An unusual complication of endotracheal intubation in a dog

Endotracheal intubation has several indications including maintenance of a patent airway, protection of the airway from aspiration of foreign materials, administration of oxygen and inhalant anaesthetics, and application of positive-pressure ventilation (Hartsfield 2007). Oesophageal intubation is a common complication of endotracheal intubation in humans and animals. However, swallowing an endotracheal tube following oesophageal intubation is rare. We would like to report a case of a swallowed endotracheal tube following accidental oesophageal intubation in a dog.

A one and a half year old healthy male cross breed dog, weighing 18 kg was anaesthetized by veterinary students for castration surgery at a teaching veterinary establishment. The dog was premedicated with intramuscular 0.05 mg kg\(^{-1}\) acepromazine (Neurotranq, Alfasan, Holland). Anaesthesia was induced by intravenous (IV) co-administration of 0.25 mg kg\(^{-1}\) diazepam (Zepadic, Caspian Tamin Pharmaceutical Co., Iran) and 5 mg kg\(^{-1}\) ketamine (Alfasan, Holland) mixed in the same syringe and administered via a 20 gauge catheter inserted in the right cephalic vein. The dog’s trachea was to be intubated using an 8-mm cuffed tracheal tube in order to maintain anaesthesia with halothane in oxygen. Intubation was performed by a fourth year student, with the aid of a laryngoscope. The endotracheal tube cuff was inflated. However, before the tube could be fixed to the patient or connected to the Y-piece of the anaesthetic circuit, the tube disappeared from sight in the mouth and pharynx. The attendant surgery Resident was not able manually to get hold of or to remove the tube.

A lateral thoracic radiograph revealed that the lower end of the missing endotracheal tube with an inflated cuff was inside the stomach (Fig. 1). At that time, the upper end of the endotracheal tube was lodged in the oesophagus. Following intubation of the trachea, anaesthesia was maintained with IV diazepam and ketamine, and the dog underwent endoscopic examination which confirmed that the distal part of the endotracheal tube, with inflated cuff, was lodged into the stomach. Due to rigidity of the tube, endoscopic removal was unsuccessful and it was decided to perform midline laparotomy. The tube was palpated within the stomach, the distal end of the tube was manually pushed into the oesophagus (without the necessity of opening the stomach) and it then was possible to remove the tube using a biopsy forceps without difficulty. The intended castration was not performed. Recovery both from anaesthesia and from laparotomy was uneventful.

Accidental oesophageal intubation is common. It is not in itself usually harmful, providing it is detected promptly and a proper airway is established, although delayed diagnosis may result in severe hypoxia and serious morbidity and mortality (Dittrich 2002). However, deglutition of an endotracheal tube is an unusual complication of tracheal intubation. There have been several reports of swallowing of an endotracheal tube following inadvertent oesophageal intubation in humans (Abrahams et al. 1970; Johr & Schubiger 1995); however, we are unaware of a similar case in small animals.

Several clinical methods used by clinicians to verify proper tube placement, including direct visualization of the endotracheal tube passing through the vocal cords, condensation of water vapour inside the endotracheal tube during expiration, auscultation of the chest, and reservoir bag compliance, are not always reliable (Birmingham et al. 1986; Dittrich 2002). Pulse oximetry may be a useful indicator of oesophageal intubation; however, pre-oxygenation prior to intubation will delay detection of arterial desaturation (Dittrich 2002). Capnography and negative pressure testing have been used as reliable tests to differentiate between tracheal and oesophageal intubation (Birmingham et al. 1986).

Deglutition of an endotracheal tube may occur when the tube is accidently placed into the oesophagus and inadequately secured. In the present case, the tracheal tube was lost shortly after intubation. The presence of the tracheal tube in the oesophagus may have stimulated the swallowing reflex in a lightly anaesthetized dog.