

Avian Necropsy Procedures and Common Findings

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Abstract: In avian medicine, the postmortem examination is a valuable part of the diagnostic work-up. Important contributions to various avian disease conditions have come from the diagnostic evaluations at necropsy. The known disease conditions are not as well described as those of our domestic animals and antemortem tests may only hint at the true disease condition. In some situations, the findings in one animal will help others in a collection. The purpose of this overview is to describe a few of the more common disease presentations found on gross pathologic examination and to briefly review some highlights of the postmortem examination. The information presented here is by no means a complete description of all possible findings.

Before you agree to perform a postmortem examination, ask yourself if the owners have expressed any dissatisfaction with your treatment of this animal. If so, STOP! For your peace of mind and legal protection, you should consider sending the body to a pathologist for the examination. If the animal's owner has lost confidence in your veterinary abilities, it is unlikely they will accept your postmortem findings without question. In these cases, utilize a pathologist who has training, experience, or an interest in exotic species. In cases where you suspect a zoonotic disease (chlamydia, mycobacteria) and you do not have the facilities to adequately contain the organisms, submit the body to the appropriate laboratory service. Before submission, the carcass should be cooled by thoroughly soaking the plumage in a mixture of cold water and a small amount of detergent. Dry feathers will insulate the body, preventing adequate cooling and promoting autolysis. Embryos, nestlings, and small adult birds are subject to rapid autolysis. For best results, the entire bird should be submitted in formalin. Open the body cavity and the skull to ensure adequate fixation of the tissues.

If you decide to perform the postmortem examination yourself, a review of the basic anatomy of the avian species you are about to examine is useful. It is also helpful to develop a routine and use a check list to ensure you

examine everything. Regardless of the system you utilize, it is important to describe all of your findings in the medical record. Photographs of the lesions can be a valuable addition to the postmortem examination. Don't be afraid to describe what you are seeing, even if it turns out to be normal. In avian species, wetting the carcass with a disinfectant before you start may reduce the risk of an airborne infection and will help keep the feathers from adhering to you, your instruments, and the tissues you are trying to collect. A helpful tip is to collect samples of EVERYTHING. For those tissues you may submit for histopathologic examination, cut two sections; one to retain and one to send in. Remember, the quality of the information from your pathologist depends on your choice of samples and their condition (autolyzed, fragmented, frozen and thawed). If you collect a small or friable piece, place it in a container separate from the larger sections or wrap it in gauze for protection and ease of later recovery. This will help prevent these pieces from being overlooked in the submitted samples and protects the friable pieces from becoming the unexamined amorphous debris at the bottom of the container. If the carcass was frozen before the post mortem examination, do not thaw the tissues. Collect the appropriate samples and place them in formalin without thawing. This will reduce freeze artifacts.

A cytologic study is an excellent way to augment your postmortem examinations. Make impression smears of any lesions and of all major organs. For example, impressions of the lung and spleen are useful in screening for toxoplasmosis in passerines such as canaries and mynahs (1). Sarcocystis can frequently be identified on impression smears of the lungs (2). Plasmodium, hemoproteus, toxoplasma, and leucocytozoon are more readily identified in impression smears of the liver and spleen. The impression smear will also quickly differentiate tumor masses from mycobacterial granulomas. Blood smears can be made from the postmortem heart blood and examined for parasites. Another rarely utilized diagnostic tool for postmortem examinations, is the radiograph. A radiographic evaluation can alert you to bony lesions, fractures, and metallic densities.

Cultures are usually collected soon after opening the body cavity in order to reduce contamination. This is also the time to evaluate the endocrine system. Due to the small size of many of the endocrine glands, these glands need to be examined before they are obscured by the blood that will eventually fill the body cavity.

The samples collected for histopathological examination should include the organs with gross changes or those organ systems implicated by the clinical signs or antemortem laboratory test results. In sudden, unexpected death, with few or no gross lesions, collect the following tissues for histopathologic examination; brain, heart, lung, adrenal gland, thyroid gland, pancreas, and liver (3).

Tissues to collect to rule-out suspected diseases

Circovirus	Bursa of Fabricius, feather and skin
Sarcocystis	Lung (2)
Microsporidia	Kidney, liver (4)
Herpesvirus (Pacheco's)	Liver (5)
Paramyxovirus	Brain, middle and inner ear, pancreas (6)
Proventricular Dilatation Disease	Multiple sections of gastrointestinal tract, adrenal gland
Vitamin D toxicity	Kidney (6)

Diseases with No Gross Lesions and Sudden Death (3,6)

Organ System	Disease
Pancreas	Acute pancreatitis/necrosis of Quaker parakeet
Respiratory	Acute blockage of the trachea/syrinx Acute allergic pneumonitis Inhaled toxin
Central Nervous System	Trauma Thrombosis Yolk emboli Paramyxovirus
Adrenal glands	Proventricular Dilatation Disease Interrenal cell vacuolization of African Greys
Parathyroid glands	Neoplasia or hyperplasia in African greys
Heart	Bacterial myocarditis Polyomavirus Proventricular Dilatation Disease Paramyxovirus Vitamin E/Selenium deficiency Atherosclerosis
Liver	Herpesvirus Polyomavirus
Thyroid gland	Lymphocytic thyroiditis of African Greys

Differential Diagnosis by Gross Lesions

Cardiovascular		
Heart Grey-white flecks or streaks	Avian sp.	Vitamin E deficiency (6)
Arteries Thickened and yellow	Psittacine	Atherosclerosis (6)
Heart Epicardial hemorrhage	Psittacine	Polyomavirus (6) Agonal event (7) Septicemia (7)
Gastrointestinal		
Oral cavity Yellow to brown caseous debris	Avian sp.	Hypovitaminosis A with 2° infection (8) Capillaria (8) Candida (8) Trichomonas (8) Bacterial abscess (8)
Dilated crop, proventriculus, ventriculus, or intestines	Psittacine	Proventricular dilatation Disease (9)
Intestines Thickened nodules	Psittacine	Mycobacteria (3)
Pancreas Nodular, red to white color	Psittacine	Pancreatic carcinoma (3)
Proventricular-ventricular junction Thickened area ± ulceration/perforation	Psittacine	Gastric carcinoma (3) Mycobacteria
Kidney		
Swollen and mottled	Avian sp.	Bacteria (6)
Swollen and pale	Avian sp.	Visceral gout (10) Vitamin D toxicity (6)
Swollen and pale	Lovebird	Microsporidia (4)
Liver		
Multiple white, tan, or	Avian sp.	Mycobacteria (10)

yellow foci		Hepatic necrosis secondary to chlamydia, bacterial, or viral infection (9)
Pale, ± enlarged	Avian sp.	Lymphosarcoma (10) Amyloidosis (10)
Swollen and mottled	Avian sp.	Mycobacteria (10) Bacteria (11) Chlamydia (11) Herpesvirus (11)
Swollen and yellow	Avian sp.	Hepatic lipidosis (10) Normal in chicks (10) Adenovirus (11) Reovirus (11)
Swollen and mottled	Canaries and Finches	Pox Virus (6) Adenovirus (6) Malaria (6) Polyomavirus
Swollen and reddish-brown	Mynahs, toucans	Iron storage disease (10)
Multiple white, tan, or yellow foci	Psittacine	Bile duct carcinoma (3) Reovirus (esp. African greys) (6)
Pale, ± enlarged	Psittacine	Cholangiocarcinoma (12) Diabetes mellitus (6)
Swollen and mottled	Psittacine	Sarcocystis (2) Microsporidia (Lovebirds) (4) Herpesvirus (Pacheco's) (5) Polyomavirus (6) Adenovirus (6)
Swollen and black	Raptor	Malaria (10)
Musculoskeletal		
Foot Focal to diffuse swelling	Avian sp.	Pododermatitis (10) Articular gout (10)
Hemorrhage within the calvarium	Avian sp.	Hypostatic intraosseous vascular congestion incidental (8) Brain hemorrhage (8) Encephalitis (8)

Long bone Proliferations	Avian sp.	Osteitis from respiratory fungal infections (8) Osteitis from Mycobacteria (8) Mesothelioma (8) Osteosarcoma (6)
Serosal surfaces Thickening and Opacification	Avian sp.	Visceral gout (10) Infectious serositis (10) Bacterial peritonitis (6) Chlamydia (6) Barbituate euthanasia (7)
Wing Mass lesion, thickening	Avian sp.	Osteoarthritis (8) Xanthoma (8)
Coelomic cavity Free hemorrhage	Psittacine	Sarcocystis (2) Leukocytozoon
Respiratory		
Lung Reddened, heavy	Canary and finch	Lung mites (Sternostoma) (8) Pox Virus (6) Adenovirus (6)
Air Sacs Thickened and opaque	Psittacine	Chlamydia (6) Bacteria (7)
Lung Dark red and wet	Psittacine	Sarcocystosis (2,9,13) Teflon toxin (9) Necrotizing bacterial infection (9) Noxious gas inhalation (9) Adenovirus (6)
Lung Mottled	Psittacine	Bacteria (6) Fungus (6)
Skin and Feathers		
Skin Dermal nodules	Canary	Feather cyst (8)
Feathers Malformation	Psittacine	Psittacine Beak and Feather Disease
Skin Dermal or subcutaneous hemorrhages	Psittacine	Polyomavirus (6)

Skin Subcutaneous swelling or mass	Psittacine	Ruptured airsacs or subcutaneous emphysema (8) Thymoma (in neck) (14) Goiter (in neck) (15) Subcutaneous filariasis (foot) (16)
Spleen		
Splenomegaly	Canary and Finch	Systemic Pox (10) Atoxoplasma (17) Polyomavirus
Splenomegaly	Passerine	Atoxoplasma (1) Toxoplasma (18) Malaria (6)
Splenomegaly ± discolored	Psittacine	Mycobacteria (3) Sarcocystis (2,13) Herpesvirus (Pacheco's) (5) Polyomavirus (6) Bacteria (6)
Splenomegaly Black	Raptor	Malaria (10)
Special Senses		
Eye Lens opacity	Raptor	Cataracts (8) Normal ocular opacity of young owls (8)

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