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Correspondence

Newborn Response to Oxygen Blown over the Face

To the Editor:—In Dr. Gregory's excellent review article, "Resuscitation of the Newborn" (ANESTHESIOLOGY 43:225–237, 1975), he mentions many factors that sustain or depress ventilation at birth. During his description of newborn resuscitation, he states for the baby with an Apgar score of 5, 6, or 7: "These infants have generally suffered some mild terminal asphyxia, *i.e.*, asphysia(sic) occurring just prior to birth, and respond to vigorous stimulation and oxygen blown over their faces."

It has been our clinical experience that high flows of cold unhumidified oxygen blown over the face of newborn immediately after birth may result in breath-holding and deceleration of neonatal heart rate (NHR), and can occasionally be associated with profound bradycardia and apnea.

Figure 1 shows the NHR response of a healthy, full-term newborn to the procedure. In this case, electrodes were applied to the surface of the baby's skin after delivery, and the R-wave of the electrocardiogram was used to trigger the cardiotachometer of a neonatal monitor. The beat-to-beat (instantaneous) heart rate was then recorded. Six minutes following birth, a 5-l/min flow of oxygen was blown over the neonate's face, leading to deceleration in the heart rate. Shortly thereafter, a 10-l/min flow was used; it caused prolonged deceleration, with several abrupt

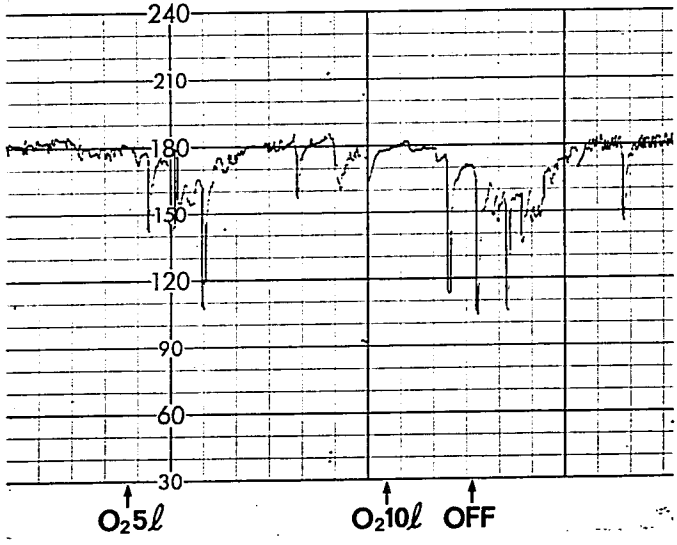

FIG. 1. Deceleration of neonatal heart rate (NHR) associated with oxygen blown over the newborn's face at flows of 5 and 10 l/min. NHR recorded in beats/min at a chart speed of 3 cm/min.

descents, in the heart rate. Transient breath-holding was also seen during this administration.

It has been documented that cardiac arrhythmias can be induced by stimulation of vagal nerve endings found in the pharynx, esophagus, or respiratory tract.[1] Respiratory changes may be explained by the same mechanism. Cordero and Hon[2] demonstrated that periods of apnea as well as cardiac arrhythmias can result from indiscriminate nasopharyngeal or oropharyngeal suctioning with a nasogastric tube. The cooling effect, force, and velocity of oxygen emitted at high flow rates upon the face and respiratory passages may lead to similar cardiopulmonary changes in the newborn. The baby's ventilation could also be impeded by the force and velocity of gas delivered at high flow rates.

We recommend in the case of mild asphyxia the gentle application of the oxygen mask with attached bag to the baby's face, and administration of oxygen flows of less than 5 l/min along with tactile stimulation of the feet. This approach has not resulted in any instance of marked bradycardia or apnea in our hands.

It is imperative that an observer (nurse, physician, student) listen to the heart of the newborn and monitor respirations during any form of oxygen administration or aggressive oropharyngeal, nasopharyngeal or tracheal suctioning (as in the case of meconium aspiration).

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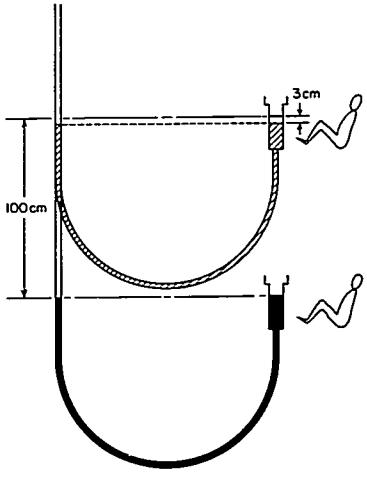
A Continuous Indicator of the Zero Level of Central Venous Pressure



To the Editor:—A "simple" indicator of the zero level of central venous pressure, by use of two water surfaces in a transparent U tube, was recently described (ANESTHESIOLOGY 43: 678, 1975). The method may, however, prove difficult to apply when the patient is placed in a hard-to-reach position, *e.g.*, under the neurosurgical equipment stand. The reasons include

FIG. 1. A continuous indicator of the zero level of central venous pressure. The syringe barrel is taped to the patient with the water level at the right atrium. The tubing is taped to the iv infusion set pole. The zero level can be read from the tubing, at a distance from the patient. Once set up, the system continues to work despite changes in patient position. In the example depicted, when the patient is elevated by 100 cm the water level will not lag below the original reference by more than 3 cm, because the 100 cm extra length of tubing requires only a 3-cm column of water from a 10-ml syringe to fill. Lifting the iv infusion set pole will return the displaced water to the syringe barrel and bring the water level back to the original reference point exactly.