The Role of Pathology in Avian Veterinary Medicine

John E Cooper[1]

Summary

Pathological examination of birds plays an important part in disease diagnosis and in furthering our understanding of avian biology. Gross *post-mortem* (necropsy) investigation necessitates a sound knowledge of normal morphology, familiarity with important diseases, access to literature and colleagues, adequate facilities, a systematic approach and a willingness to communicate. Satisfactory collection, transportation, submission and processing of laboratory samples are equally important and must be coupled with careful and critical interpretation of results.

Introduction

In recent years our understanding of the diseases of birds has been substantially advanced by developments in clinical medicine. For decades, sometimes longer, knowledge progressed primarily as a result of *post-mortem* (necropsy) and laboratory examination of birds that died in captivity or, in some cases, in the wild.

Pathology remains a vital part of the rapidly developing field of avian medicine. In this paper the principles of pathological examination of birds are outlined, with the express intention of encouraging the practitioner to carry out his/her own *post-mortem* examinations well or, alternatively, to ensure that they are performed in a professional way elsewhere. The emphasis is on gross pathological examination and the taking and submission of samples for laboratory investigation.

Requirements

Post-mortem and pathological examination of birds require the veterinarian to have:

1) sound knowledge and understanding of the normal anatomy of the different orders of birds. An understanding of what is normal is essential before the veterinarian attempts to interpret pathological changes.

2) some basic knowledge of the common causes of morbidity and mortality.

3) access to appropriate literature and to suitably qualified colleagues for advice.

4) adequate equipment and facilities in order to deal with the species in question. What is needed for *post-mortem* examination of large ratites may be very different from the requirements for pathological examination of small passerine birds.

[1] Consultant Veterinary Pathologist, Jersey Wildlife Preservation Trust. Les Augrés Manor, Trinity, Jersey JE3 5BP, Channel Islands

5) a systematic approach to pathological examination, including the use of standard forms and specimen data which can be computerised and which are compatible with systems used elsewhere.

6) a willingness to communicate his/her findings with others and to disseminate the relevant information widely.

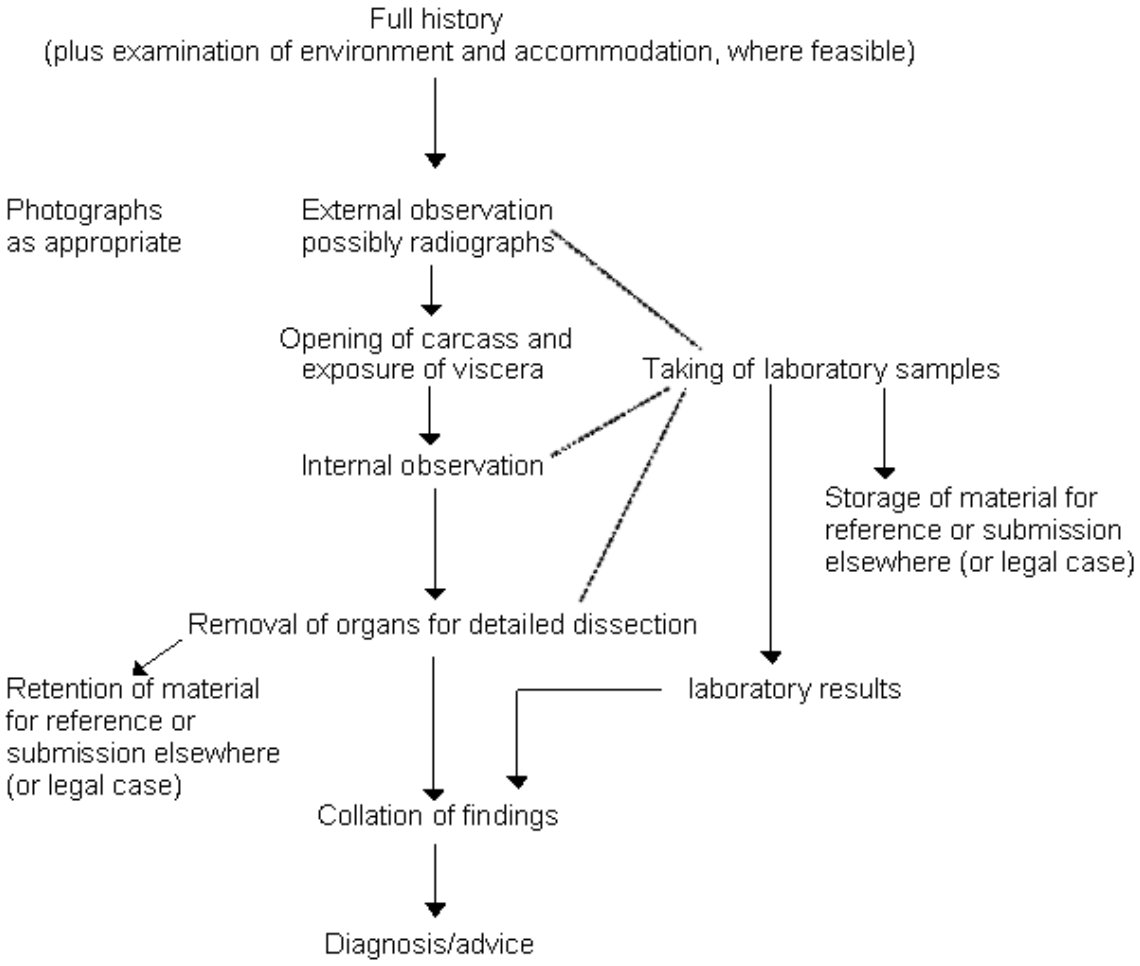
Post-mortem examination

Necropsy should not be carried out "in-house" unless the veterinarian has:

a) reasonable knowledge of avian morphology and the more prevalent conditions to which birds are susceptible

b) adequate and appropriate equipment including those that are necessary to prevent spread of zoonoses[1]

The main features of the *post-mortem* examination are depicted below:-



Accurate record keeping is vital and the following points must be emphasised :-

1 record all findings, even if some appear not to be significant or their relevance is unclear.
During the examination itself, a tape-recorder (preferably voice-activated) is invaluable, especially if the person doing the necropsy is working alone.

2 use a standard format for collation and storage of information, preferably one that is linked to, or compatible with, an internationally used system and database.

The retention of material after the examination is a wise precaution in case of accident or loss. It is essential if the bird is the subject of a legal case.[2] In addition, however, storing of carcass and tissue provides an opportunity to build a reference collection which can be a valuable source of information for use retrospectively.[3]

Further information on *post-mortem* examination and supporting laboratory tests is to be found in a number of standard texts.[4,5,6]

Small birds and specimens such as eggs and embryos may require the use of special instruments and techniques - the “mini-necropsy”.

From time to time the remains of a bird's carcass is required for display in a museum or other similar purposes; in this case a “cosmetic” *post-mortem* examination must be carried out in order to obtain the necessary information and material but with minimum external damage. Such an examination necessitates skill and experience.

Laboratory samples

The taking, transportation, submission and processing of samples are all key steps that should lead to the successful completion of important diagnostic tests. However, at each stage, errors may be made and these can adversely affect the quality of the sample that is received in the lab and, in turn, the validity and reliability of the results. If samples are taken in different ways and subjected to various conditions prior to examination, they may yield widely different results - and thus make accurate comparison of findings impossible.

Common causes of error are:-

1. Samples taken at various periods of time after death.
Using (e.g.) swabs of different type or make, with or without transport medium.
Sampling carried out in different ways by more than one person.

2. Samples packed and transported in diverse ways and not at constant temperatures.

3. Samples entered incorrectly or inconsistently.

4. Samples processed in different ways or at varying times after submission.
Variation in storage.

In addition to avoiding the pitfalls listed above, the veterinarian who is sending samples from birds for laboratory investigation elsewhere must be aware of, and adhere to, the relevant

postal regulations and appropriate legal requirements. The latter may apply both to animal health and to conservation of endangered species (eg. CITES)[7]. In this context it should be remembered that CITES applies not only to live and dead animals but also to “recognisable derivatives” and this can include histological sections and blood smears.[8]

Interpretation of findings

Interpretation of *post-mortem* and laboratory findings often requires some knowledge of the common causes of morbidity and mortality in the species and where this is inadequate, access to literature and colleagues who can advise. Often, a provisional diagnosis can be made but confirmation requires further tests or more detailed investigation of the environment and management. Sometimes the cause of death cannot be ascertained but useful background information is gained about the bird or the collection.

Conclusions

Although there is a relatively long history of interest in diseases of captive and free-living birds, information on avian pathology is still remarkably sparse. There is a need for the practitioner to contribute to this dearth by ensuring that necropsies and laboratory investigations are carried out professionally and by promoting the philosophy amongst aviculturists and biologists as well as veterinary surgeons that pathology is the key to enhancing our understanding of the health of birds and other non-domesticated species. Only in this way will reliable databases on normal parameters and important diseases be established. At the same time he/she will benefit and learn; as Coles[9] puts it in his book "There is probably no other way in which a clinician's acumen is increased than by *post-mortem* examination".

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