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HEART RATE CHARACTERISTICS MONITORING AND CENTRAL NEONATAL APNEA

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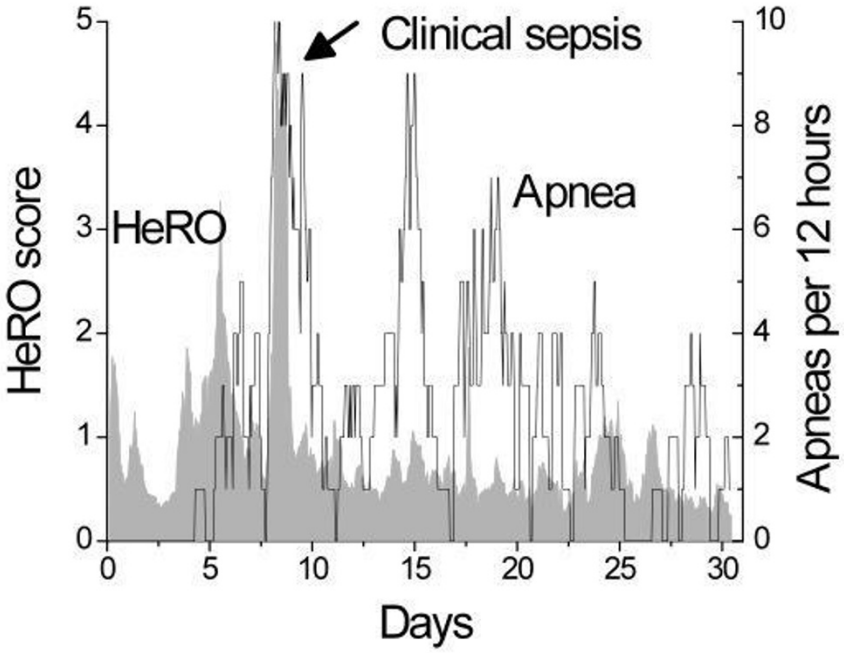
Background: Heart rate characteristics monitoring using the HeRO score detects reduced variability and transient decelerations that occur prior to clinical signs of neonatal sepsis, and reduces VLBW mortality when displayed to clinicians. Neonatal apnea causes HR decelerations.

Aim: We tested the hypothesis that central apneas are the cause of high HeRO scores.

Methods: We fashioned an algorithm to detect central neonatal apnea that efficiently removes the cardiac component of the chest impedance signal. We identified 0.9 episodes per day lasting more than 30 sec and accompanied by bradycardia and desaturation in 1837 non-ventilated days in 105 VLBW infants in the University of Virginia NICU.

Results: Severe central apneas accounted for only 17% of the variance in HeRO scores but were highly significant predictors of high HeRO score even after birth weight, Apgar, and hospital day were taken into account. Individual records (Figure), though, showed inconsistent temporal association of HeRO score (shade) and the number of severe apneas (line), here in an infant who died of lung disease - some but not all, synchronized with HeRO.



[HRC and apnea example]

Conclusion: Frequent and severe central neonatal apneas can correlate with elevated HeRO scores, and may be partly causative. We speculate that abnormal heart rate control in sepsis may have mechanisms in addition to hypoxemia caused by central apnea.