Using the Self-Inflating Bulb to Detect Esophageal Intubation in Children

Several devices have been approved to aid in confirming endotracheal tube (ETT) placement. One such device, the self-inflating esophageal bulb, is approved for patients weighing more than 20 kg. The benefit of this device is that it can be used in nonperfusing patients. It works on the principle that if the ETT is in the rigid trachea and negative pressure is applied by compressing and then releasing the bulb, free aspiration of air occurs and the bulb rapidly reexpands. In the esophagus, soft tissues prevent rapid entry of air into the tracheal tube, and bulb reexpansion is delayed or absent. These authors assessed whether the device can be used reliably in children weighing more than 20 kg and compared 2 methods: compressing the bulb after attaching it to the ETT (on-deflate method) and compressing the bulb before attaching it to the ETT (off-deflate method).

Seventy-five children weighing more than 20 kg and undergoing general anesthesia were intubated both in the trachea (confirmed by capnography) and in the esophagus. After 5 mL/kg of air was insufflated into the stomach through the esophageal tube (to mimic gastric inflation by bag/mask ventilation), drapes were applied to blind the investigator to the location of each tube. An anesthesiologist then performed the on-deflate and off-deflate methods in random order for each of the 2 tubes. The sensitivities of the on-deflate and off-deflate methods for tracheal intubation were both 99%, and the specificities were 92% and 100%, respectively. There were 6 (8%) false-positive results (tube in esophagus but bulb indicates trachea) when the on-deflate method was used.

Comment: Sensitivity is useful, but specificity is crucial, as missed esophageal intubation can be lethal. In this small study, the off-deflate method appears to be superior; its use allowed identification of every esophageal intubation, and tracheal intubation was identified as esophageal intubation only once. Capnography remains the standard of care for confirming tube placement in perfusing patients, but this study and others support cautious and correct use of the esophageal bulb in children.

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