

13270 P

Phenomenon of Asphyxial Resuscitation. Resuscitation with Inert (Asphyxiating) Gases.

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In a study of the various resuscitation procedures in advanced asphyxia, over a hundred experiments were carried out in 43 dogs. During this work, it was observed that in the third phase of asphyxia (cessation of respiration and rapidly falling blood pressure), complete resuscitation of the heart and respiration can be quite regularly produced by rhythmic alternating insufflation and suction with an inert gas (nitrogen, helium), which had just been used to produce the asphyxia. Asphyxial resuscitation was administered at a rate of 15-20 complete strokes per minute, using a positive phase of +14 mm Hg and a negative phase of -9 mm Hg. This resuscitation was continued until the first spontaneous respiration occurred and was then immediately discontinued and the animal allowed to breathe atmospheric air. (Fig. 1.)

The animals were anesthetized by intraperitoneal injection of nembutal (1 cc per 5 pounds). They were then asphyxiated by (1) obstructive (strangulation) asphyxia, or (2) nitrogen, helium, or nitrous oxide inhalation. Either a specially-fitting face mask and pharyngeal airway were used or else a special intratracheal catheter with inflation cuff to prevent leakage.

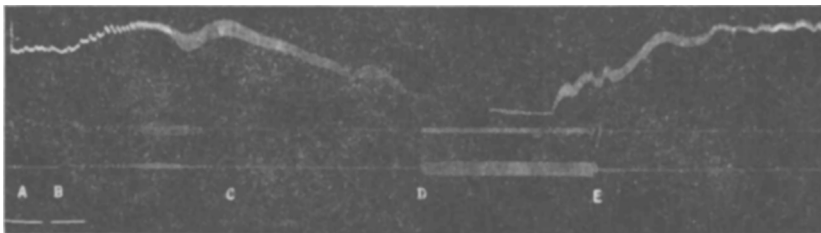


FIG. 1.

Dog 43. *The Phenomenon of Asphyxial Resuscitation.* A, Normal respiration. B, Nitrogen inhalation asphyxia started. C, Respiration has ceased. In the interval C to D, which is $2\frac{3}{4}$ minutes, the animal's lungs were left connected only to nitrogen gas. D, $2\frac{3}{4}$ minutes after respiration had ceased, rhythmic inflation and suction of the lungs with nitrogen was started. E, A spontaneous respiration was taken, and the intratracheal tube was opened to the atmospheric air; natural breathing followed.

From above down, blood pressure, respiration, and positive-negative resuscitator.

TABLE I.
Summary of 106 Experiments with Different Resuscitative Procedures.

	Oxygen			Nitrogen		
	Success	Failure	% Success	Success	Failure	% Success
Manual Artificial						
Respiration	6	5	55	1	6	15
Rhythmic Inflation	7	2	78	2	10	17
" Suction	4	1	80	1	4	20
Resuscitation	21	1	95	30	5	85
(Rhythmic Inflation and Suction).						

If asphyxia be allowed to reach the third phase (cessation of respiration, rapidly falling blood pressure), the animal ordinarily dies; but if asphyxial resuscitation be applied in this third phase at periods from one-half to $2\frac{3}{4}$ minutes after cessation of respiration, permanent resuscitation of the heart and respiration can be accomplished quite regularly.

Asphyxial resuscitation, using inert gas, was produced by manual artificial respiration in 15% of the animals, produced by rhythmic positive insufflation in 17%, and produced by rhythmic suction in 20% of the animals. This phenomenon, however, was produced in 85% of the experiments where the combination of rhythmic insufflation and suction was used. (Table I.)

Resuscitation with an inert gas, like resuscitation with oxygen, is more effective the sooner it is applied after cessation of respiration. The phenomenon is abolished or markedly altered by carotid sinus denervation. It is abolished by double vagotomy.

Other physiological studies, including blood gas and alveolar gas analyses, are under way to determine what other factors may be involved in the mechanism of the phenomenon.

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Continuous and Reproducible Records of the Electrical Activity of the Human Retina.*

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Two technical problems which have presented considerable difficulty in experimentation on human vision are (1) providing a sat-

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