CURRENT COMMENT AND CASE REPORTS

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MOUTH-TO-MOUTH AIRWAY

Dr. Peter Safar, Baltimore, reports on a new technique of mouth-to-mouth artificial respiration which is performed with a special oropharyngeal artificial airway. He modified a conventional oropharyngeal airway by fusing two airways to form an S-shaped instrument, as illustrated.

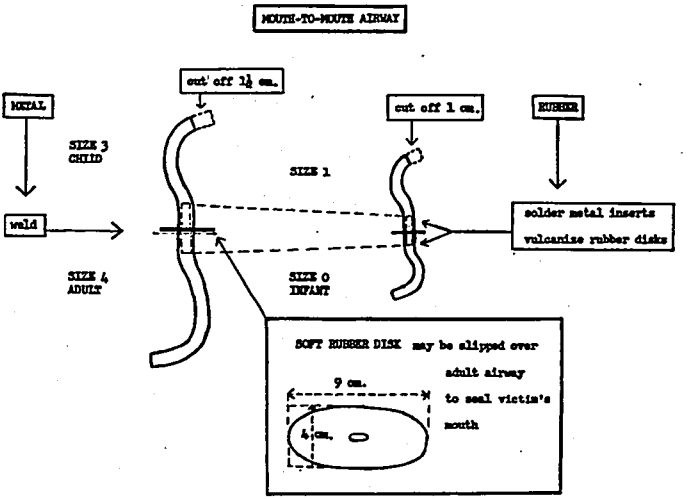

FIG. 1. Diagram of mouth-to-mouth airway for artificial respiration showing component parts of adult and infant size devices.

TECHNIQUE

(1) When the "victim" is an adult, the long end of the airway is inserted; when a child, the short end is inserted; and when an infant, the special infant airway is used. The horizontal plate of the airway must be at the level of the lips. The part of the airway which remains outside serves as a mouthpiece for the "rescuer." (2) The victim's head is extended. (3) The angles of the mandible are grasped with both hands, and the rescuer pulls forcefully upward. (4) The victim's nostrils are closed with the operator's thenar eminences. The soft rubber disk is not essential, but it helps seal the mouth with the thumbs over the victim's lips. (5) After taking a deep breath, the operator blows into the mouthpiece, forcefully in adults, gently in children, and only with "puffs" from the oral cavity in newborn babies. (6) The victim's chest is watched at all times. When the

FIG. 2. Airway in place, "victim's" head extended, and operator's hands in position for application of artificial respiration.

chest rises the operator takes his mouth off the mouthpiece, turns his face to the side, and lets the victim exhale passively. (7) If the chest does not rise, the extension of the victim's head and the support of the mandible are improved and the operator blows more forcefully. Air is blown into the stomach only when there is obstruction of the air passages or when too high inflation pressures are used. Gastric distension is self-limiting, but if it occurs, gentle manual pressure over the epigastrium between breaths will expel the air. (8). The inflations can be repeated about 20 times per minute or at any rate considered necessary. Depressed spontaneous respirations may be assisted satisfactorily with this technique by using short "puffs" of large volumes immediately after the victim starts inspiring.

FIG. 3. Operator inflating the "victim's" lungs by blowing into the mouthpiece of airway device for artificial respiration.

Results

The recommendation of this method is based on a controlled study of 130 laymen and doctors, who performed various methods of artificial respiration on 10 anesthetized and curarized adult volunteers (weighing 130–210 pounds) and 10 apneic patients. Tidal volumes greater than 1,500 ml. could be moved in all subjects with the mouth-to-mouth and the mouth-to-airway techniques, while the Holger-Nielsen and the Silvester methods did not move more than deadspace air in 50 per cent of the volunteers whose tracheas were not intubated.

With the mouth-to-airway technique, breaths of approximately 1,000 ml. each, at a rate of approximately 12 per minute, could be maintained by untrained laymen for periods up to 30 minutes without fatigue or dizziness of the rescuer. The victim's alveolar pCO_2 could be maintained below normal, and the arterial hemoglobin, 100 per cent saturated with oxygen. Those untrained rescuers who failed to ventilate the "victim" adequately with the mouth-to-mouth technique were successful with the mouth-to-airway method.

The advantages of the mouth-to-airway technique over the direct mouth-to-mouth technique are: (1) More acceptable and pleasant for the operator, (2) better pulmonary ventilation, (3) less fatigue of the rescuer, (4) less gastric distension of the victim, and (5) fewer failures, because maintenance of a patent upper airway is easier.

This airway can be carried in the pocket, particularly when it is made of rubber or plastic. Captain Martin McMahon of the Baltimore Fire Department Ambulance Service, who was Dr. Safar's associate in developing this technique, his "firefighters," and doctors at the Baltimore City Hospitals are using this airway at the present time.

Dr. Safar credits Drs. A. Lamont and J. Elam for their suggestions in the development of this airway.

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ANEROID MANOMETER FOR ARTERIAL BLOOD PRESSURE

Dr. John Severinghaus, Iowa City, Iowa, suggests connecting an aneroid manometer to an arterial catheter for continuous indication of mean pressure, and his comments follow.

It is occasionally desirable to connect an intra-arterial catheter to some device for continuous indication of the blood pressure, as for example in hypothermia or induced hypotension when cuff pressure may be difficult to obtain. The formerly popular mercury manometer is rarely used in man, but has many advantages. The usual method, at present, includes a strain gauge transducer, its amplifier and recorder, calibration equipment and an operator. This is necessary if either systolic and diastolic pressure must be known or a permanent continuous record is needed. But for continuous indication of mean pressure, a much simpler method is available. An aneroid manometer, filled with fluid and mounted at heart level, may be directly connected to an arterial catheter. Since the manometer cannot be easily sterilized, a membrane must be interposed between it and the catheter. As illustrated, this membrane may be constructed of ⅜-inch Penrose latex tubing tied over rubber stoppers with stainless steel suture. The upper stopper fits snugly into a 5 ml.-syringe barrel and has a hole fitting the manometer nipple. The lower stopper, about ¼-inch long, should slide freely in the barrel. If facilities are available, a membrane with a closed bottom could be molded from liquid latex over a ⅜-inch test tube. All air must be eliminated from the manometer and membrane to keep the system compliance low and prevent blood from entering the catheter with each pulse. Bubbles are removed by pumping liquid into the manometer from a syringe attached with a short rubber tubing. When completely liquid filled, the compliance of the usual aneroid manometer is less than 0.2 ml. per 100 mm. of mercury. Ethylene glycol is a satisfactory