A Comparison of Oxygen Saturation Data in Inpatients with Low Oxygen Saturation Using Automated Continuous Monitoring and Intermittent Manual Data Charting

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Background

The manual collection and charting of traditional vital signs data in inpatient populations have been shown to be inaccurate when compared with true physiologic values. This issue has not been examined with respect to oxygen saturation data despite the increased use of this measurement in systems designed to assess the risk of patient deterioration. Of particular note are the lack of available data examining the accuracy of oxygen saturation charting in a particularly vulnerable group of patients who have prolonged oxygen desaturations (mean Spo2 <90% over at least 15 minutes). In addition, no data are currently available that investigate the often suspected "wake up" effect, resulting from a nurse entering a patient's room to obtain vital signs.

Methods

In this study, we compared oxygen saturation data recorded manually with data collected by an automated continuous monitoring system in 16 inpatients considered to be at high risk for deterioration (average Spo2 values <90% collected by the automated system in a 15-minute interval before a manual charting event). Data were sampled from the automatic collection system from 2 periods: over a 15-minute period that ended 5 minutes before the time of the manual data collection and charting, and over a 5-minute range before and after the time of the manual data collection and charting. Average saturations from prolonged baseline desaturations (15-minute period) were compared with both the manual and automated data sampled at the time of the nurse's visit to analyze for systematic change and to investigate the presence of an arousal effect.

Results

The manually charted data were higher than those recorded by the automated system.
Manually recorded data were on average 6.5% (confidence interval, 4.0%–9.0%) higher in oxygen saturation. No significant arousal effect resulting from the nurse's visit to the patient's room was detected.

Conclusions

In a cohort of patients with prolonged desaturations, manual recordings of Spo2 did not reflect physiologic patient state when compared with continuous automated sampling. Currently, early warning scores depend on manual vital sign recordings in many settings; the study data suggest that Spo2 ought to be added to the list of vital sign values that have been shown to be recorded inaccurately.