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Respiratory Gas Studies with Ether Convulsion

JAMES WAUN, M.D., AND WENDELL STEVENS, M.D.*

The patient, a four year old Negro girl, weighing 38 pounds, was admitted for repair of a congenital cleft palate. Review of history, physical examination and routine laboratory studies were unremarkable. Premedication consisted of meperidine 30 mg. and scopolamine 0.2 mg., intramuscularly.

Anesthesia was induced using nitrous oxide, cyclopropane and oxygen at a total flow of approximately 10 liters/minute in an adult circle absorption system with unidirectional valves at the mask. Agents were gradually changed to ether, nitrous oxide and oxygen for maintenance with total flow over 5 liters/minute. Dead space of the anesthetic apparatus after intubation was 12 ml.

After an unsuccessful attempt at blind nasotracheal intubation, succinylcholine 50 mg. was given intramuscularly to achieve more adequate relaxation. A No. 3 Davol tube was passed through the nose into the trachea under direct vision. After approximately five minutes of what was believed to be adequate controlled ventilation, the patient was hypoventilated in an attempt to re-establish spontaneous respiration. During this period gas flows were nitrous oxide and oxygen at 3.5:1.5 liters/minute, respectively. Ether was administered via a Copper Kettle with the oxygen flow gradually reduced from 1,400 ml./minute at time of

intubation to zero a few minutes before the subsequent seizures.

Fasciculations of the tongue and face were noted approximately thirty minutes after the succinylcholine had been given. These soon progressed to generalized clonic seizures. Thiopental, 25 mg. was given intravenously to stop the seizures.

Rectal temperature at this time was 37.5° C., and remained so for the duration of the operation. Heart rate was 140 beats/minute. It had been noted prior to the seizures that it slowed to 100 beats/minute between respirations and returned to 140 beats/minute following even a single respiration. Nitrous oxide was discontinued for a few minutes at the time of the seizures and then flow rates were re-adjusted to nitrous oxide and oxygen at 3.5 liters/minute each. Within a short time the patient was too lightly anesthetized to proceed with surgery so that ether was restarted and was continued throughout the remainder of the case.

Nearly 25 minutes after the seizures, during which time purposeful hyperventilation was performed, arterial blood gases and pH were determined. P_{aO_2} was 67 mm. of mercury, P_{aCO_2} was 75 mm. of mercury and pH 7.0. At the end of the procedure the blood gas values were P_{aO_2} —80 mm. of mercury, P_{aCO_2} —37 mm. of mercury, pH 7.15. The following day the values were P_{aO_2} —88 mm. of mercury, P_{aCO_2} —37 mm. of mercury, pH 7.38 with the patient breathing room air.

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The postoperative course was uneventful.

This case is reported as one in which "ether convulsions" were noted and correlated with arterial blood gas tensions. Hypercarbia and acidosis have been frequently incriminated as

causing this complication but have not been well documented. These extremely abnormal values, even after some correction of offending hypoventilation, seem to support the case for CO₂ retention.

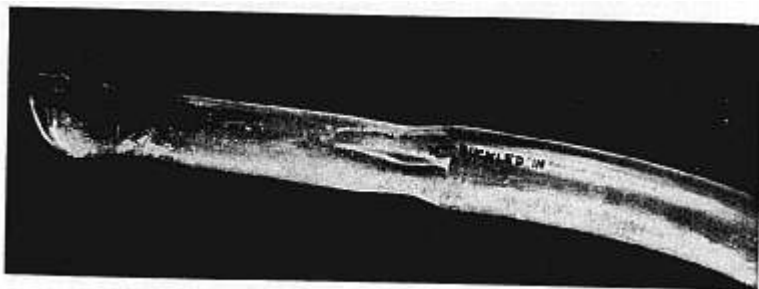
Obstructed Endotracheal Catheter

ARNOLD M. SOBEL, M.D.*

Although there are many reasons for a properly placed endotracheal tube not always ensuring an unobstructed airway, I recently noted a plastic tube which was partially obstructed, but apparent only on close examination. A size 36 French clear plastic endotracheal catheter which had turned amber after one year's use developed a leaky cuff. This

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cuff had originally been very snug fitting and upon removing it the tube had a constricted area two and one-quarter inches in length. Apparently the pressure of the cuff aided by the warmth of the body when in use over the period of the year or less had remolded the thermolabile plastic (see illustration). The upper three-quarters of an inch of this constricted area was buckled inward. The length of the area is easily noted.



CORRESPONDENCE

Correction

To the Editor.—There is an error in my paper, "Krypton⁸⁵ and Nitrous Oxide Uptake of the Human Brain During Anesthesia." (ANESTHESIOLOGY 25: 37, 1964.) Line 25 on page 41 should read, "A fall in cardiac output during hypocarbia would also produce

a more rapid rise in arterial N₂O concentration similar to the pattern seen in figure 3."

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