What Perioperative Factors are Associated with High-Risk Daily Morphine Milligram Equivalents in Cervical Spinal Fusions?

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Background

Morphine Milligram Equivalent (MME) dosing recommendations were introduced in 2016 by the Centers for Disease Control and Prevention (CDC) as a guideline for primary care providers to aid in understanding the cumulative effect of opioids and the risk associated with long term use in chronic pain patients. The formula is defined as: Strength per Unit X (Number of Units/Days Supply) X MME = MME/Day. Daily dosages of ≥ 100 MME/day are associated with an almost nine-fold increased risk of overdose. Current general recommendations endorse the lowest effective dose and ≤ 50 MME/day. We sought to understand how many patients undergoing cervical spinal fusions received opioids at higher risk doses and which patient demographic and historical factors could predict this higher risk.

Objective

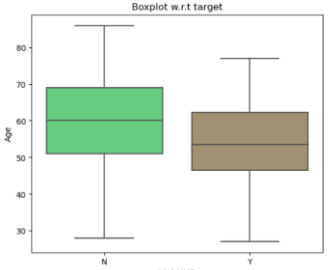
To determine what factors are associated with high-risk daily Morphine Milligram Equivalent totals in patients undergoing cervical spinal fusions.

Methods

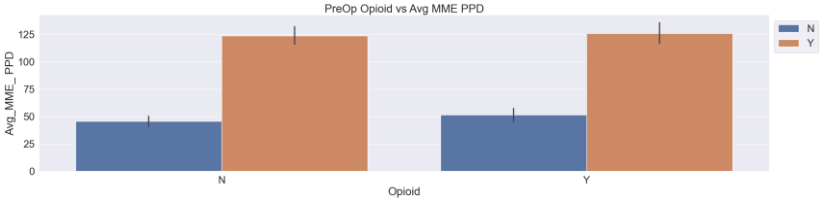
Retrospective analysis was conducted on 237 patients that underwent one to six level cervical fusion within a multi-center network over 2 years. All surgeries were conducted in a hospital system that encourages surgeons to deploy multi-modal post-operative pain pathways. Average MME/day was calculated as the sum of qualifying inpatient MMEs administered divided by the sum of inpatient length of stay (LOS). 14 independent variables were collected from demographic, clinical and surgical domains and were subject to comparative analysis. Data was then grouped and coded for logistic regression analysis.

Results

Overall mean MME per day was 67.32 ± 42.34, with a range of 0-188.54 MME/day. “High MME” was defined as greater than the overall upper quartile value, 95.02 MME/day. A total of 60 patients were determined to have “High MME” during their inpatient stay. Patients with high MMEs were significantly younger than those with MMEs within normal limits (WNL), 52.87 ± 11.33 vs 59.49 ± 11.94 respectively. *(p= 0.0002).* Patients age ≤60 accounted for 70% (n=42) of the High MME group. 23.3% were categorized “young” (25-44 years) and 46.7% were “middle” aged (45-60 years).



Age vs Incidence of High MME



There were also significant differences between the two groups in terms of preoperative prescriptions for opioids. 32.3% *(n=32)* of patients with High MMEs had an active preoperative opioid prescription vs 20.3% *(n=28)* of those with MMEs WNL. There we no significant demographic or intraoperative differences between the groups, nor any significant difference in length of stay. When subject to logistic regression the final optimized model returned a test recall value of 0.61, identifying age as the only significantly variable affecting the odds ratio. For each unit decrease in age, risk increased by 0.48 or 51.9%.

Conclusion

Patients with high MME/day who underwent one to six level cervical fusions were significantly younger and more likely to have been prescribed preoperative opioids than cervical fusion patients with MME WNL. Younger age at the time of surgery significantly impacted the risk of high MME. As a result, pre-operative opioid risk education and mitigation strategies should be considered for those at risk, especially in the younger spine population.

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