Association of Avian Veterinarians Australasian Committee Ltd.
Annual Conference 2015 23, 69-72

Avian Gastro-Intestinal and Upper Respiratory Endoscopy

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Previously published in whole or part. Not peer-reviewed by AAVAC Ltd. - included with permission of the author.

Introduction

The oral approach permits examination of the buccal cavity, esophagus, crop, proventriculus, ventriculus, glottis and trachea down to the level of the syrinx. The vent approach permits examination of the cloaca, and openings to the shell gland and ureters. This review has been written with the general practitioner in mind, and only the most commonly employed avian techniques have been described. For more detailed descriptions the reader should consult the references (Lierz, 2006; Divers, 2010).

Instrumentation

Given the variation in size, species-specific anatomy, and variety of procedures that may be performed, a selection of different endoscopes and instruments may be required. However, when dealing with most companion birds, the 2.7 mm system offers flexibility and diagnostic power for an affordable investment (Table 1).

The 2.7 mm system is most widespread in practice, offers greatest versatility, and can be expanded as individual practice caseload dictates. This system offers several advantages including single-entry procedures, ports for gas or fluid infusion, and an operating channel for the introduction of 1.7 mm (5 Fr) instruments. In addition, the 1.9 mm telescope with integrated sheath, and the 1 mm semi-rigid miniscope are extremely useful for smaller species.

The telescope is connected via a fiber-optic light guide cable to a light source. While halogen light sources are far cheaper and very effective for small animals < 2 kg, xenon light sources provide better quality light and an intensity that can illuminate the body cavities of larger animals.

An endovideo camera connected to the eye-piece of the telescope, although once considered a luxury addition, is an integral part of the endoscopy system and greatly facilitates the surgeon's performance. Cameras, available in both PAL and NTSC formats, can vary dramatically in cost from budget single-chip cameras to 3-chip digital high definition models. However, the fact is that any camera, however cheap, will greatly improve performance compared to using the eye-piece, and will facilitate photo-documentation. The Tele Pack system combines a hybrid xenon light source, endovideo camera, and LCD monitor with digital storage which is well suited for avian endoscopy. Operating room set-up is important and the monitor should be positioned directly in front of the endoscopist, with instruments within easy reach. The use of saline infusion can be especially helpful, especially when dealing with a hollow viscus (e.g. gastro-intestinal tract, bladder, cloaca).

The 1.7 mm (5 Fr) grasping forceps are useful for manipulating tissues, debridement and retrieving foreign objects or parasites. The fine aspiration/injection needle can be used for the aspiration of fluid from cystic structures where biopsy may be contraindicated due to post-sampling leakage or the risk of perforation. The needle can also be used for irrigation, and drug administration. The flexible biopsy forceps are used to harvest tissue samples for histopathology and microbiology. The small sample size usually permits the collection of several biopsies for multiple laboratory tests, and serial biopsies to monitor disease progression over time to assess response to treatment.

The general handling techniques used in avian endoscopy are similar to those employed for domesticated animals. However, the fact that most companion birds weigh < 1kg requires careful control with the base of the telescope, eyepiece, and camera supported using the superior hand and the terminal end held by thumb and forefinger of the inferior hand.

Upper Respiratory Endoscopy

The lower respiratory tract can be evaluated using the left and right approaches to the airsacs and lungs (see avian coelioscopy). However, to complete the respiratory examination an oral approach to the choana, trachea

and syrinx, and an external approach to the nares are required. Parrots that are severely dyspnoeic, or suddenly lose their voice and present in acute respiratory distress must first be stabilized. Oxygen and, when necessary, an airsac tube to provide an alternative airway should be considered. Gas anaesthesia can be delivered by an airsac tube leaving the mouth and trachea clear for endoscopy, biopsy and debridement. In larger birds the 3.5 mm protection sheath should be used and will enable tracheoscopy of birds over 400 – 500 g (e.g. Amazons, African grays, macaws and cockatoos). In smaller birds, a 1.0 mm semi-rigid endoscope or 1.9 mm telescope is required. The 1.9 mm and 2.7 mm telescopes can be used without any sheath; however, the advantages of reduced diameter should be weighed against increased risks of telescope damage. The bird is positioned in dorsal recumbency with the head and neck extended, and the telescope can be inserted through the glottis and advanced down the trachea. A surgical plane of anaesthesia is required to prevent coughing, but irritation and mucosal damage can be reduced by raising the leading edge of the 30o telescope above the mucosal surface while advancing down the trachea. The complete tracheal rings, syrinx and sometimes even the proximal primary bronchi can be examined. Even where tracheal diameter prevents the use of a sheathed telescope, retrieval and biopsy forceps can be inserted alongside the telescope for retrieval of foreign bodies, debridement and sample collection.

Ingluvioscopy and Gastroscopy

Examination of the oral cavity, esophagus, crop, proventriculus, and ventriculus are possible in most birds under 400-500g using the 2.7 mm telescope and 4.8 mm operating sheath, via an oral approach. In larger birds, the ventriculus can only be reached using flexible or by the introduction of a rigid telescope through a temporary ingluviotomy. Gas insufflation can be used to dilate and examine the esophagus, crop and proventriculus for foreign bodies. However, warm (39-40°C, 102- 104°F) sterile saline irrigation provides better visualization, superior mucosal detail, and helps dilate the tract as the sheath-telescope is advanced. All birds should be intubated and placed at a 30-45° incline to reduce the risks of aspiration. Foreign bodies can be removed using retrieval forceps or wire basket devices.

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Cloacoscopy

Cloacoscopy using warm saline irrigation is very rewarding and preferred for the evaluation of cloacal papillomas, coprodeum, urodeum (including the openings to the ureters and, in females, the distal uterus), bursa of Fabricius, and proctodaeum (Figure 1). Excessive cloacal fluid administration can result in oral regurgitation, and so intubation remains important. Proliferative lesions can be easily biopsied but care is required not to penetrate the cloacal wall. Cloacal neoplasia can be ablated using radiosurgical or diode laser probes introduced via the instrument channel of the sheath.

Complications

The major complications encountered are typically associated with anaesthesia, and the advanced disease state of many birds at the time of presentation. The importance of stabilization, and a thorough pre-operative evaluation cannot be overemphasized. Endotracheal intubation, ventilation, intravenous or intraosseous catheterization with perioperative fluid support, and warm air/water blankets are important. Minor haemorrhage following tissue biopsy is common but generally insignificant. Most endoscopy issues are related to operator error until experience and ability have been gained. In general, the ability to examine birds internally and collect tissue samples greatly aids diagnosis and improves treatment success.

Post-Operative Care

Birds should be closely supervised on recovery as anaesthetic compromise can ensue following extubation and cessation of cardiorespiratory support. Fluid therapy and nutritional support should continue, with psittacine and passerine birds eating within an hour of recovery. Meloxicam is used routinely post-operatively, although opiates and local anaesthetics could prove useful as part of a balanced approach to analgesia. Typically birds return to normal function quickly following procedures compared to more traditional, invasive surgery.

Acknowledgements

The author would like to thank Karl Storz Veterinary Endoscopy for supporting endoscopy research, development, and training in zoological medicine.

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Table 1. Endoscopic instrumentation for companion birds.

Equipment Description	Primary Indications
Visualisation and Documentation	
Endovideo camera and monitor Xenon light source and light guide cable Digital capture device (e.g. AIDA-DVD)	Required for all endoscopy procedures
Rigid Telescopes and Endoscopes	
1.9 mm x 18.5 cm telescope, 30o oblique, with integrated 3.3 mm operating sheath	Preferred for birds <100 grams
2.7 mm x 18 cm telescope, 30o oblique 4.8 mm operating sheath	Preferred for birds <100 grams
Flexible instruments for use with rigid telescopes and operating sheaths	
1 mm biopsy forceps 1 mm grasping forceps	For use with 1.9 mm telescope and integrated sheath
1.7 mm biopsy forceps 1.7 mm single-action scissors 1.7 mm remote injection needle 1.7 mm grasping/retrieval forceps 1.7 mm wire basket retrieval 1.7 mm needle end radiosurgery electrode 1.7 mm polypectomy snare	For use with 2.7 mm telescope and 4.8 mm operating sheath
Insufflation	
Sterile saline suspended above endoscopy table with intravenous drip line to a port on the operating sheath	Used for sterile saline infusion for ingluvioscopy, gastroscopy and cloacoscopy

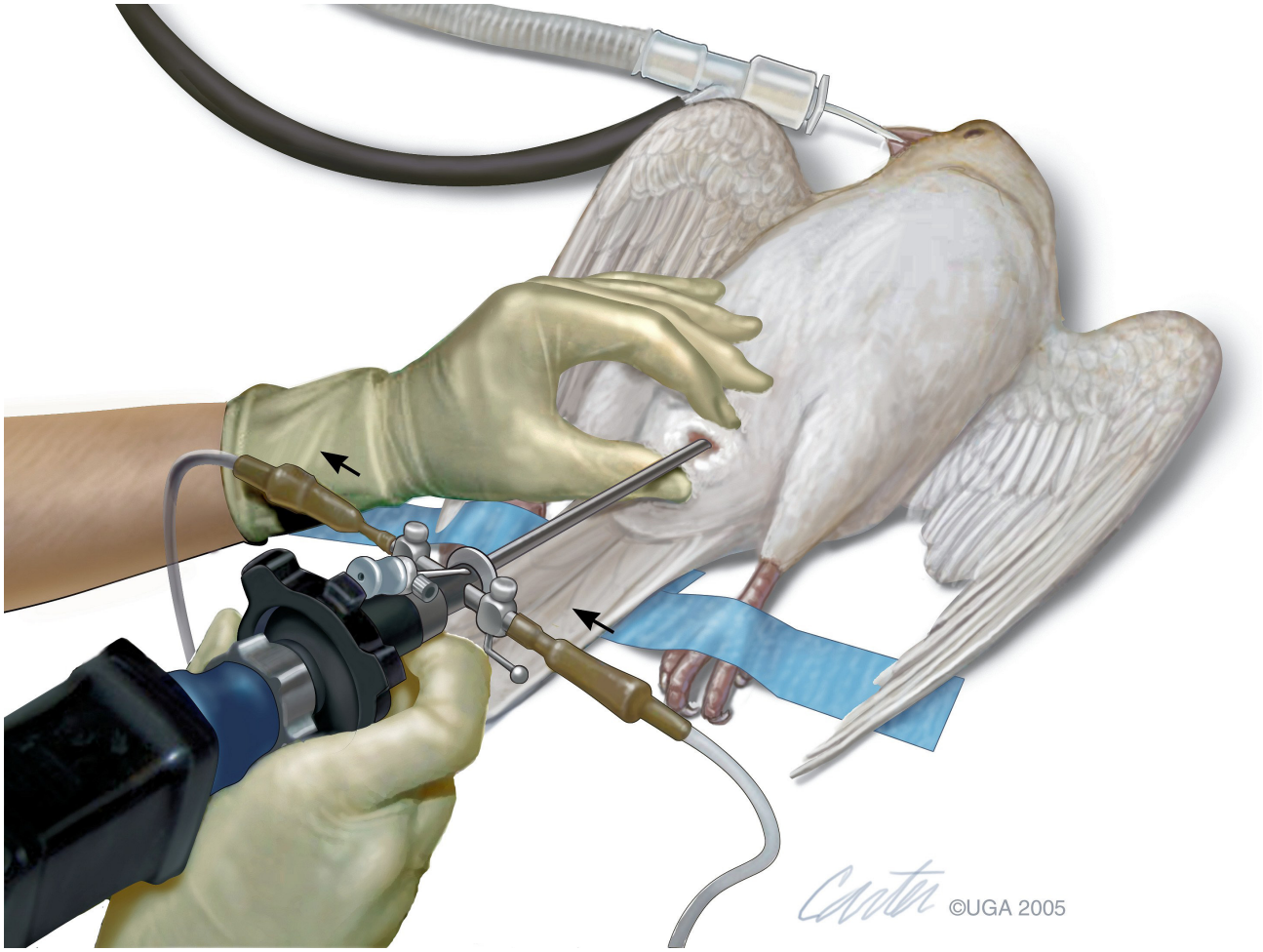

Figure 1. Pigeon in dorsal recumbency during cloacoscopy using saline infusion (arrows).