

Comparison of Nellcor™ PM1000N and Masimo Radical-7(®) for detecting apnea in volunteers.

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PURPOSE: Although capnography is considered the gold standard for monitoring of ventilation, it may not work accurately in some situations. We compared the performance of two non-invasive continuous respiratory rate (RR) monitors that are alternatives for the detection of respiratory depression.

METHODS: Fifty healthy volunteers ≥ 20 years old were enrolled in this study. After monitoring of the volunteers was started by the Masimo Radical-7(®) and Nellcor™ PM1000N, they breathed at the rate of 12 breaths/min for 3 min and then stopped breathing. As soon as the apnea alarm of either monitor went off, breathing was resumed at the same rate. This entire procedure was repeated three times. The data collected every 30 s included the RR, pulse rate (PR) and oxygen saturation (SpO₂). The times of alarm on, alarm off and reappearance of RR on the monitor screens were also recorded.

RESULTS: The biases of the RR, PR and SpO₂ measurements from the two monitors were 0.5, 0.2 and -0.4, respectively. Of 143 procedures that stopped breathing for more than 30 s, 114 and 15 alarms were shown by the Masimo Radical-7(®) and Nellcor™ PM-1000N monitors, respectively. Most alarms of the Nellcor™ PM1000N followed from SpO₂ <90%. Conversely, most alarms of the Masimo Radical-7(®) were caused by RR <10 breaths/min. Times to alarm on, alarm off and display of RR measured by the Masimo Radical-7(®) monitor were significantly shorter than the Nellcor™ PM-1000N monitor.

CONCLUSIONS: The Masimo Radical-7(®) monitor provides better detection of apnea in volunteers than the Nellcor™ PM-1000N.