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DIAGNOSTIC VALUE OF ENDOSCOPY IN PRACTICE WITH REPTILES

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There are nearly 8 000 species belonging to the class Reptilia. Endoscopic examination is used in clinical diagnostics of diseases in reptiles for many years and descriptions of individual endoscopic techniques can be found in numerous papers\(^1\). Unlike in mammals, in reptiles individual organs are less fixed in the coelom. Without insufflation/irrigation, some organs or tissues are almost inaccessible in reptiles. The organs can move to some degree during examination, which considerably complicates orientation and prolongs the time necessary for endoscopic examination. Obvious anatomic differences among reptilian species necessitate application of different approaches, which influences both the complexity and effectiveness of endoscopic examinations.

The endoscopic examination of reptiles is performed using rigid endoscopes (Hopkins Documentation Forward-Oblique Telescope ø 2.7 mm, 18 cm; Hopkins Forward-Oblique Telescope ø 1.9-2.1 mm, 19 cm), an examination sheath, and a xenon light source. The image is scanned by an endoscopic camera connected to a monitor and a computer.

A coelioscopic examination of all major organs and structures in the coelomic cavity in lizards is performed according to a standard protocol\(^2,3\). Lizard is placed in lateral (left/right) recumbency with the cranial part of the body and hindlimbs taped to the operating table. The paralumbal region is aseptically prepared using chlorhexidine solution. A 2 – 5 mm skin incision in the centre of the paralumbal region is made. The skin and underlying musculature are pinched and elevated before small haemostat is inserted through the incision and bluntly forced through the coelomic musculature into the coelom. The haemostat is removed and replaced by the operating sheat. One of the sheat port is connected to a CO2 insufflator or to an unfusion set with sterile 0.9% NaCl solution. In chelonians the methods is similar except the skin incision point which is in the left/right prefemoral region.

Endoscopy has proven effective in determining gender in monomorphic reptiles and offers a fast, reliable and immediate means of determining gender that can be used to monitor and adjust incubation in chelonians\(^4\). The ovary or testis may be differentiated at a very early age, especially when the terminal telescope lens is held against the gonad to facilitate a high magnification of the tissue. Under anesthesia, prefemoral insertion of 1.9 mm or 2.7 mm rigid telescopes combined with CO2, air (insufflation), or sterile saline (irrigation) enables visualization of the immature reproductive tract in young chelonians, even in hatchling turtles. Given the small size of the animals involved, a single injection can often achieve sufficient irrigation. This method can be used for some mini-invasive surgeries like the urolith removal or the coelioscopic-assisted prefemoral oophorectomy in chelonians\(^5\). After examination of the coelomic cavity, an avascular area of ovarian interfollicular connective tissue is selected for placement of grasping forceps, taking care to avoid perforation of any ovarian follicles. Gentle traction is applied under endoscopic visualization, and the ovary is retracted toward the incision. The ovarian vasculature is ligated and the mesovarium is transected with scissors. The coelomic aponeurosis is closed in a simple pattern. Skin is closed with horizontal mattress pattern\(^5\).
Direct oesophagoscopy and gastroscopy are feasible methods for evaluation and biopsy of the mucosa of the cranial parts of GIT in reptiles. The classical methods of endoscopic examination of the reptilian lungs through the trachea, was described\(^6\), but due to the restricted length of most endoscopes available, the use of a rigid endoscope is limited to the examination of the upper respiratory system. The classical examination of the reptilian coelom is based on the insufflation/irrigation methods\(^7\). Snakes and some lizards have air sacs, which are direct continuation of the caudal part of the lungs and stretch as far as the second third of the coelom. The air sacs in snakes differ in size and capacity, depending on the phylogenetic status of the particular taxon. Air sac in reptiles is organ with relatively low vascularisation. Their volumes are significantly increased during inspiration, resulting in body wall distension. The method of endoscopic examination with access through the air sac was tested on snakes\(^7\). The hospitalized snakes are not fed for 5 days prior to the endoscopic examination but have unlimited access to water. All patients are clinically examined including haematological and biochemical blood tests and are premedicated with enrofloxacin or marbofloxacin. Prior to the endoscopic examination, patients are immobilized in a ventral position using a half-open anaesthetic system with assisted ventilation and addition of isoflurane/oxygen mixture. After an aseptic preparation of the surgery area, a short incision in the skin on the right side of the body, at 35 – 45 % of the length of the patient, parallel with the horizontal body axis, is made. The incision was between the second and third row of lateral skin scales. The length of the incision ranged between 1 and 2.5 cm. Then a blunt perforation of the muscle layer and the peritoneum is made. When the air sac is reached, two absorbable fixation sutures are made in its wall. The endoscope with an examination sheath is introduced through a small incision of the air sac between the two sutures. The heavily perfused lung area can be easily distinguished from the air sac where the vascularisation is much less. In small snakes even the bifurcation and the caudal part of the trachea can be viewed using a retrograde orientation of the endoscope. Where there are pathological changes, the affected part of the respiratory organ can be imaged and targeted sampling for laboratory tests can be performed under endoscopic control. Due to the grey-white colour of the wall of the air sac and the Glisson's sheath, the colour of the liver seen through the air sac with endoscopy appears in the shades of grey-brown to red-brown. When the endoscope is oriented in the caudal direction, the shape, size and external surface of the liver, spleen and gall bladder (in some cases also pancreas and the external wall of both the stomach and the colon) can be viewed. After observation of selected organs in the coelom, the air sac is closed with absorbable horizontal U-suture. The muscle layer is closed using a simple continuous suture. Then the skin was closed with non-absorbable continuous horizontal U-suture and is covered with disinfectant. The approach through the air sac provides an easy alternative method for examining the caudal segment of respiratory system of large snakes. No changes in respiratory function and no problems with the general health status in association with the examination were observed. The air-sac endoscopy broadens possibilities of rigid endoscopy used in clinical practice in snake patients.

Cloacoscopy is a feasible method of direct evaluation the contents of the urinary bladder and indirect control of the gonads and liver in chelonians\(^8\). This method can also be used for removal of the foreign bodies (uroliths, eggs) from the bladder\(^9\). Two methods can be used for the distension of the cloaca and urinary bladder: insufflation with gas (air or CO\(_2\)) or irrigation with a sterile fluid. The latter method is more feasible. The cloacoscopy-assisted removal of the eggs from the urinary bladder is carried out under propofol and isoflurane anesthesia. The female is fixed in vertical oblique position and the cloaca is flushed with water or saline. An irrigation system using a bottle of sterile saline solution and sterile intravenous infusion set connected to a 14.5Fr operating sheath is used. The system provides intensive irrigation with safe opening the urinary bladder sphincter and distension of the bladder space. The eggshell can be destroyed with the use of different methods, based on the principle of the use of mechanical power. All fragments of the eggshell are then carefully removed by the use of small instruments and irrigation with sterile saline. Aggressive flushing of the bladder and cloaca rinses out the content of destroyed eggs.

REFERENCES


