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Title: Pulse transit time allows a reliable non-invasive measurement of respiratory effort under non-invasive ventilation

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Body: Rationale: Among respiratory events which may occur during nocturnal non-invasive ventilation (NIV), differentiating between central and obstructive events requires appropriate indicators of respiratory effort. Objective: To assess pulse transit time (PTT) as an indicator of respiratory effort under NIV in comparison with esophageal pressure (Pes). Methods: 1: During wake period, PTT was compared to Pes during spontaneous breathing and under NIV with or without induced leaks in 11 healthy individuals. 2: To evaluate the contribution of PTT vs Pes for differentiating central from obstructive respiratory events occurring under NIV during sleep in 10 patients with obesity hypoventilation syndrome (OHS). Results: 1: From spontaneous breathing to NIV without leaks, respiratory effort decreased significantly and with increasing level of leaks, there was a significant increase in respiratory effort. In both situations changes in PTT accurately reflected changes in Pes. 2: In OHS patients during nocturnal NIV, intraclass correlation coefficients between Pes and PTT were 0.970 for total number of events and 0.970 for percentage of central events. Conclusion: PTT accurately reflects the unloading of respiratory muscles induced by NIV and the increase in respiratory effort during NIV. PTT during sleep is also useful to differentiate central from obstructive respiratory events occurring under NIV. Clinical trial registration number: NCT00983411.