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Prolonged apnea in the preterm infant is not a random event.

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Abstract

We tested the hypothesis that in preterm infants, prolonged apneas (apneas \geq 20 sec) are not random events but are preceded by frequent and progressively longer respiratory pauses associated with changes in ventilatory variables. We studied 36 preterm infants with apnea [birth weight 1190 \pm 60 g (mean \pm SEM), study weight 1300 \pm 60 g, gestational age 28 \pm 1 weeks, and postnatal age 23 \pm 2 days]. A nose-piece with a flow-through system was used to measure ventilation and alveolar gases. Throughout the monitoring period for each infant we established 10-min moving "window of observation" followed by a 1-min interval examined for the detection of a prolonged apnea. Within the 10-min window, three variables were defined: the number of apneic episodes, the maximum length of a single apneic episode, and the total duration of apneic time. During the following minute (eleventh) the presence or absence of a prolonged apnea was determined. Chi-square test for a linear-trend in the rate of prolonged apnea and multiple logistic regression analysis showed that the relative risk of a prolonged apnea increases significantly from preceding periods without apnea to preceding periods containing the potential predictors of prolonged apnea. The strongest predictor was total duration of apneic time in the previous 10 min. When the 1 min before prolonged apnea was compared with the 1 min of similar sleep state not having prolonged apnea, minute ventilation decreased, primarily due to a decrease in respiratory frequency. Oxygen saturation decreased and alveolar PCO₂ did not change. These findings suggest that prolonged apnea is not a random event but is preceded by a disturbance of the respiratory control system characterized by (1) frequent apneas of progressive duration, (2) decrease in respiratory minute volume and frequency, and (3) decreased O₂ saturation.

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