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ROLE OF ENDOSCOPY IN DIAGNOSIS AND REMOVAL OF RESPIRATORY SYSTEM FOREIGN BODIES IN DOGS AND CATS

(With One Table and 10 Figures)

By

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دور المناظير فى تشخيص وازالة الأجسام الغريبة من الجهاز التنفسى

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أجريت هذة الدراسة على عدد ١٥ حيوان (١٠ كلاب و ٥ قطط) تعانى جميعها من وجـود الأجسام الغريبة فى الممرات التنفسية. تم تسجيل تاريخ الحالة والأعراض الأكلينيكيـة لكـل حالة وتم تاكيد التشخيص باستخدام الأشعة والمناظير. أظهرت نتائج الدراسة نجاح اسـتخدام المناظير فى تشخيص وازالة الأجسام الغريبة الموجودة فى الجهاز التنفسى فى عدد ١٤ حالة مما يؤكد أن استخدام المناظير آمن ولا يسبب اى مشكلات.

SUMMARY

The present study was carried out on 15 pit animals (10 dogs and 5 cats), suffering from presence of respiratory tract foreign bodies. Case history and clinical signs were reported. Diagnosis was confirmed by radiography and endoscopy. Endoscopy was used in diagnosis and removal of foreign bodies from the respiratory tract. The procedure was successful in 14 of the examined cases. In one case where the foreign body was lodged into the lung tissue, endoscopy was failed in removal of the foreign body. Results of this study showed that endoscopy can be used successfully in diagnosis and removal of foreign bodies from the respiratory tract. The technique is non invasive and safe for the patient.

Key words: *Endoscopy, Respiratory foreign bodies.*

INTRODUCTION

Air-ways obstruction with aspirated foreign bodies is fairly common (den Hertog 2003, Roy *et al.,* 2005). In some cases the migration of gastrointestinal foreign bodies leads to obstruction of the air

ways and other respiratory system lesions as acute mediastinitis and mediastinal abscess (Koutinas *et al.*, 2003, Yang *et al.*, 2005) These foreign bodies are usually the cause of many respiratory symptoms as nasal discharge, intermittent epistaxsis, sneezing, persistent cough, and in some cases may lead to complications during inhalation anesthesia (Gibson and Hedlund 1992, Pacchiana *et al.*, 2001, Roy *et al.*, 2005, Tivers and Moore 2006).

In some cases, an aspirated foreign body may migrate into the bronchial tree and continue to be a potential hazard leading to bronchiectasis, lung abscess, emphysema or pulmonary fistula (Roubio *et al.*, 1979). The site of the respiratory system foreign body varies according to the time and cause of occurrence. A history of dental prophylaxis without use of tracheal intubation was reported as a cause of aspiration dental calculi which leads to impaired respiratory signs (Gibson and Hedlund 1992).

Improved endoscopic techniques, together with their greater availability, allowed their use in diagnosis and removal of foreign bodies endoscopically (Brearley *et al.*, 1991, Kraft 1993, den Hertog 2003). Diagnostic indications include the evaluation of structural diseases, inflammatory conditions and traumatic injuries (Venuta *et al.*, 2006)

Several airway-sampling techniques are also available via endoscopy (Willard and Radlinsky 1999). Therapeutic indications of respiratory system endoscopy in veterinary medicine are foreign body removal from the nasopharynx and the bronchi (Kraft 1993 and Rha and Mahoney 1999), as well as in diagnosis and removal of nasal polyps in cats (Esterline 2005)

The role of endoscopy in diagnosis and removal of foreign bodies in the respiratory system of dogs and cats is discussed in this article, in addition to the comparison of endoscopy to radiography as another diagnostic method.

MATERIALS and METHODS

The present study was carried out on 15 animals (10 dogs and 5 cats) 12 cases selected from the clinical cases admitted to the veterinary medical hospital, Assiut university and three cases were admitted to the small animal clinic of the Justus- Liebig University, Giessen, Germany.

Case history:

The animals were presented with a case history of sudden appearance of the intermittent bleeding from the nostrils after playing with wooden steaks, recurrent dry hacking cough, sneezing, nasal

discharge and shaking of the head. The range period for the appearance of the clinical symptoms was 2- 15 days.

In three dogs there was a history of persistent cough which did not respond to medical treatment. One of these animals suffered persistent fever in addition.

Anesthesia:

All animals were examined under the effect of general anesthesia using Ketamine Hcl and Xyalzine 2%. Cats received a dose of 1 mg/kg xylazine and 5 mg/kg ketamine i.m. For dogs xylazine 1 mg/kg i.v. and Ketamine Hcl 10 mg/kg i.v. was used.

Radiographic and endoscopic examinations:

The animals were radiographed for examination of the nasal cavity, sinuses, neck and the thorax in latero-lateral and ventro-dorsal views with a 42 KV and 5 MA/S.

For the endoscopic examination, animals were positioned in sternal recumbency. Endoscopy of the nasal cavity was done with a 0° forward angle, 2.4 mm arthroscope and the nasopharynx was examined with a 110° forward angle endoscope. For endoscopic examination of the trachea and main bronchi a rigid 0°, 36 cm length endoscope was used (Fig. 1).

RESULTS

Clinical signs:

Clinical signs observed on the examined cases are summarized in Table (1).

Table 1: Clinical signs of the examined animals in relation to the seat of the foreign body (FB)

Animal	No	Seat of FB	Clinical signs
Dog	5	Nasal cavity	intermittent epistaxis, sneezing, with nasal discharge
Dog	2	Nasopharynx	Bleeding from the mouth and nasal cavities
Dog	2	Main bronchus	Persistent dry cough
Dog	1	Lung lobe	Persistent cough, nasal discharge, fever
Cat	2	Larynx and upper third of trachea	Cyanosis of the tongue, difficulties in inspiration, cough and trials to vomit
Cat	3	Nasopharynx	Sneezing, cough, nasal and mouth bleeding
Total	15		

Radiography:

The Ventro-dorsal and latero-lateral radiographic examinations of the nasal cavity, nasal sinuses, neck and the thorax revealed non specific radiographic changes in 10 animals (7 dogs and 3 cats). In two of the examined dogs a soft tissue mass density was observed at the level of the bronchi. In one dog a wire piece was seen radiographically at the level of the right lung lobe (Fig. 2&3). The sinuses appeared unchanged in all of the examined animals. Two cats showed bone density foreign body at the level of larynx and upper third trachea (Fig. 4&5).

Endoscopic examination and management:

In five of the examined dogs, endoscopic examination of the nasal cavity showed a foreign body in the nasal cavity, three animals had wooden piece foreign bodies in the nasal cavity (Fig. 6) and in two animals the foreign body was a grass awn and a wheat awn. All foreign bodies in the nasal cavity were removed under endoscopic vision using a foreign body extractor passing through the endoscopic sheath (Fig. 7).

In two dogs the foreign body (a wooden piece) was found in the left main bronchus. Removal of the foreign body was done with a foreign body extractor passed through the endoscopic sheath and under endoscopic guidance.

In five of the examined animals (2 dogs and 3 cats), the foreign body was in the nasopharynx. In one dog, the foreign body was a wooden piece which injured the nasopharynx and the soft palate. The foreign body itself was not found during the endoscopic examination and thought to be expelled after injury, but remnants from wood, and the wounds were seen endoscopically (Fig. 8). In another dog the foreign body was a piece of bone which lodged into the nasopharynx and was removed endoscopically.

In two cats the foreign bodies were pieces of chicken bone which lodged in the larynx and the upper third of the trachea. In both cases the foreign bodies were extracted endoscopically (Fig. 9). In one cat the foreign body was a fish bone which lodged horizontally at the larynx and was also extracted under endoscopic vision control.

In one dog which showed in radiographic examination of the thorax a wire piece, endoscopy of the upper respiratory tract showed unremarkable changes due to migration of the foreign body. Trials for thoracoscopy was not successful in diagnosis and the animal was euthanized at owner's request and post-mortem examination revealed an abscess in the caudal right lung lobe in which a 4 cm long wire piece was lodged inside and was covered with a thick white layer of fibrous

connective tissue (Fig. 10). A summary of the examined cases is illustrated in Table 2.

Table 2: Summary of the examined animals

Animal	No	Type of FB	Seat of FB	Radiography	Endoscopy	Method of extraction
Dog	1	Wooden piece	Naso-pharynx	- ve	+ ve	Endoscope
Dog	2	Wooden piece	Left nasal cavity	- ve	+ ve	Endoscope
Dog	1	Bone piece	Naso-pharynx	- ve	+ ve	Endoscope
Dog	1	Wheat awn	Right nasal cavity	- ve	+ ve	Endoscope
Dog	2	Wooden piece	Left main bronchus	+ ve. Soft tissue density	+ ve	Endoscope
Dog	1	Grass piece	Right nasal cavity	- ve	+ ve	Endoscope
Dog	1	Wire piece	Right lung lobe	+ ve. Metal object	- ve	- ve
Dog	1	Wooden piece	Right nasal cavity	- ve	+ ve	Endoscope
Cat	2	Chicken bone	Larynx and upper third of trachea	+ ve. Bone density	+ ve	Endoscope
Cat	1	Fish bone	Naso-pharynx	- ve	+ ve	Endoscope
Cat	2	Chicken bone	Naso-pharynx	- ve	+ ve	Endoscope
Total	15					

LLEGENDS OF FIGURES

Fig. 1: Show the instruments used in the endoscopic examination

Fig. 2&3: Show a ventro-dorsal and a latero- lateral radiographic views of a foreign body (wire piece) at the level of the thoracic cavity in a dog

Fig. 4&5: Show a ventro-dorsal and a ventro-dorsal radiographic views of a foreign body (bone) at the level of the larynx and upper part of the trachea in a cat

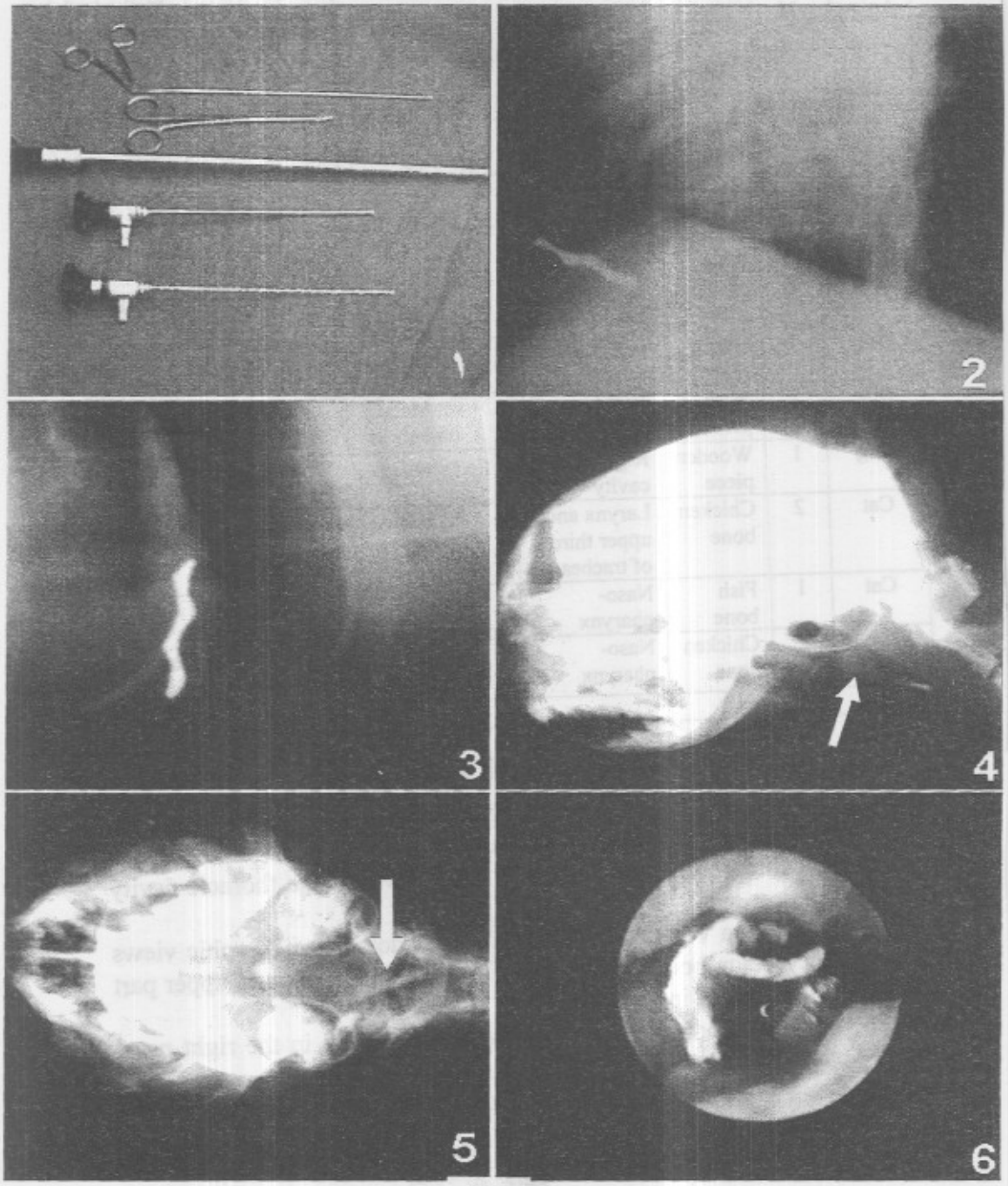
Fig. 6: Show an endoscopic view of a wooden piece in the right nasal cavity of a dog

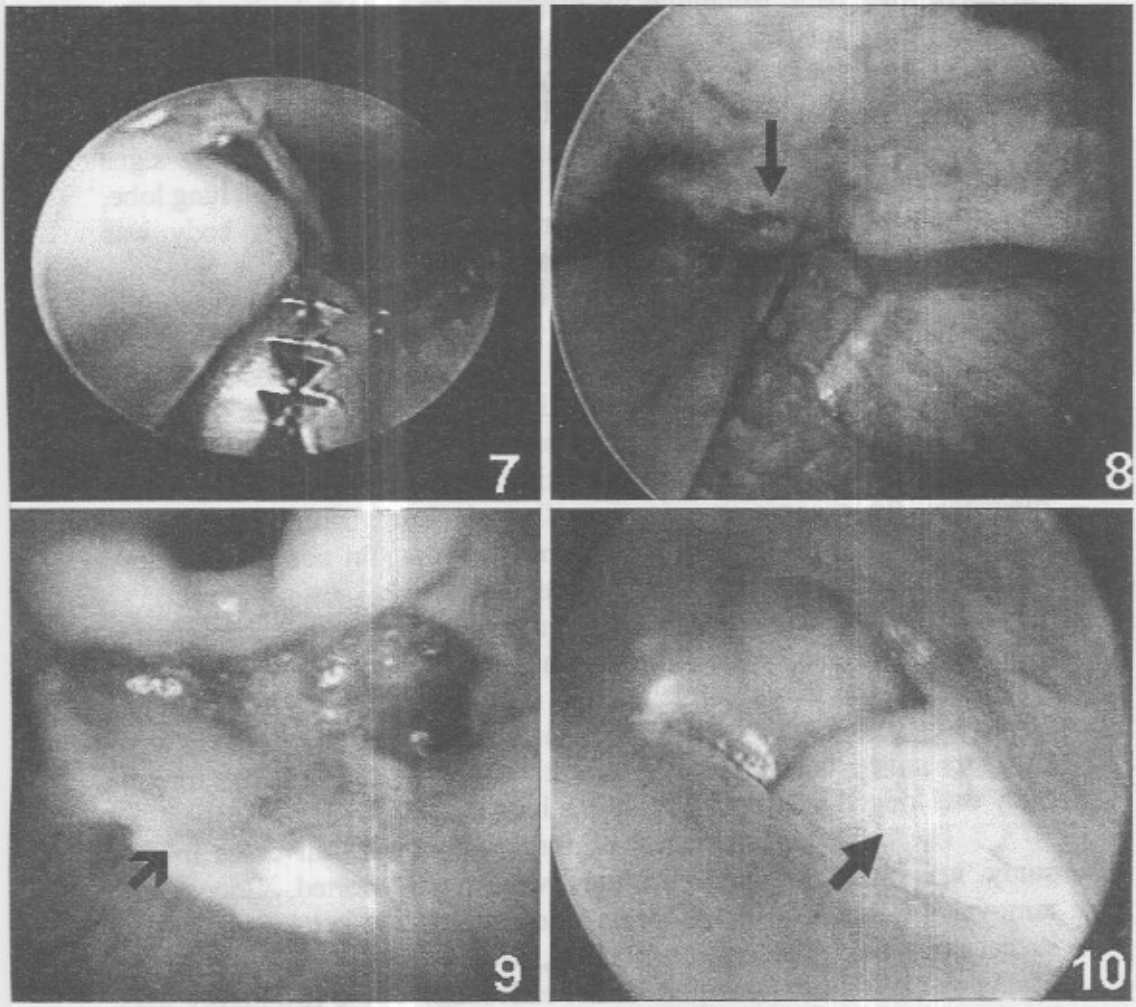
Fig. 7: Show the endoscopic removal of a grass awn in the nasal cavity of a dog

Fig. 8: Wound in the nasopharynx after injury with a foreign body in a dog (black arrow)

Fig. 9: A foreign body (Chicken bone) under the larynx in a cat (black arrow)

Fig. 10: Show an abscess in the lung tissue of a dog (black arrow)





DISCUSSION

The present study illustrates the clinical signs of respiratory system foreign bodies in dogs and cats and their endoscopic diagnosis and removal. Respiratory system obstruction with foreign bodies is a common problem in small animal practice (Gibson 1992, den Hertog 2003, Roy *et al.*, 2005). Otherwise several respiratory system lesions could also happen due to migration of foreign bodies from the gastrointestinal tract in human and animals (Bilgen *et al.*, 2002, Hunter *et al.*, 2003, Koutinas *et al.*, 2003, Yang *et al.*, 2005).

Endoscopic diagnosis is considered to be an effective non invasive diagnostic technique for diagnosis of foreign bodies in many body organs (Brearley *et al.*, 1991, Kraft 1993, Bilgen *et al.*, 2002, den Hertog 2003). In the present study endoscopic examination of the respiratory tract was successful in diagnosis of 14 from 15 examined cases. Only in one dog where the cause of the respiratory distress signs was a 4 cm long wire imbedded in the interstitial tissues of the lung lobe, endoscopy was not helpful in diagnosis and the foreign body was detected and removed in the postmortem examination.

Compared to radiography, endoscopy was more successful in diagnosis of many foreign bodies in the respiratory tract; this can be related to the low radiographic density of some foreign bodies diagnosed in this study as plant materials or wood. Otherwise in two cats with bone foreign bodies in the larynx and trachea and the dog of a wire foreign body in the lung lobe, radiographic examination was helpful in diagnosis. Endoscopic examination allowed clear vision of the lumen content in all parts of the upper respiratory tract in addition to clear vision of any changes in the mucous membrane.

Improved endoscopic techniques together with their greater availability, allowed possibility of removal of the foreign bodies in the airways, making surgical interference unnecessary (Kraft 1993, Bilgen 2002, den Hertog 2003). All foreign bodies diagnosed in this study were easily removed endoscopically except in one case where the foreign body was lodged into an abscess in the lung tissues.

The endoscopic removal of foreign bodies in all cases in this study was safe and complications were not reported. Endoscopic removal of foreign bodies from the respiratory system was also successfully used from Sullivan (1991), Kraft (1993) and from Rha. and Mahoney (1999). It was reported that endoscopy of the respiratory tract is also helpful in diagnosis and treatment of many other respiratory lesions as in diagnosis of nasopharyngeal masses in cats (Bilgen *et al.*, 2002, Esterline 2005), and treatment of bronchial emphysema (Rha and Mahoney 1999, Venuta *et al.*, 2006).

In our study a case of lung abscess formation due to the presence of a wire piece inside the lung tissue was diagnosed radiographically and the foreign body was removed in the postmortem examination from an abscess which formed inside the lung tissue. The way of entrance of the foreign body inside the lung tissue was suspected to be through migration from gastrointestinal tract. Migration of foreign bodies inside the body leads to formation of several lesions as gastrocutaneous fistula,

mediastinal abscess, chronic draining tracts, abscesses formation or non-healing subcutaneous wounds. Diagnosis of such foreign bodies depends on their nature. Different diagnostic tools such as radiography; ultrasonography and endoscopy were used for diagnosis of such migrating foreign bodies (Calfee and Manning 2002, Brennan *et al.*, 2004, Hunt *et al.*, 2004, Young *et al.*, 2004, Gundi *et al.*, 2005). In our study diagnosis of the metal foreign body was not successful endoscopically as the wire piece was impeded inside an abscess formed in the lung tissue which could not be seen during the endoscopic examination.

In conclusion endoscopy could be considered as a safe non invasive technique for diagnosis as well as for removal of respiratory tract foreign bodies.

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