



### **G76 Esophageal and Pharyngeal Injury Associated With the Esophageal-Tracheal Combitube®**

*Robert Stoppacher, MD, MS, BS\*, Milwaukee County Medical Examiner's Office 933 West Highland Avenue, Milwaukee, WI*

The goals of this paper are to present a series of cases of esophageal and pharyngeal laceration associated with the use of the Combitube®.

The esophageal-tracheal combination tube or Combitube® is a ventilatory device used for the intubation of patients in a number of different clinical settings. Its basic design consists of a twin lumen tube with proximal and distal inflatable cuffs. This design allows for placement of the device in either the trachea, or more commonly, the esophagus, and through appropriate inflation of the proximal and/or distal cuffs provides a conduit for ventilation. The major benefit of the Combitube® is that its design and function allow for non-laryngoscope-assisted or blind insertion into the oropharynx. Therefore, it is frequently used in emergency situations such as cardiopulmonary resuscitation in both the hospital and pre-hospital setting. As with any invasive procedure, intubation using the Combitube® is not without complications. The majority of complications is relatively minor and includes sore throat, dysphagia, upper airway hematoma, and a more pronounced hemodynamic stress response. A rare and serious complication reported primarily in the anesthesiology literature is rupture of the esophagus. However, this reportedly rare injury is increasingly seen by medical examiners/coroners in the forensic setting.

A series of three cases of esophageal rupture and a single case of laceration of the hypopharynx associated with the use of the Combitube® that were identified at the time of medico-legal autopsy at the Milwaukee County Medical Examiner's Office between 1997 and 2002 will be presented. The cases involved patients between the ages of 15 and 78. The cause of death in three of the cases was determined to be sudden cardiac death due to atherosclerotic and hypertensive cardiovascular disease while acute asthmatic attack was the cause of death in one case. All individuals were intubated in the field by emergency medical personnel during cardiopulmonary resuscitation. The Combitube® was inserted in the esophagus in the three cases of esophageal rupture and in the hypopharynx in the case of pharyngeal laceration and placement of each was confirmed at postmortem examination.

A review of select literature is also presented. This includes a review of the development of the Combitube®, its design and function, and the manufacturer's recommendations for its use. Case reports from the anesthesiology literature are also provided. In addition, the presentation will review information regarding possible mechanisms of injury focusing on recent reports that investigate the importance of anatomic location, cuff volume, esophageal and tracheal distortion, and mucosal pressures in the development of esophageal rupture.

By providing this information, it is hoped the awareness of the forensic community to the esophageal and pharyngeal injuries associated with use of the Combitube® and how they occur is raised. The authors stress the importance of thorough investigation of the perimortem events including review of resuscitation records/reports as they aid in defining the extent to which the injury contributes to the cause and manner of death. In addition, this work demonstrates the vital role the medical examiner/coroner plays in identifying existing or potential problems with current or emerging medical devices. By fulfilling this role, the medical examiner/coroner can provide clinicians and emergency medical personnel information that can be used to prevent similar injuries in the future.

#### **Esophageal Rupture, Combitube®, Complications**