



Alarm settings for infusion pumps are considered important for patient safety, but limits are not created in a standardized manner from actual usage data. We estimated 90th and 95th percentile infusion rates from a national database for potential use as upper limit alarm settings” Bermanm et al (2017).

Abstract:

BACKGROUND: Continuous medication infusions are commonly used during surgical procedures. Alarm settings for infusion pumps are considered important for patient safety, but limits are not created in a standardized manner from actual usage data. We estimated 90th and 95th percentile infusion rates from a national database for potential use as upper limit alarm settings.

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METHODS: We extracted infusion rate data from 17 major hospitals using intraoperative records provided by Multicenter Perioperative Outcomes Group for adult surgery between 2008 and 2014. Seven infusions were selected for study: propofol, remifentanil, dexmedetomidine, norepinephrine, phenylephrine, nitroglycerin, and esmolol. Each dosage

entry for an infusion during a procedure was included. We estimated the 50th, 90th, and 95th percentile levels for each infusion across institutions, and performed quantile regression to examine factors that might affect the percentile rates, such as use in general anesthesia versus sedation.

RESULTS: The median 90th and 95th percentile infusion rates (with interquartile range) for propofol were 150 (140-150) and 170 (150-200) $\mu\text{g}/\text{kg}/\text{min}$. Quantile regression demonstrated higher 90th and 95th percentile rates during sedation for gastrointestinal endoscopy than for all surgical procedures performed under general anesthesia. For selected vasoactive medications, the corresponding median 90th and 95th percentile rates (with interquartile range) were norepinephrine 14.0 (9.8-18.1) and 18.3 (12.6-23.9) $\mu\text{g}/\text{min}$, and phenylephrine 60 (55-80) and 80 (75-100) $\mu\text{g}/\text{min}$.

CONCLUSIONS: Alarm settings based on infusion rate percentile limits would be triggered at predictable rates; ie, the 95th percentile would be exceeded and an alarm sounded during 1 in 20 infusion rate entries. As a result, institutions could establish pump alarm settings consistent with desired alarm frequency using their own or externally validated usage data. Further study will be needed to determine the optimal percentile for infusion alarm settings.

Reference:

Berman M,F,, Iyer, N., Freudzon, L., Wang, S., Freundlich, R.E., Housey, M. and Kheterpal, S. (2017) Alarm Limits for Intraoperative Drug Infusions: A Report From the Multicenter Perioperative Outcomes Group. *Anesthesia and Analgesia*. 125(4), p.1203-1211.

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