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Abstract

Purpose Demonstrate that continuous vital sign monitoring can identify early, actionable signs of deterioration in adult, postoperative inpatients, to prevent failure to rescue.

Design A prospective observational quality improvement pilot was implemented on a 32-bed Orthopaedic/Ortho-Spine/ Trauma adult postoperative, inpatient unit, in a large academic medical center, from December 11, 2015 – March 8, 2016.

Methods Daily alarm data per patient was collected and categorized as true actionable, true non-actionable, false or unclear and then analyzed for frequency, sensitivity and specificity. Chi-square was performed to see if there was any correlation between the presence of continuous vital sign alarms and the dependent measures of complications, Rapid Response Team (RRT) calls, transfers to an ICU and failure to rescue death. The continuous vital sign monitoring dependent measures were compared to identical dependent measures from baseline data where manual, episodic vital signs were performed. Staff satisfaction was measured by a convenience sample using a 21 item Likert scale survey.

Findings The average overall alarm rate of all five vital sign parameters (Heart Rate, Respiratory Rate, Continuous Non-invasive Blood Pressure, SPO2 and Temperature) was 3.1 alarms / patient/day. Forty-three percent of the patients went an entire day without generating an alarm. There was a statistically significant relationship between an ICU transfer and the presence of complications (Fisher's Exact Test $p < 0.05$), between ICU transfer and calling an RRT (Fisher's Exact Test $p< 0.05$), and between calling an RRT and the presence of complications (Fisher's Exact Test $p < 0.05$). No further combinations of dependent variable

relationships were statistically significant. The percentage of positive staff perception with the continuous vital sign monitoring device increased by the end of the pilot project.

Conclusion Continuous vital sign monitoring detected early clinical deterioration in adult postoperative patients that decreased the presence of complications, transfers to an ICU and failure to rescue deaths.

Key Words: continuous vital sign monitoring, adult postoperative inpatients, failure to rescue, postoperative complications, early deterioration, RRT calls, ICU transfers, surveillance monitoring, PCA narcosis, obstructive sleep apnea (apnoea)

Clinical Relevance

The clinical relevance was shown through improved clinical outcomes for postoperative inpatients and higher staff satisfaction due to having access to continuous, high fidelity patient vital sign data with the ability to trend the data over the previous 72 hours.