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Novel use of Technology to Enhance a Multimodal Approach to Pain Control After Cardiac Surgery

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Novel use of Technology to Enhance a Multimodal Approach to Pain Control After Cardiac Surgery

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Problem

8-12% of opioid naïve cardiac surgery patients become new persistent opioid users 90-180 days post-surgery.¹ Traditional electronic medical records (EMR) don't provide single, standardized metric, morphine-milligram equivalent (MME) data to guide dose adjustments to facilitate de-escalation and discontinuation decisions. (Figure 1)

Objective

Implement a multimodal analgesia protocol and improve MME situational awareness

Methods

- We developed a MME Utilization application (MME App) which was embedded into the electronic medical record.
- We collected retrospective data from 50 adult consecutive opioid-naïve patients who underwent cardiac surgery. In the first 25 patients, pain had been managed perioperatively according to standard of care (SOC group). The second 25 patients had been managed according to our multimodal perioperative pain management protocol.
- The MME App was used to collect postoperative MMEs utilized. Intraoperative MME data was collected manually.²
- For the purposes of statistical analysis, we calculated means and standard deviations (SD) or counts and frequencies as appropriate for the variables collected. We compared the SOC and multimodal groups using the Student's t-test for continuous variables and the chi-square test for categorical variables, except when a cell count was < 5, in which case we used the Fisher's exact test. All p-values < 0.05 were considered statistically significant.

Results

Compared to SOC, the multimodal group showed a 70% mean decrease in total intraoperative administration of MMEs (mean 374 ± 119.1 versus 113.5 ± 60.4 MME; $p < .001$) (Figure 1). There was no significant change in overall mean MME utilization in the multimodal group during inpatient postoperative convalescence. The mean MME of fentanyl was reduced by 67.7% (32.5 ± 29.0 versus 10.5 ± 29.0 ; $p = 0.010$). At discharge, the number of patients in the multimodal group who received any prescription for opioids fell by about half (84.0% vs 44.0%, $p = 0.007$) with a 92.5% reduction in mean MME of tramadol (47.9 ± 75.5 versus 3.6 ± 18.0 ; $p = 0.006$). (Figure 2)

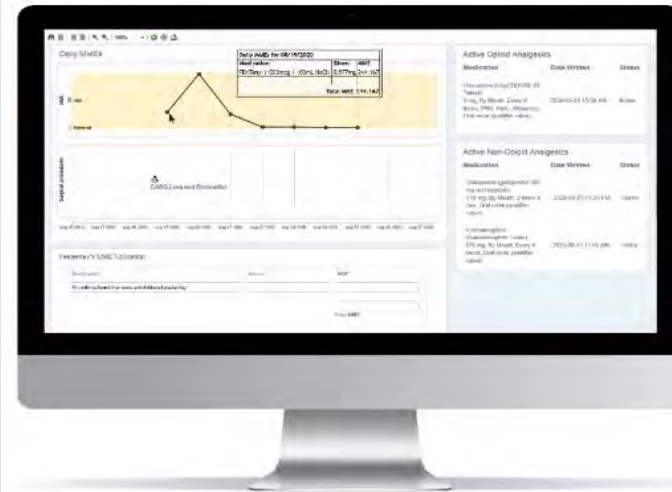


Figure 1

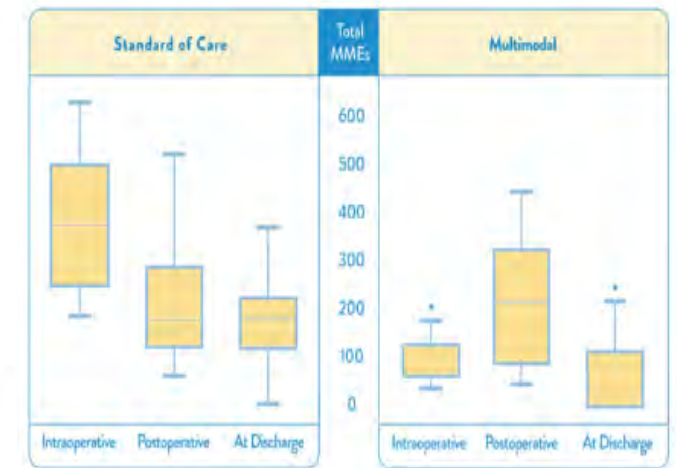


Figure 2

Conclusions

Improved situational awareness and implementation of a multimodal analgesia protocol significantly decreased the number of patients discharged with an opioid prescription and the amount of intraoperative opioid utilization.

1. Brescia, Alexander A et al. "Impact of Prescribing on New Persistent Opioid Use After Cardiothoracic Surgery." *The Annals of thoracic surgery* vol. 108,4 (2019): 1107-1113. doi:10.1016/j.athoracsur.2019.06.019
2. Engelman, Daniel T et al. "Situational Awareness of Opioid Consumption: The Missing Link to Reducing Dependence After Surgery?" *Anesthesia and analgesia*, 10.1213/ANE.0000000000005923. 2 Feb. 2022, doi:10.1213/ANE.0000000000005923