ICU
MANAGEMENT & PRACTICE

Comparison of Masimo Acoustic Respiration Rate (RRa®) and Nellcor Plethysmographic Respiration Rate

Masimo Radical-7® Pulse CO-Oximeter® with RAS-125c Respiratory Acoustic Sensor

Masimo has announced that researchers at the Tokyo Women's Medical University, Department of Anesthesiology, in Japan have published a study investigating the measurement of respiration rate in volunteers. Masimo acoustic respiration rate (Masimo), using the Masimo Radical-7® Pulse CO-Oximeter®, was studied alongside Nellcor plethysmographic respiration rate (Nellcor), using the Nellcor PM1000N.[1]

Dr. Kitsiripant and colleagues enrolled 50 healthy adult volunteers in the study. Respiration rate, pulse rate, and oxygen saturation (SpO2) values were measured using the two technologies: Nellcor respiration rate, pulse rate, and SpO2 on PM1000N (version 2.0.20.0) were measured using an SpO2 adhesive sensor on the left index finger; Masimo respiration rate on Radical-7 (V.7910, processor V1.3.06i) was measured using the RAS-125c (rev D) acoustic sensor on the left side of the neck, with an R1-25L adhesive sensor on the right index finger measuring Masimo pulse rate and SpO2.

Both devices were configured to alarm in the event of respiratory pause (Masimo) or low respiration rate (Nellcor) for 30 seconds, respiration rate under 10 breaths/minute, and SpO2 of 90% or below. The volunteers were required to breathe at a rate of 12 breaths/minute for 3 minutes, then hold their breath until one of the device's respiratory pause/low respiration rate alarms was triggered, then resume breathing. Because of the difficulty for some volunteers of completely stopping airflow for 30 seconds, a smaller group of 10 volunteers was recruited to perform the same procedure but with respiratory pause/low respiration rate alarms set to 15 seconds.

Of the 143 procedures in which breathing was successfully held for more than 30 seconds, Masimo alarmed 114 times and Nellcor alarmed 15 times. The average time to alarm for Masimo was 35 seconds and for Nellcor, 59 seconds. Most of the alarms for Nellcor followed from SpO2 being < 90%, whereas most for Masimowere caused by respiration rate < 10 breaths/minute (which tended to occur prior to the drop in SpO2). Of the 29 procedures in which breathing was held for 15 seconds, Masimo alarmed 29 times, with an average time to alarm of 21 seconds, and Nellcor did not alarm at all.

The researchers concluded that Masimo acoustic respiration rate provided faster detection of respiratory pause than Nellcor, but it should be noted as a limitation of the study that the measurements were taken using volunteer participants who maintained a fixed breathing rate and then abruptly held their breath.

rainbow Acoustic Monitoring® sensors and cables are indicated for the continuous, noninvasive monitoring of respiratory rate (RRa®). The RAS-125c sensor is indicated for adult and pediatric patients, in hospitals, hospital-type facilities, mobile and home environments.

Reference

1. Kitsiripant C et al. Comparison of Nellcor™ PM1000N and Masimo Radical-7® for detecting apnea in volunteers. *J Anesth*. 9 July 2017. DOI: 10.1007/s00540-017-2385-4.

Source & Image Credit: Masimo

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