# The Historical Background of Cricoid Pressure in Anesthesia and Resuscitation

M. R. SALEM, M.D.*
B. A. SELLICK, M.B., B.S., F.F.A.R.C.S.†
J. O. ELAM, M.D.‡

**Cricoid pressure is employed for two main purposes: controlling regurgitation of gastric contents during induction of anesthesia and prevention of gastric inflation during bag-mask or mouth to mouth respiration. Search of the literature revealed that cricoid pressure was used as early as 1774 for the prevention of gastric inflation during resuscitation of the apparently drowned.**

CRICOID pressure as a technic for preventing regurgitation of gastric contents during induction of anesthesia is thought by some to be a new procedure. In point of fact, references to this technic are found in the literature as far back as two centuries ago.

Such control of regurgitation by cricoid pressure, as described by Sellick,[1,2] consists of temporary occlusion of the upper end of the esophagus by backward pressure of the cricoid ring against the bodies of the cervical vertebrae while the neck is kept extended. Sellick suggested using the maneuver also to prevent gastric inflation resulting from positive-pressure ventilation applied through a face piece or by mouth-to-mouth respiration.[2]

More recently, the efficacy of cricoid pressure has been demonstrated in pediatric patients.[3] The maneuver has been found effective in preventing reflux against an intra-esophageal pressure up to 100 cm. of water[3] and in preventing gastric inflation during bag-mask ventilation in pediatric patients.[4]

Cricoid pressure was used as early as 1774 by Monro. In a letter from Dr. William Cullen to Lord Cathcart,[5] dated August 8, 1774, and published in 1776, concerning the recovery of persons "drowned and seemingly dead," the use of cricoid pressure was referred to as a means of preventing gastric distention during inflation of the lungs.

In this historic letter, Cullen states: "On this subject, I am obliged to my learned and ingenious Colleague, Dr. Monro, who has made some experiments for ascertaining the best manner of inflating the lungs of drowned persons. By these experiments he finds it may be more conveniently done, by blowing into one of the nostrils, than by blowing into the mouth. For blowing into the nostril, it is necessary to be provided with a wooden pipe, fitted at one extremity for filling the nostril, and at the other, for being blown into by a person's mouth, or for receiving the pipe of a pair of bellows, to be employed for the same purpose. Dr. Monro finds, that a person of ordinary strength can blow into such a pipe, with a sufficient force to inflate the lungs to a considerable degree; and

*Division of Anesthesiology, Cook County Hospital and the Hektoen Institute for Medical Research of the Cook County Hospital, Chicago, Illinois 60612.

†Department of Anesthesiology, The Middlesex Hospital, London, England.

‡Department of Anesthesiology, University of Chicago Hospitals, Pritzker School of Medicine, Chicago, Illinois.

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thinks the warm air from the lungs of a living person, will be most conveniently employed at first; but when it is not soon effectual, in restoring the respiration of the drowned person, and that a longer continuance of the inflation is necessary, it may be proper to employ a pair of bellows, large enough at once to contain the quantity of air necessary to inflate the lungs to a due degree.

"Whether the blowing in is done by a person's mouth, or by bellows, Dr. Monro observes, that the air is ready to pass by the gullet into the stomach; but that this may be prevented, by pressing the lower part of the larynx backwards upon the gullet. To persons of a little knowledge in anatomy, it is to be observed, that the pressure should be only on the cricoid cartilage, by which the gullet may be straitened, while the passage through the larynx is not interrupted.

"When, by blowing thus into the nostril, it can be perceived, by the raising of the chest or belly, that the lungs are filled with air, the blowing in should cease; and, by pressing the breast and belly, the air received into the lungs should be again expelled; then the blowing and expulsion should be again repeated; and thus the practice is to be continued, so as to imitate as exactly as possible, the alternate motions of natural respiration.

"It is hardly necessary to observe, that when the blowing into the nostril is practiced, the other nostril and the mouth should be accurately closed.

"If it should happen, that, in this practice, the air does not seem to pass readily into the lungs, Dr. Munro informs me, it is very practicable to introduce directly into the glottis and trachea a crooked tube, such as the catheter used for a male adult. For this he offers the following directions: The surgeon should place himself on the right side of the patient, and introducing the forefinger of his left hand at the right corner of the patient's mouth, he should push the point of it behind the epiglottis; and using this as a directory, he may enter the catheter which he holds in his right hand, at the left corner of the patient's mouth, till the end of it is passed beyond the point of his forefinger; and it is then to be let fall, rather than pushed into the glottis; and through this tube, by a proper syringe applied to it, air may be with certainty blown into the lungs. I observe, that some such measure had been proposed by Mons. Le Cat in France; but I have not learned that it has ever been put in practice, and I am afraid it may be attended with several difficulties, and must be left to the discretion of surgeons, who may be properly provided and instructed for this purpose."

Reference to pressure on the larynx was also mentioned by Hunter,[6] in 1776, as a means of preventing insufflation of the stomach during inflation of the lungs by a bellows. In his article he states:

"If during the operation of the bellows, the larynx be gently pressed against the oesophagus and spine, it will prevent the stomach and intestines being too much distended by the air, and leave room for the application of more effectual stimuli to those parts. This pressure however, must be conducted with judgment and caution, so that the trachea and the aperture into the larynx may both be left perfectly free."

## COMMENTS

Cullen[5] emphasized that pressure should be only on the cricoid cartilage, so that

★ M. Ramez Salem, M.D., is Associate Director, Department of Anesthesiology at Cook County Hospital, and Professor of Anesthesiology at Loyola University, Stritch School of Medicine, Chicago, Illinois. He served his Residency at the University of Chicago (Illinois) Hospitals and Clinics. After graduation from the Faculty of Medicine of Cairo University in his native Egypt, Dr. Salem was associated with the American University Hospital, Beirut, Lebanon and St. Louis University (Missouri) School of Medicine, and the University of Chicago, Pritzker School of Medicine.

laryngeal patency would remain uninterrupted, while Hunter[6] advised "gentle" pressure on the larynx against the esophagus and spine. He warned that the pressure be conducted "with judgment," so that the larynx and trachea remain patent.

Cricoid pressure is now employed for two main purposes in anesthetized patients: the prevention of regurgitation of gastric contents during induction of anesthesia[1-3] and in the prevention of gastric inflation during bag-mask or mouth-to-mouth respiration. For the prevention of regurgitation of gastric contents, firm cricoid pressure is required to counteract the excessive rise in intragastric pressure.[1-3] However, gentle pressure on the cricoid cartilage is all that is necessary if gastric distention is to be avoided during bag-mask ventilation or mouth-to-mouth respiration.[4] If firm pressure is applied under these circumstances, airway patency may be compromised, especially in infants and children.[4]

Both Cullen's letter and Hunter's article also dealt with resuscitation of the apparently drowned. However, successful respiratory resuscitation was reported earlier in medical records. In 1732, Tossach[7] performed the first recorded successful resuscitation.

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In this country, every man is the architect of his own ambitions.

—*Horton Bain*

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Not education, but character is man's greatest need—and man's greatest safeguard.

—*Herbert Spencer*

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The strength of a man's virtue must not be measured by his occasional efforts, but by his ordinary life.

—*Blaise Pascal*