Ex - Exotics

ADVANCES IN EXOTIC ANIMAL ENDOSCOPY

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BIRDS

In birds, fine diameter endoscopes have been used for diagnostic purposes since late 1970´s (Taylor 1998). In 1992 the new endoscope and sheath system for avian use was developed by Taylor (Taylor 1993). This author described an anatomic approach to better understand the most applicable access point for avian endoscopy. The universal equipment for endoscopy includes rigid telescope, flexible fiber optic light cable and cold light fountain source. The most commonly recommended rigid endoscope is Standard Hopkins telecope, with 4.0 mm outer diameter, 18 cm in length, 30 ° angle of view. Slender Hopkins telescope – 18 cm in length, 30 ° angle of view, with 1.9 - 2.1 mm outer diameter, is very useful for extremelly small space documentation. The rigid telescope is regulary used with a protection sheat (3.5 mm outside diameter) or a 14.5Fr working sheat that provides three ports (for water inflation, aspiration, irrigation, insufflation, with excellent operating channel). Cold light fountain (100 – 125/220-240 VAC, 50/60 Hz, Xenon spare lamp 175 Watt, 15 volt) enables perfect control of all internal organs in large birds (owls, raptors). The internal anatomical organisation of the avian body is ideal for endoscopy examination. The caudal thoracic air sacs are the key entry points to the avian air sac system (Molnar 2003). The cranial thoracic and abdominal air sacs can be easily accessed from a single entry point into the caudal thoracic sacs via the lateral thoracic wall. The entry site is located by finding the point where the semimembranous muscle crosses the last rib. Isoflurane anesthesia is generally required. Respiratory arrest occurs if trachea is irritated by tracheal tube and/or endoscope (Molnar 2003). During mask inhalation the trachea can be blocked by saliva, or during deep anesthesia, by regurgitation of the crop content. The left side approach is entering the caudal thoracic air sac by inserting the endoscope in triangular area created by last rib-pelvic bone and femoral muscle. In larger birds the preferred insertion site is the last intercostal area. Advantages of the practical use of the rigid endoscope in the avian medicine have already been demonstrated in many cases (Chamness 1999, Harris 1999). Using endoscopy in the case of the gunshot falcon proved to be an optimum choice (Jekl et al. 2006). A classical surgical approach would have been more demanding and hazardous concerning the risk of injuring major blood vessels. Following a standard preparation of the surgical field endoscopy was performed with the access through the left caudal thoracic air sac in a male of peregrine falcon. A blunt perforation was made behind the last rib about 1.5 cm from the lateral diapophysis. Despite the small size of the wound the minimally invasive approach enabled removal of a bullet without any damage to adacent organs or blood vessels.

Recently, minimally invasive endoscopic surgery of birds has been described in details (Hernandez-Divers 2005). This author compared single-entry with the double-entry as well as triple-entry techniques. The single-entry endosurgery in birds is limited to a single instrument that cannot be manipulated independently of the telescope. It is feasible for salpingohysterectomy. This form of basic endosurgery prevented the need for more invasive coeliotomy and reduced surgical trauma. It is very useful method, even for a very small avian species. The main disadvantage of single-entry techniques are restriction to single instrument use (Hernandez-Divers 2005). Double-entry techniques can facilitate endoscope-assisted biopsy, enterotomy, enterectomy, duodenostomy, cloacopexy, syringeal surgery, proventriculotomy/ventricolutomy. Double-entry techniques reduce trauma associated with standard form of coeliotomy, the main disadvantage of this technique is dependence of one instrument on the sheath and telescope. The next step is the triple-entry method, developed for avian medicine by the same author (Hernandez-Divers 2005). This technique enables the simultaneous use of two instruments – independent of the telescope.

The use of this technique is restricted to large patients.

REPTILES

Endoscopy in reptiles has developed from methods for sexing monomorphic reptiles (Schildger 1998). It started to be very important method for clinical diagnosis and different endoscopic techniques were developed for reptilian patients (Divers 1999, Schildger et al. 1999). Nowadays it includes diagnostic endoscopy (with a form of guided biopsy) and minimally invasive endosurgery. Basic examinations of the mouth cavity and cloaca can be realised in reptiles under mild anesthesia. General anesthesia (isoflurane) is required for advanced endoscopy – laparoscopy and respiratory endoscopy. The tightly packed coelomic cavity in the reptilian patient leaves limited space for instrument manipulation (with the risk of iatrogenic trauma). Gas insufflation (carbon dioxide is the insufflation gas of choice) is the preferred technique that is well tolerated by the patient. For a good endoscopy examination insufflation technique is necessary in lizards and chelonians. For GIT endoscopy – air insufflation is feasiblle method, for coelioscopy insufflation with CO_2 is standard. Reccommended coelomic pressure is 2 – 4 mm Hg, with a CO_2 flow rate of 0.5 – 1.0 l/min. The most feasible coelioscopic approach in chelonians is via the small perforation of the prefemoral fossa skin. Cloacal endoscopy is feasible method of direct evaluation the contents of the urinary bladder and indirect control of the gonads (follicles). Not only visualization, but tissue biopsies are required to investigate unclear pathological situations. Endoscope-guided biopsies allow the surgeon to collect biopsies from particular locations, especially when only portions of the organ are altered. The most common biopsies in exotic pets are those of the liver, kidneys and air sacs. Small size biopsies are difficult to evaluate. If indicated multiply biopsies can be taken from the same site. Sampling a non-significant tissue mass can mislead the final diagnosis.

Recently, new endoscopy method has been described in snakes (Jekl and Knotek 2006). This method serves as a modified endoscopic method to access the coelom of snakes through the air sac. Air passages (lungs, air sac, trachea) could be examined directly by this method, other organs like liver, stomach, pancreas and spleen are assessed indirectly. This mini-invasive method is very easy, with minimum risk for the reptile patient. Short incision is made in aseptic prepared skin on the right side of the snake´s body, 35 – 45% along its length and parallel with horizontal axis of the body. Small incision of 1 – 2.5 cm in length is made between the second and the third row of lateral skin scales. This is followed with blunt perforation of the muscle layer and the peritoneum. Two absorbable fixation sutures is made in the wall of the air sac before its gentle perforation. The endoscope with an examination sheath is introduced through this small perforation between the two sutures. This method is feasible for direct control of the mucosa of the lungs as well as for indirect image the surfaces of liver, spleen, gall bladder and pancreas. The approach through the air sac provides an alternative method for examining the caudal segment of respiratory system of large snakes like pythons and boas, without the need for more expensive flexible endoscopes (Jekl and Knotek 2006).

SMALL MAMMALS

The endoscopy is very feasible method for clinical examination in small herbivorous mammals, especially for clinical dentistry (Taylor 1999). The mouth cavity of small herbivorous mammal is long and narrow, making its carefull clinical examination technically more difficult than in carnivores and insectivores. Molar and premolar malocclusions are very frequent serious health problem in small mammals. Diagnosis and treatment of oropharyngeal disease in these patients are facilitated perfectly with the rigid endoscope. The technique was evaluated on a group of 55 rabbits, 30 chinchillas, 36 guinea pigs, 17 degus, and 12 prairie dogs suffering from a lack of appetite, hypersalivation accompanied by humid dermatitis, swelling of the lower jaw or mild exophthalmus. A total of 265 examinations were realized. Telescope with 30° optics enabled a detailed examination of all the parts of the mouth cavity and oropharynx. It provided precise observation of external lesions on premolars and molars as well as on mucosal layers of the gingiva, the tongue, and the upper palate. Telescope with 70° optics provided an excellent control of occlusal tooth surfaces, tooth crowns, and buccal mucosa. Under endoscopic control collection of bioptic samples, removal of foreign objects and correction of malocclusion were carried out without any risk of injury (Jekl et al. 2006).

FISH

Rigid endoscopy and minimally invasive endosurgery offer in fish new possibilities in research as well as in wildlife and exotic pet medicine. Endoscopy in fish was first described in details by Murray (1998). More advanced form of reproductive endoscopy and endosurgery in fish has been decribed recently (Hernandez_ Divers et al. 2005). The rigid endoscopy permits the minimally-invasive examination of the

respiratory and gastro-intestinal systems. Saline flushing-insufflation of the coelom helps in examination of other visceral organs.

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