Elizabeth Maxwell

Abstract

Rational: Tracheal ruptures associated with intubation in cats may occur following over inflation of the endotracheal tube cuff, change of the cat's recumbent position without proper disconnection of the endotracheal tube from the anesthetic machine, traumatic intubation with a stylet, type of endotracheal tube used, and removal of the endotracheal tube without deflation of the cuff. Clinical signs can occur within a few hours to a few days and include subcutaneous emphysema (100 percent), dyspnea (30 percent) and respiratory stridor (15 percent). Pneumothorax may develop if pressure is high enough to rupture the mediastinum, and clinical signs may result in death. Although tracheal rupture may be managed with supportive care, resolution of subcutaneous emphysema is slow and may take 1-6 weeks. Cats with severe dyspnea, or worsening subcutaneous emphysema may require emergency surgery. This surgical approach is invasive, requiring a median sternotomy, and is often very challenging due to the location of the tear. There has been no other investigation of other treatment modalities for this condition in veterinary medicine. Endoscopic management with instillation of fibrin glue has been reported in people, and is an easy and feasible strategy that supplements medical treatment of post-intubation tracheal lacerations. The tissue glue covers the tracheal laceration and promotes tissue sealing and regeneration.

Aim 1: To determine feasibility of endoscopic application of fibrin glue for treatment of post-intubation tracheal laceration in cats.

Aim 2: Develop guidelines for application of fibrin glue for various types, lengths and locations of tracheal lacerations.

Study Design: Ex vivo experimental study in 10 feline cadavers

Methods: Each cadaver will be intubated with an endotracheal tube and cuff inflated >6 ml of air to induce a spontaneous tracheal tear. The endotracheal tube will be removed. After endoscopic identification of the tracheal laceration, a double lumen catheter will be used to instill the fibrin glue into the tracheal laceration. Following the procedure, the airway of each cat will be harvested intact and tested for an airtight seal by submerging in a plastic receptacle filled with 0.9% NaCl at room temperature (21°C). Leakage will be documented.

Clinical Significance: Developing a minimally invasive treatment approach for post-intubation tracheal lacerations in cats will improve morbidity, and avoid invasive surgical procedures for cats in a clinical setting.

Student responsibilities: The student will be responsible for preparing cadavers and instruments for each procedure day. They will also be responsible for inducing tracheal lacerations, harvesting the airways, and testing for a seal. The student will be responsible for data analysis (with the assistance of a statistician if needed) and for writing up the manuscript for publication (with assistance of other authors/investigators
and mentor. They will be primary author for this study.