CRICOID COMPRESSION IS EFFECTIVE IN OBLITERATING THE ESOPHAEGAL LUMEN IN THE PRESENCE OF A NASOGASTRIC TUBE

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Introduction. Intravenous induction of anesthesia immediately followed by a full paralyzing dose of a muscle relaxant and tracheal intubation is a widely used technique for patients with a "full stomach". To enhance the safety of the technique, Sellick introduced cricoid compression to prevent gastric contents from reaching the upper esophagus in case regurgitation occurs.\(^1\) In spite of the reliability of cricoid pressure, its efficacy in occluding the esophageal lumen in the presence of a nasogastric tube has been questioned.\(^1\) The present investigation was undertaken to determine the efficacy of cricoid compression in the presence of a nasogastric tube in adult cadavers.

Methods. The study was approved by the medical center's Committee on Human Research. Six fresh adult cadavers were studied. The stomach was exposed by an abdomino-chest incision. A mushroom gastrostomy catheter was inserted into the distal esophagus via the stomach. Tape was placed firmly around it to secure the catheter. The catheter was connected to a three-way stopcock system to allow colored saline to run freely into the esophagus from a height of 100 cm. A plastic nasogastric tube (18 Fr Salem Sump) was introduced via the nose to the mid-esophagus and a clamp was applied proximally to it. Cricoid compression (as described by Sellick) was then applied while the esophagus was being filled with colored saline at 100 cm H2O. The pharynx was visualized while the nasogastric tube was clamped, following its release and again after removal of cricoid pressure. In two cadavers the experiment was repeated using contrast material and lateral X-ray films were taken.

Results. In the presence of a clamped nasogastric tube, cricoid pressure was effective in preventing saline from reaching the pharynx. After releasing the clamp, saline passed freely through the nasogastric tube to the outside, but no fluid was seen in the pharynx. Upon removal of cricoid pressure, fluid immediately appeared in the pharynx and mouth. The results were consistent in all cadavers.

Discussion. Intragastric and intraesophageal pressures higher than 50 cm H2O are unlikely to develop in anesthetized patients except in the presence of active vomiting, coughing, straining or severe mechanical overdistension of the stomach. Adequate muscular relaxation will prevent vomiting, coughing and straining. A functioning nasogastric tube will help reduce the intragastric pressure in the presence of overdistension of the stomach until the time of induction of anesthesia.

The present investigation confirms that firmly applied cricoid pressure is effective in sealing the esophagus around a nasogastric tube against an intraesophageal pressure up to 100 cm H2O. The fact that nasogastric tubes were unoccluded by cricoid pressure in the present investigation should not be surprising. Plastic tubes are too firm to be occluded by cricoid compression even if considerable pressure is exerted. It seems that the type of nasogastric tube used determines whether cricoid pressure would directly occlude the tube or not. In Sellick's original studies, he used a very soft latex tube that required slight pressure to be occluded.\(^1\)

The present data are in agreement with previous findings on infant cadavers that cricoid pressure is effective in sealing the esophagus around the nasogastric tube.\(^2\) Therefore, the tube need not be withdrawn before induction of anesthesia. If a sudden rise in intragastric pressure occurs, an unoccluded nasogastric tube will act as a "blow-off" valve while cricoid pressure will prevent regurgitation of gastric contents to the pharynx.

References.