Location and Internal Pressure of Esophageal Cuffs for Alternative Airways in Humans
—Combitube vs. SUMIWAY-WB®—

Takao Masuzaki, Eiichi Goto and Keiichi Tanaka

Emergency and Critical Care Medicine, School of Medicine, Fukuoka University

Abstract：Alternative airways, such as the esophageal-tracheal combitube(ECT), are as important as endotracheal intubation for airway management in prehospital care. Following our experience of an esophageal rupture that occurred during cardiac massage with intubation of a Sengstaken-Blakemore tube (SBT) in a patient with cardiopulmonary arrest due to a gastric varicose vein rupture, we investigated the pressure in the esophageal cuffs of alternative airways in cases undergoing cardiac massage under similar conditions. Furthermore, we investigated the location and esophageal cuff pressure of ECT and an esophageal obturator airway, SUMIWAY-WB® (WB), which are alternative airways approved in prehospital care in Japan. [Methods] The esophageal cuffs of 3 devices, esophageal gastric tube airway (EGTA), ECT, and WB, were filled with a specified volume of air and the internal pressures were measured. ECT and WB were inserted in cases of unsuccessful resuscitation for CPA after confirmation of death. The esophageal cuff pressure was measured during cardiac massage, and the location of the cuff was confirmed by chest X-ray and CT. [Results] The mean esophageal cuff pressures were 52.4, 122, and 219.2 mmHg for ECT, EGTA, and WB, respectively, thus demonstrating that the highest pressure was obtained with WB. The cuff pressure of the ECT did not change during cardiac massage, but the pressure in the WB was affected by cardiac massage: 212 and over 280 mmHg, with and without compression, respectively. On imaging with the tube inserted, the ECT was located in the suprasternal notch, but the WB was located on the caudal side of the bifurcation of the trachea. [Conclusions] Compression injury of the esophagus and surrounding tissues may occur during the application of WB due to the high pressure of the esophageal cuff, and the fact that the cuff is located immediately below the sternal compression site. A large-scale clinical survey is needed, and modification of such tubes should be considered depending on the results.

Key words：**Combitube, Esophageal obturator airway, Alternative airways, Esophageal cuff**