WHAT'S YOUR DIAGNOSIS? AVIAN CASES

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Veterinarians working with avian patients are routinely presented with challenging cases. The purpose of this presentation is to provide attendees with a series of avian cases in an interactive forum and discuss the different diagnostic and treatment approaches.

Anamnesis

A detailed anamnesis can make the difference between success and failure with a avian case. Shortchanging the time it takes to collect a detailed history can lead to the clinician down a path of mis-diagnosis. The detailed history should be focused and consistent. Establishing an algorithm that ensures the clinician follows a set of direct questions will minimize the likelihood of missing important historical information. For the author, the history begins with the signalment. However, with birds collecting this information can be easier said than done as many animals are not sexually dimorphic and age can often only be established using categorical variables (adult vs. juvenile). In cases where it is important to determine sex, it is possible to do so using different diagnostic methods, including both invasive and non-invasive methods (e.g., blood testing and endoscopy). While establishing actual age can be helpful, especially with geriatric cases, many diseases in birds follow a pattern of being associated with juveniles or adults because of the role of husbandry. The next step in the author's history algorithm focuses on the husbandry. Questions commonly asked include cage size and type, perch number and type, substrate, and type of enrichment. Next, diet should be evaluated: types of food offered, nutritional ingredients and quality, frequency offered, moisture content of diet, and other methods moisture is offered. Finally, the reason the bird is being presented should be evaluated. It is important to take an epidemiologic approach to pursuing the "problem" to help characterize how the disease not only may affect the individual patient being presented but other animals in the collection. Questions pertaining to the size of the captive population, species involved, quarantine system, and acquisition time of subjects are all relevant questions. Follow up questions specific to the individual(s) being presented should then be pursued, including clinical signs, duration of clinical signs, number of animals involved, and any treatments attempted. Talking time to ask all of these vital questions can make the job of the diagnostician easier because it allows them to move forward using a solid foundation of knowledge regarding the case.

Physical examination

A thorough physical examination should be performed on every avian patient. As simple as this may appear, this is often a point of failure for clinicians. More junior clinicians are more likely to perform a complete physical examination, but not understand the meaning of all the biological information they collect. Likewise, more senior clinicians may rely more on experience and shortchange the exam (e.g., focusing only on the components relevant to the signs identified in the history). To minimize the likelihood of introducing bias, it is important that a thorough exam be performed that follows a distinct pattern; this will minimize the likelihood that the clinician will skip/miss vital information that may help guide them through the diagnostic and treatment needs of the patient. If the animal presents in respiratory distress, the physical examination should be postponed until the

animal is stabilized. Placing the animal into an oxygen chamber or delivering oxygen via a facemask or endotracheal tube should be done to reduce the likelihood of hypoxia in the animal. The physical examination can be used to develop an initial prognosis regarding the case and guide the client regarding the level of investment they can make in the case. Veterinarians must be realistic when considering the potential outcome for a case.

Diagnostic Testing

Diagnostic testing is essential to developing a sound (testable) reasoning for coming to a conclusion with a case. Unfortunately, this is often a point where veterinarians may not fully pursue the case, leading to cases with no confirmed diagnosis. Historically, our diagnostic options were limited and included haematology and biochemistries, radiographs, microbiologic culture, histopathology, and necropsy. Many times, these tests are good screening tests for ruling out disease (e.g., good specificity, low false positives), but are limited (non-specific) for confirming disease. The author finds that every diagnostic test has value, as long as you can appreciate its limitations.

Haematology

The complete blood count (CBC) can provide important information regarding the immunologic status of a patient. There are two common (generic) reasons a bird can present with an elevated white blood cell count: inflammation or stress. Many clinicians often mistakenly consider infectious causes as a generic reason, which leads them to not necessarily consider other options such as neoplasia, trauma, foreign bodies, and toxins. A differential count is essential to determining the most likely cause of the leukocytosis. With stress, heterophilia, monocytosis, lymphopenia, and eosinopenia are common, while with inflammatory leukograms a heterophilia, monocytosis, and a lymphocytosis are common. The CBC also provides information regarding the erythron. In general, birds should have a packed cell volume >40%. If anaemia is confirmed, then attempts to classify the anaemia (regenerative, non-regenerative) should be made.

Avian patients are stoic animals that can mask their illness. Serum/plasma biochemistry analysis can be used to evaluate physiologic disturbances in these animals. Veterinarians may find it difficult to find reference data for many of the species being presented to their facilities; however, the values for many of the biochemistries are similar across vertebrates. Much like the leukograms, it is important for veterinarians to interpret biochemistries thinking of them in relative versus absolute terms. In cases where there are physiologic differences compared with other vertebrates (e.g., urea nitrogen is the primary end product of protein catabolism in mammals and uric acid is the primary end product in birds), it is important for veterinarians to become familiar with these differences.

Diagnostic imaging

Survey radiographs, ultrasound, and advanced imaging (e.g., computed tomography and magnetic resonance imaging) can be used to evaluate many different systems simultaneously, and provide insight into possible problems in a case. To be successful with diagnostic imaging, veterinarians need to acquire a basic knowledge of anatomy regarding the species of interest, methods used to restrain birds to collect the images, and the most appropriate techniques used to collect and interpret the results.

When taking radiographs it is important to always collect at least two images. The most common images are a lateral and dorsoventral or ventrodorsal image. These two, two-dimensional images will provide the most insight into interpreting the anatomy of a three-dimensional bird. Care should be taken when positioning an

animal to ensure that the area of interest can be evaluated.

The author finds interpreting bird radiographs the easiest of the three major groups of exotic species (including reptiles and mammals). The elaborate air sac system provides an excellent air/soft-tissue interface that provides an excellent level of detail. The best way to become comfortable with interpreting radiographs is to practice, practice, and practice.

As veterinarians have become more familiar with ultrasonography, its application in avian medicine has greatly expanded. When considering an ultrasound machine for a veterinary hospital, it is important to consider the range of patients the machine will be used on. The author has found that 10.0 and 14.0 mHz transducers are generally best for evaluating birds. Because of the relative small size of many of our avian patients, the author also prefers the transducer to have a small footprint. The author finds ultrasound to be most useful for assessing the heart and organs in the caudal coelomic cavity. The author generally uses ultrasound to assist with the collection of fine-needle aspirates or biopsies of different coelomic organs, such as the liver and kidneys; however, the airsacs can limit access in some cases and may require another method for sample collection (e.g., endoscopy).

Advanced imaging is now becoming more available to clinicians. Computed tomography enables multiple systems to be evaluated simultaneously and, in many cases, allows for 3-D rendering of the system of interest. In addition, soft tissue contrast enhancement is possible with this modality that allows for better tissue definition. The author has found computed tomography to be invaluable in birds, and will use it over radiography as a first level diagnostic when possible. Magnetic resonance imaging is also used by the author, albeit less frequently. The author primarily uses this imaging method for evaluating the brain.

Infectious disease testing

Microbiological culture is an important diagnostic tool for veterinarians; however, it is often interpreted incorrectly. Historically, veterinarians managed most infectious diseases as a primary bacterial disease; this was in response to the fact that it was one of the few “infectious disease” tests we had. However, it is now being recognized that many of the signs associated with “bacterial infections” in the past were actually fungal or viral infections. While bacteria can certainly serve as primary pathogens, there are also many cases in which they are secondary invaders to viral or fungal pathogens. In these cases, if a bacterial culture is the only diagnostic test done to screen for pathogens, then the veterinarian may pursue an incorrect diagnosis. Cytology and histopathology can be invaluable tools for guiding clinicians when submitting diagnostic tests for infectious diseases.

The advancement of serologic and molecular diagnostic assays has greatly improved the veterinarian’s chances of making an ante-mortem diagnosis for an infectious disease. Currently, haemagglutination inhibition assays are available to characterize exposure to alphaviruses, flaviviruses, and paramyxoviruses. Because these assays are subject to misclassification, other more specific assays should be pursued to characterize specific viruses. Enzyme-linked immunosorbent assays and serum neutralization assays are considered more sensitive and specific then HI assays. When using serological assays, serial tests are necessary to characterize active infections. Polymerase chain reaction-based assays enable veterinarians to characterize active infections in avian patients; however, it is always important to use these results in combination with other diagnostics (e.g., histopathology) to confirm that the organism is indeed a pathogen.

Histopathology

Biopsy on ante-mortem cases and necropsy on post-mortem cases, and subsequent histopathology, are often necessary to confirm a diagnosis in a case. This is especially important in the face of an epizootic. Veterinarians should take appropriate precautions when performing a necropsy on a bird patient. Because many infectious diseases can be transmitted via aerosolization, necropsy should be performed under a negative pressure hood. Veterinarians should submit samples to a pathologist that is familiar with avian pathology.

Conclusions

Success with avian cases requires a thorough and well thought out diagnostic plan. Historically, avian cases were approached by performing few diagnostics and administering empirical therapeutics. By practicing the same good standard-of- care expected for domestic pets, veterinarians will find improved success with their bird cases.