A view of Perioperative effects of Intra-operative Opioid use in Anesthesia

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AIM

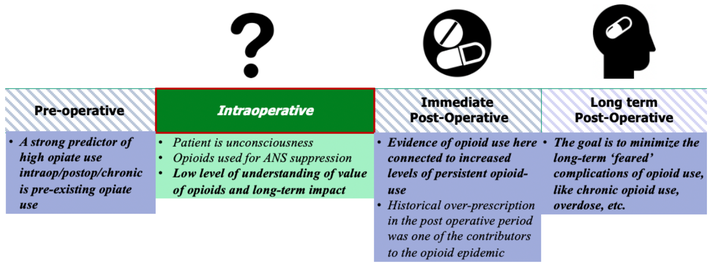
The original aim was to better understand the post-surgical and long-term effects of intraoperative (IO) opioid use. We were specifically keen on understanding how IO opioid use might play into opioid use disorder (OUD). While current literature sees clear correlations between opiate use in conscious patients and the development of OUD[1], little is known about long-term effects of opiates given to unconscious patients.

As the field of anesthesia trends towards opioid minimization[2], the actual perioperative effect of opioid use during surgery have not been clearly characterized. Opioids have long been used in anesthesia for their analgesic and hypnotic/sedative properties in combination with favorable hemodynamics and blunted sympathetic response. Opioids are also cost effective and relatively non-toxic to the renal and hepatic systems. However, there is little known about their need in anesthesia and effect beyond surgery.

Through literature and the perioperative data available through the multicenter perioperative outcomes group (MPOG), we inspected how varying amounts of IO oral morphine equivalents correlated to different perioperative outcomes and ICD-10 diagnoses.

BACKGROUND

Persistent opiate use after surgery has a higher correlation to specific mood disorders, pre-existing chronic pain conditions, metastatic disease, and anxiety[3], While persistent opioid use disorder is correlated to use of opioids while a patient is conscious, there is still a lack of evidence on role IO use of opioids play on short and long-term outcomes.



Literature points to reported hyperalgesia and increased LOS with remifentanil[2], however this is a less commonly used opioid intraoperatively. There is still a paucity of evidence around more commonly used IO analgesics like fentanyl, morphine, and hydromorphone

Methods and SYSTEM ANALYSIS

The project employed literature review and the MPOG (multicenter perioperative outcomes group) database. We aimed to assess the reported outcomes that have been correlated to opioid use like post-operative hyperalgesia, increased nausea and vomiting.

Population: We focused on patients within the DHMC IO population, who were 18+ and had cholecystectomies. We wanted to consider that different procedures had different pain outcomes based off of their level of intervention. We split up the population based on other high-risk categories to see how specific comorbidities might play into IO opioid use:

- **Drug Abuse:** Determined by ICD 10 code
- **Depression:** Determined by ICD 10 code
- **Obesity classification:** Patient's with BMI>30
- **Cholecystectomy:** CPT 47562 or 47563

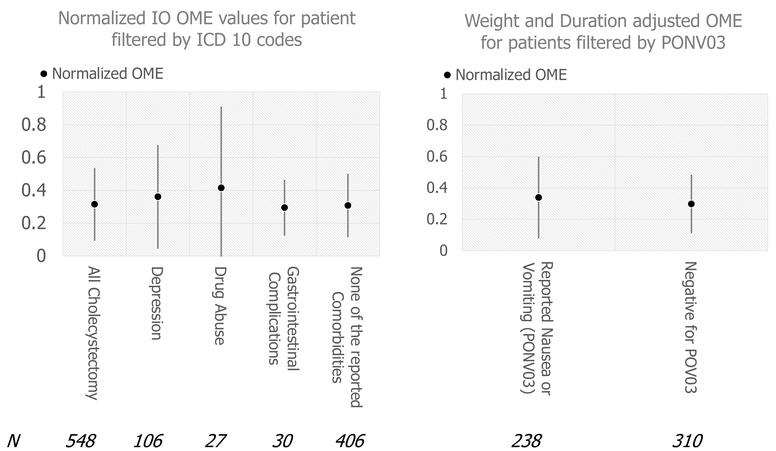
Intraoperative opioid metric:

OME: We used the OME (oral morphine equivalent value) and normalized it by patient weight and duration of procedure. The oral morphine equivalent takes the variable analgesics, like fentanyl, hydromorphone, and morphine, and converts it to a morphine equivalent.

The specific outcomes we were able to filter by included:

- **GastrointestinalAdministrativeValueNormalized:** Any patients tagged with complications related to GI, i.e post-operative functional disorders, ulcers, infections, and more
- **PONV03:** patients who undergo a procedure and have a documented nausea/emesis occurrence OR receive a rescue antiemetic in the immediate postoperative period

FINDINGS



CONCLUSIONS

From this initial exploration, we concluded two major points:

1. Within this dataset, there were no significant differences demonstrated in the selected outcomes as they relate to amount of intra-operative opioid used

   Patients with an ICD-10 drug abuse disorder diagnosis did have high variability in normalized OME values, which may be due to a low number of patients. Short term, there seems to be no difference in OME administered for patients that reported nausea and vomiting and those that didn't. However, this doesn't elucidate much more on how opioids might be playing a long-term positive or negative role in a person's anesthesia care.

2. Limitations were identified in using MPOG for our initial aim. Specifically, these limitations related to lack of meaningful outcome variables.

   For retrospective research, the MPOG database does not have an accessible way to access length of stay and post-operative pain. This was due to the nature of the database and some unfinished variables that may become available in the future. Understanding these two factors would have led to a better understanding if the remifentanil risks are also present for more commonly used intra-operative opioids. Since MPOG looks at single surgical time points, it is difficult to understand what happened beyond the operating room for each patient.

   We also were unable to see if there were any new diagnoses of OUD after surgical intervention which was the original aim our research.

NEXT STEPS

There is still much unknown about the the effects and necessity of intra-operative opioid use.

A future goal should be to link the MPOG database to longer term outcomes via eDH and other relevant patient databases. Through a cursory look into eDH data, we found there was no standardized method for categorizing and reporting pain in the perioperative period. We might want to consider creating a smart form for anesthesiologist to create a quick way to input and consolidate data on pain, LOS, and GI complication. We want to also tangentially consider how we can aggregate PACU pain scores through eDH.

While we were unable to draw many conclusions, our work this summer, did successfully characterize some of the limitations of the MPOG database when it comes to intraoperative analysis as they relate to perioperative outcomes.

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