

Abstract:

Comparing Artificial Intelligence to Routine Monitors in Neonatal Evaluation: The CARE Trial

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Purpose: Neonatal respiration is a pivotal marker in routine neonatal care. Continuous monitoring of respiration is critical in detecting early changes in breathing pattern and avoiding worsening outcomes such as apnea, hypoxia, or sudden infant death syndrome (SIDS). Classically, neonatal respiration is monitored by echocardiography (ECG) leads attached to the chest wall to determine thoracic impedance with increasing voltage on inspiration and decreasing voltage on expiration. However, this measurement is not perfect as body positioning and movement, as well as incomplete skin adhesion, can decrease the accuracy of these measurements. Moreover, continuous adhesive can be irritating and damaging to the neonate. Non-contact respiratory rate monitoring, using camera vision and artificial intelligence, offers a less invasive method to record these values in real time.

Methods: In the IRB approved CARE Trial, neonates admitted to the Lake Forest Hospital Neonatal Intensive Care Unit (NICU) were monitored with a camera connected to an artificial intelligence algorithm for analysis while simultaneously recording the respiratory rate display from classical ECG recording.

Results: This recorded data is under further review and algorithm refinement to determine non-inferiority when compared to the ECG monitor with results expected Spring, 2021. Preliminary results indicate that the camera vision was able to identify a reliable rhythm. Correlation to the ECG recording is currently underway.