treating the condition is frequent beak trimming so the beak can remain functional.

Mouth- Examination of the mouth is a very important part of the physical. The beak can be held open with a speculum, scissors, gauze strips, etc. and a direct light source should be used to illuminate the oral cavity. Care must be taken with birds that have thin margins of the beak, such as macaws and cockatoos for if they bite down aggressively cracking of the beak and hemorrhage may occur.

The epithelium of the oral cavity should be smooth. In bacterial infections it may appear to have a grayish cast, sometimes with a pungent odor. Off-white oral lesions may be seen, usually due to squamous metaplasia produced by a vitamin A deficiency (one of the most common nutritional deficiencies seen). Other causes of mouth lesions

include candidiasis, trichomoniasis, avian pox or bacterial infections. Candidiasis is especially common in young birds being hand raised. Occasionally abscesses may be seen, particularly on the sides of the tongue.

The margin of the choanal slit should be sharp, clean and bordered by numerous sharp papillae. Blunted, absent papillae, thickened edges to the choanae and white plaques indicate vitamin A deficiency. This can provide ample opportunity for secondary pathogen invasion. Choanal viral papillomas may also be noted in Amazons, macaws and particularly hawk headed conures. Occasionally these papillomas may be peppered throughout the oral cavity and have been noted in close proximity to the glottis interfering with respiration.

Eyes- The eyes of the bird should be examined as any other animal, however, an added feature is that birds have a functional third eyelid. Check for any abnormalities of the margins of the eyelids. Avian pox can cause deformation of the eyelids as well as corneal ulcerations, particularly in blue fronted Amazons. Discharges, conjunctivitis, matting of feathers around the eyes, and periophthalmic swellings are all indications on infections. Mycoplasma may cause these signs in cockatiels and budgies.

Ear- Ear infections are uncommon in birds but they do occur. In my experience I most often see otitis externa in lovebirds. Discharge may be noted and the ear canal swollen shut. On occasion pruritus in the region may lead to self-mutilation in the area.

Neck/Trachea- Leaving the head, the neck and trachea are palpated for any unusual swellings or abnormalities. In small birds such as canaries and finches the feathers in the neck can be wetted and the trachea transilluminated to detect air sac mites.

Crop- The crop should be palpated next. Palpate the crop contents is there fluid, food, masses, gas, foreign body? Care must be taken if there is fluid in the crop to prevent backflow into the mouth and aspiration. The crop wall should feel relatively thin, in some cases of candidiasis, particularly in young birds, a thickened crop can be palpated. In hand raised birds fed formulas that were too hot could suffer from burning of the crop with resultant fistulation. This can be detected when food runs through the fistula during feeding, visualizing the actual fistula, scabbing, or the presence of food on the lower aspect of the crop.

Chest- The pectoral muscles and keelbone should be palpated/evaluated. Over time you will develop a feel for the normal muscle mass of the chest. Birds that are ill can lose weight rapidly and this is manifest by the loss of musculature, in fact this may be one of the initial signs of a disease condition before serious clinical signs are noted. Sick birds will tend to ruffle their feathers which would mask the loss of musculature, hence the client or the veterinarian would not be aware of the loss unless the bird was actually handled/palpated.

Obesity in birds could also be detected in this manner as fat deposits/lipogranulomas may develop on the chest/abdomen. Palpation of the pectoral muscles should not serve as the only means of evaluating a bird's weight/condition. An important part of every physical examination is to obtain the weight of every bird and record it so comparisons can be made.

Dehydration can be detected with skin fold elasticity as in other animals. I have noted that in dehydrated birds their skin appears dark with little elasticity; almost tight on their face/trunk.

Abdomen- The abdomen of the bird is quite small, the cranial border at the base of the sternum running caudally to the pelvis. It is normally palpable as a slight indentation and in the normal bird very little is discernable on palpation. On occasion the gizzard can be detected as a firm mass on the left side of the abdomen and could be mistaken as a growth. Liver enlargements can be determined through the palpation of the right lobe of the liver, protruding beyond the margin of the sternum; normally it is not palpable. Neoplasms and eggs may be detected through abdominal palpation. In a bird that is undergoing reproductive activity, the abdomen may enlarge due to the enlargement of the uterus.

A grossly enlarged abdomen could indicate a reproductive tract disorder (egg-binding, cystic ovaries, etc.), neoplasms, obesity, and ascites (secondary to heart disease, neoplasms, and reproductive tract disorders). Care must be taken in handling these birds as their respirations are compromised due to abdominal enlargement. Rough palpation could rupture the abdominal air sacs and cause death.

Vent- The vent should appear clean and unsoiled. Staining of the vent with droppings indicate a gastrointestinal disturbance such as diarrhea or the presence of an abdominal mass irritating the gut, interfering with normal passage of droppings. Cloacal prolapse, egg binding or cloacal papillomas can also produce staining. An enlarged, dilated vent may indicate hormonal stimulation in the female bird and reproductive readiness.

Feet/Legs- The feet/legs have scales similar to reptilian skin and it appears smooth/shining. Check the bottom of the feet for pressure sores/ ulcerations commonly caused by improper perches or malnutrition. Hyperkeratosis of the feet may occur due to hypovitaminosis A. Crustiness of the feet/legs, particularly in small birds (budgies/ canaries) may serve to indicate cnemidocoptic mange (scaly leg/ face). Check the leg/joints for any structural abnormalities.

Wings- Examine the wing/joints very carefully. Check range of movement and for evidence of old injuries/fractures. Evaluate the web of the wing for presence of an india ink tattoo, especially in the larger birds. In birds that are surgically sexed the males are marked in the right web, females on the left. Scrutinize the feather quality on the wing (and the entire body as you go along); checking for the presence of abnormal feathers, discolorations, stress lines and, in wild caught birds, parasites (mites/lice). Check the feather shafts on new imports as occasionally feather follicle mites may be seen. The feather shaft should normally be clear, if feather follicle mites are present the feather would be filled with brownish debris. Confirm the diagnosis by opening the shaft and examine the contents microscopically, when you would see exoskeletons of the mites.

Auscultation- Auscultations can be beneficial. For best results use a pediatric stethoscope. The heart is difficult to evaluate due to its rapid rate. Respiratory abnormalities can be detected readily, with practice.

The Avian CBC

A complete avian physical examination should include a CBC, mouth smear, and fecal examination. Some practitioners include cloacal and choanal cultures, blood chemistries and radiographs in the physical examination.

Blood Collection

Multiple sites can be used for blood collection in birds, site selection depends upon the size of the bird, state of health, volume of sample and the experience of the person drawing the sample. Seriously ill birds may be unable to undergo the stresses of handling and blood collection so exercise good judgement.

The blood volume of a bird has been calculated to be 6-13% of total body weight. Sample volumes of 0.5-1% of a bird's body weight can be safely removed (10% of total blood volume) which is more than adequate for diagnostic testing. The volume actually drawn should depend upon the amount needed for the tests and the condition of the bird.

Samples can be collected in standard microhematocrit tubes, we prefer the heparinized variety. For larger samples microtainer serum separators (Becton/Dickinson) are excellent. A collection tip is provided so blood can be directly collected into the tube from a clipped toenail or transferred into the tube with a syringe.

Toenail Clip- It is a fast and easy method, readily accessible, minimal restraint is needed and most birds can be sampled by one person. Clean the toe and nail before clipping to prevent sample contamination, particularly with uric acid from the droppings. Human nail clippers, small suture scissors or small wire clippers can be used to clip the toenail of a small bird. Larger birds require a good quality sharp dog nail clipper for a clean cut.

When clipping the nail begin conservatively and clip only enough to obtain adequate flow. An extreme clip may be difficult to clot. Squeezing blood from the toe will cause cell lysis and alter hematologic and chemistry values

obtained. Ferric subsulfate (Monsel's powder) is our preferred means of hemostasis, however, silver nitrate sticks, styptic powder, and tissue cement may be used. Flour, corn starch and baking soda may be employed if other means are unavailable.

Ulnar Vein - Used extensively in poultry. It is on the ventral aspect of the wing and easily located passing over the elbow. The lack of subcutaneous tissue in this area predisposes to hematoma development. The vein can be easily sampled but is preferred as a site for the injection of IV antibiotics or fluids in critically ill birds.

Assistance is required as the wing needs to be extended. Wetting of the feathers with alcohol or water to visualize the vein is preferred to plucking. The vein may or may not need to be held off. For venipuncture we use insulin syringes U-50 (1/2cc) or U-100 (1cc) with a 28 gauge needle. If the sample is drawn quickly anticoagulant does not need to be added (it will lead to dilution), however, an appropriate anticoagulant should be available if needed. The vein is entered proximal to the elbow, the needle passing proximal to distal. Due to the ease of hematoma formation pressure may need to be applied for several minutes following sampling.

Medial Metatarsal Vein - Superficial along the metatarsus and appears to fit in a "groove" in the bone. It can be easily used on large birds where it can be readily visualized. Some birds have thickened, scaly skin so visualization may be difficult and the needle is passed in the supposed area of the vein. The scaliness and thickness of the skin is helpful in preventing hematoma formation. The bird is restrained in dorsal recumbency with the leg extended; the vein may or may not need to be held off. Enter the vein below the hock, care taken not to penetrate the joint. Pass the needle distal to proximal. Apply pressure for a few minutes following sampling.

Jugular Vein - The jugular veins vary in size and location. In birds the right jugular is usually larger than the left. The vein is visualized in the featherless area alongside the cervical vertebrae. Large samples and multiple samples can be taken from this site, however it can be stressful to the bird if not done properly.

Skin Prick - Some practitioners prefer this technique in small birds. The skin over the medial metatarsal vein is punctured with a 25 gauge needle. Blood is collected directly from the skin. Apply adequate pressure for hemostasis.

Heart Puncture - You will come across this in the literature as a means to obtain a large volume of blood rapidly. I never performed it on a pet bird and I doubt I ever will, there are other safer sites.

The Avian CBC

You should be able to perform your own screening CBCs in house to enable rapid diagnostics and effective treatment. The method of evaluation described below is simple and once you overcome your initial apprehension with practice you will add a facet to your practice that will benefit you diagnostically and financially.

Hematocrit/Plasma protein

Blood is drawn in two small diameter tubes, Pre-Cal Microhematocrit Capillary Tubes, heparinized (Clay Adams). Using non-heparinized tubes leads to clumping and poor separation during centrifugation. The volume of blood needed to fill these tubes can be safely drawn from birds as small as finches and larger. Although larger volume tubes can be used in large parrots, the volume provided by the smaller tubes is adequate.

The normal avian hematocrit/PCV ranges from 40-55%. We have found the range in cockatiels to be 50-60% The plasma should be clear, however in cockatiels a faint yellow tint is seen normally. Our normal plasma protein range is 3.5-5.5mg%. Smaller birds tend to have values on the lower end of the range. You will find as you begin to perform your own hematology that many birds are hypoproteinemic so these evaluations are essential in determining the level of health. Dr. T.J. Lafeber had performed studies years ago and found that in birds with plasma proteins below 2.5mg%, unless they were put on supplemental gavage feedings they did not survive.

Blood Smear

The blood is collected in the larger variety microhematocrit tube. (Microhematocrit Capillary Tubes, heparinized-Scientific Products). Only a small volume is required, initially a 20% volume is fine but as your skill in preparing blood smears improves, smaller amounts will suffice. After the blood is collected, invert the tube to enable the anticoagulant to mix with the blood, otherwise the blood will clot in the tube. We have found that using two microscope slides in preparing the blood smear leads to poor WBC distribution as well as causing cell damage/distortion. The coverslip method is preferred as it provides a more uniform distribution of the blood cells.

The technique is as follows:

- 1) Hold the coverslip by two corners with your index finger and thumb.
- 2) Place a drop of blood on the coverslip. The volume we find adequate is a drop approximately 3-5mm in diameter. The amount used is important as too thick of a smear will be difficult to read. If the blood does not easily pass out of the hematocrit tube you may need to carefully blow the blood out of the tube onto the coverslip.
- 3) Quickly drop another coverslip on top of the first, rotated 90 degrees so that the coverslips do not directly oppose each other. The blood will begin to spread rapidly initially and then begin to slow.
- 4) As spreading slows and before it has completed, hold each coverslip between the thumb and index finger of each hand and separate them by sliding them quickly apart. Do not lift the coverslips apart as it will damage the smear. If too small a volume of blood was used the cells could be damaged even with the proper technique.
- 5) Allow the coverslip to air dry completely before staining.

It may take several attempts before you have an ideal smear, but with practice this technique provides an even smear with little cell damage. For staining you can either add a drop to the micro-scope slide and directly place the coverslip on the stain or dip the coverslip into the stain. We routinely use new methylene blue stain, but the choice of stain is personal preference.

Evaluation of the Blood Smear

The slide can be viewed under high dry power (450X). The cells should be in a monolayer where there is no overlapping but the RBCs are just about in contact with each other. The number of RBCs in such a smear will be approximately 800 per field.

A detailed description of avian hematology is beyond the scope of our introductory discussion but I will give a quick overview of the avian blood cell types as well as a method for evaluating the blood smear qualitatively and quickly. Two excellent sources for avian hematology are Laboratory Manual of Avian Hematology F.J. Dein (1984) and Avian Hematology and Cytology T.W. Campbell (1988).

Identification of Avian Peripheral Blood Cells

Erythrocytes - The most striking feature is that the avian erythrocyte is nucleated. It is an oval cell with an oval nucleus which stains darkly with chromatin clumping. The cytoplasm stains orange-pink with Wright's stain.

Reticulocytes - Immature RBCs are common in avian blood, up to 1-5% in normal birds. These cells are larger than mature RBCs, nuclear chromatin is less condensed causing the nucleus to appear larger and almost "airy". The cytoplasm stains basophilic with Wright's stain. New methylene blue will reveal the reticulum in the cytoplasm.

Thrombocytes - Thrombocytes are nucleated and function as do mammalian platelets. Mature thrombocytes are smaller than erythrocytes, are oval with rounded ends, but have an irregular contour. The nucleus is dark; dense. The most helpful feature is their tendency to clump in close proximity on peripheral blood smears.

Heterophils - The most common leukocyte in the peripheral blood of most birds is the analogue to the mammalian neutrophil. The cells are round with a multi-lobed nucleus, the cytoplasm is colorless and contains distinguishing cytoplasmic granules which are elongated or rod-shaped. In some birds the granules may be spherical which leads to confusion with eosinophils.

Eosinophils - Are difficult to distinguish from heterophils. Generally the eosinophilic cytoplasmic granules are round rather than rod-shaped. The cytoplasm stains pale blue compared to the lack of color in heterophils. The nucleus also seems to stain darker than the heterophil nucleus.

Basophils - Much more common in avian than mammalian blood and their appearance is similar.

Lymphocytes - May be the most common leukocyte in the peripheral blood of some species of birds. In the majority of differentials we perform the percentage of heterophils and lymphocytes are roughly 50:50. Lymphocytes can be separated into the large and small varieties, the small predominating on most normal peripheral smears. The small lymphocytes are similar to the mammalian cells; round cells, very little cytoplasm in relation to the nucleus which is round. Large lymphocytes have more cytoplasm which may stain pale blue. The nucleus is generally round and centrally placed but may be eccentric causing confusion with monocytes.

Monocytes - Easily confused with large lymphocytes and some people group them together. Monocytes are generally larger than lymphocytes with an eccentric nucleus which varies from round to generally bi-lobed. The nucleus contains small chromatin clumps so it appears less dense. The cytoplasm takes a pale blue stain and contains alveolar spaces.

Rapid Screening WBC Evaluation

In performing our white blood cell counts we check ten fields under high dry power. The range of WBCs is 0-3 WBC/HDF in smaller birds and 0-5 WBC/HDF in larger birds. It is only an estimate but with experience it becomes a valuable tool. The normal distribution of leukocytes is approximately 50% heterophils and 50% lymphocytes. Different factors will change their distribution. A bird under stress may have a WBC count that is doubled but elevations beyond that are a definite indication of disease.

Fecal Examination

Another component of the avian physical examination is the microscopic examination of the droppings. In our lab we perform both wet mounts and gram stains as needed.

Wet Mounts - A small amount of fresh dropping placed on a slide and is mixed with one or two drops of saline. A coverslip is added and the slide is initially examined under low and then high power. Over time you will develop expertise evaluating avian droppings and recognize normal background bacteria, undigested food material and other elements which are normal.

The bacterial population can be evaluated. Normal avian droppings should not contain an abundance of bacteria and the normal population is generally cocci. If there is a predominance of bacilli, gram staining may indicate if these are gram negative and potentially pathogenic. Motile bacteria almost always are pathogenic.

Candida may be normal if there is an occasional non-budding form. However, budding yeast and mycelia are indicative of invasive, infective forms.

Parasitic infections can be determined using wet mounts. Protozoan infections require fresh samples. Giardia, hexamita and trichomonas can all be seen on wet mounts. Occasionally helminth eggs may be detected.

Gram Staining - The normal gut flora of birds is gram positive bacteria. The most commonly isolated pathogens from birds are gram negative bacteria, most often E. coli. Therefore gram staining is an important part of your diagnostics in the determination of the character of the bacterial population, however it is a screening tool. The presence of a few gram negative organisms alone does not constitute disease because in the normal psittacine dropping a few are normal. You must evaluate the bird, clinical signs, and for final confirmation do a culture/sensitivity.

Choanal/mouth smears

The same principles described for the fecal examination apply. Bacterial populations, candida and trichomonas can be screened with a wet mount, the fine tuning with the gram stain. Trichomonas is best seen on a fresh wet mount. Too often the mouth smear is overlooked and it is a valuable diagnostic tool. Due to the prevalence of vitamin A deficiencies, pharyngitis is extremely common in pet birds which may present as excessive mucous in the mouth, abscessation, congested sounding breathing and poor eating.

Fluid Therapy

Advances in the use of fluid therapy have led to great improvement in survival rate of sick birds. The most rapid means of fluid administration is intravenous fluids. Birds will not tolerate standard IV catheterization so IV boluses of fluids are administered. Because of the safety of isoflurane anesthesia some practitioners will anesthetize the bird during fluid administration, however, remember these birds are already debilitated so use discretion. The majority of the time we do not use anesthesia for the procedure as IV fluid therapy is reserved for critically ill birds.

The veins that can be used for IV fluids include the ulnar (preferred in large birds), medial metatarsal and jugular (used in very small birds). Fluids used include normal saline, 5% dextrose solution or lactated Ringer's (preferred in most clinical conditions). Approximate maximum doses of bolus fluids (McCluggage) are: finch 0.5ml, budgie 1.0ml, cockatiel 2.0ml, conure 4.0ml, Amazon 7.0ml, cockatoo 10ml and macaw 12ml. Through rotation of sites fluids can be given TID. Administer fluids through a small gauge needle 25-28 gauge and of course fluids should be warmed. Another excellent means of fluid administration is through an intraosseus catheter.

In the majority of cases rapid administration of fluids is not critical so subcutaneous fluids can be given. Multiple sites are available including the webs of the wings, intrascapular region, breast and inguinal region (our preferred site). A 22 gauge needle can be used to deliver the fluids which are administered until the skin is taut. Using multiple sites 5ml or more can be given to a budgie and up to 40ml to a macaw. Roskopf recommends 0.05ml of fluid/g of body weight daily (50ml/kg/24hours) in divided doses in multiple sites. Fluid replacement will also be assisted through gavage feeding, however in seriously ill birds either subcutaneous or IV fluids should be implemented to hasten stabilization.

Drug Therapy

The various medications used in avian medicine can be found in many exotic formularies or avian medicine textbooks. Frequently with critically ill birds we are forced to implement a "best guess" therapy until diagnostics and cultures are completed. Vomiting birds should never be given oral antibiotics rather injectables for rapid, effective absorption. To get the best overall coverage before results are known the use of amikacin with a cephalosporin or penicillin derivative will have great efficacy due to potentiation. If you have reason to suspect kidney dysfunction utilize the aminoglycosides with caution. Dexamethasone can be given to "shocky" birds. We also routinely administer vitamin B complex and calcium gluconate by injection to boost debilitated birds. As before if renal disease is suspected calcium supplementation is used with caution to prevent mineralization. Once the bird is stabilized and vomiting ceases (if it had occurred), the bird is placed on oral antibiotics. If the bird tolerates treatment and is eating well it is sent home with the owner to complete treatment.

Force Feeding/Gavage Feeding

Most sick birds have either stopped eating or are not eating enough to maintain themselves so supplemental feeding is essential. A variety of feeding solutions can be used, we prefer Emerald I and Emerald II (Lafeber Co.). Other practitioners utilize Nutrical and water or Nutrical, baby cereal and water. In a bird that is vomiting, we will give very dilute Emerald I (high glucose soln.) in small amounts until the passage of food begins and then will gradually increase the thickness until we can convert over to Emerald II which is more of a maintenance solution. If the hospitalized bird is in reasonably good condition Emerald II can be utilized immediately.

We administer the gavage feedings with Sovereign urethral catheters. They are easily introduced into the crop and non-traumatic if used properly. Many practitioners are using the metal feeding tube with the ball attachment on the

end. It is all a matter of personal preference. For your information a listing is provided describing the variety of bird, catheter size used and amount that can be safely fed (from Lafeber). These are only guidelines so in each individual case there will be variation.

<u>Type of Bird</u>	<u>Catheter Size (French)</u>	<u>Amount Tube Fed(ml)</u>
Finch	5	1/4-1/2
Canary	5-8	1/4-1/2
Parakeet	8-10	1-2
Lovebird	10	3-4
Cockatiel	10	3-4
Conure	10-14	6-8
Amazon parrot	10-18	30-35
Cockatoo	18	40-45
Macaw	18	30-60

Before tube feeding a bird evaluate the fullness of the crop. Feeding a bird with a partially full crop is risky as it could back up into the esophagus leading to aspiration. If the crop is not emptying removal of the crop contents through aspiration should be performed and then small amounts of dilute feeding solution added.

Estimate the length of feeding tube to be passed by measuring the distance into the crop from the mouth. You can mark the tube with tape if preferred. Canaries do not possess a well-developed crop so the estimate should be in the "region of the crop".

I prefer to extend the neck slightly with the head upright so that when the feeding tube is introduced it is in more of a direct, straight passage. Introduce the tube on the left side of the mouth, pass it gently but firmly over the tongue and it will pass into the esophagus which runs on the right side of the neck. It can usually be felt passing into the esophagus. In small birds a speculum is not required but in larger birds it is a necessity. Sometimes merely displacing the upper beak laterally a centimeter or so will allow the passage of the tube in large birds without the speculum. There is no danger of the bird severing the metal feeding tube as there would be with the rubber tube, however, overzealous passage of the metal tube could injure the esophagus.

The tube should be passed slowly and carefully. Never force the feeding tube, if so it could puncture the esophagus or crop. It is extremely important to determine that the tube is properly positioned in the crop. Palpate the crop to be sure that the tube is in position before administering the feeding.

With the tube in position slowly deliver the feeding solution. You will see/feel the crop begin to fill. Keep a close watch on the mouth for evidence of any solution welling up in the pharynx which indicates an overfilled crop or poorly positioned tube. If this occurs remove the tube and turn the bird over with the head directed downward so the solution can pass out the mouth and not risk aspiration. A bird may retch or vomit occasionally after tube feeding. Evaluate your technique and the bird's condition if this occurs frequently to determine the cause.

The gavage feeding can be performed several times daily depending upon the emptying time of the crop. Thinner solutions will pass through much more rapidly. Generally we gavage feed the hospitalized birds two to three times daily.

Conclusion

Hopefully the preceding discussion will provide you with adequate information to have a starting point in avian medicine. You must overcome your initial apprehensions and undertake the challenge. It is a fascinating field, everchanging and developing, a source of mental stimulation.

Adapted from *Avian Medicine: A Practitioner's Guide 2nd Edition*. Peter S. Sakas DVM. AAHA Press 2002.