Increasing Doses of Intraoperative Hydromorphone Do Not Reduce Postoperative Pain

Craig S. Curry  
*Maine Medical Center*

Michael B. Henry  
*Maine Medical Center*

Wendy Craig  
*Maine Medical Center*

Janelle M. Richard  
*Maine Medical Center*

Denham S. Ward  
*Maine Medical Center*

Follow this and additional works at: [https://knowledgeconnection.mainehealth.org/mmc](https://knowledgeconnection.mainehealth.org/mmc)

Part of the [Anesthesiology Commons](https://knowledgeconnection.mainehealth.org/mmc), [Pain Management Commons](https://knowledgeconnection.mainehealth.org/mmc), and the [Surgery Commons](https://knowledgeconnection.mainehealth.org/mmc)

**Recommended Citation**  
[https://knowledgeconnection.mainehealth.org/mmc/688](https://knowledgeconnection.mainehealth.org/mmc/688)

This Poster is brought to you for free and open access by the All MaineHealth at MaineHealth Knowledge Connection. It has been accepted for inclusion in Maine Medical Center by an authorized administrator of MaineHealth Knowledge Connection.
Increasing Doses of Intraoperative Hydromorphone Do Not Reduce Postoperative Pain
Craig S. Curry, M.D., Michael B. Henry, M.D., Wendy Y. Craig, Ph.D., Janelle M. Richard, BA, CCRP, Denham S Ward, M.D., PhD
Department of Anesthesiology Maine Medical Center, Portland, ME, USA

Methods
- After Institutional Review Board approval, clinical, demographic, and anthropometric data were retrospectively extracted from the electronic health records of all patients who underwent total hip or knee surgery under general anesthesia at Maine Medical Center between 12/3/12 and 5/1/17.
- Patients were grouped into quartiles based on intraoperative hydromorphone dose.
- Pain scores were routinely assessed in the post anesthesia care unit (PACU) using 0-10 numeric rating score (NRS).
- Bivariate analysis was used to identify possible factors associated with pain score and narcotic consumption in the PACU for inclusion in regression analysis.
- Ordinal regression analysis was used for assessing impact on pain score and analysis of covariance was used for assessing impact on narcotic consumption in the post anesthesia care unit (figure 1).

Results
- 3519 (1023 knee and 2496 hip) cases were found eligible for inclusion.
- The median dose of hydromorphone given during the study period was 8.3 [5.5-11.0] μg/kg.
- Preoperative pain score, age, gender, body mass index, duration of surgery, type of surgery, intraoperative doses of hydromorphone and fentanyl were all found to have significant associations with pain score and narcotic consumption.
- Increasing intraoperative hydromorphone dose had an adjusted dose-related direct correlation with increased postoperative pain scores and narcotic consumption (figure 1).

Discussion
- Most providers use longer acting narcotics such as hydromorphone, morphine or methadone during surgery in part to provide an analgesic effect in the early postoperative period.
- Both morphine6,5 and methadone6 have previously been shown to be effective in this regard.
- In our study, increasing intraoperative doses of hydromorphone was independently associated with increased maximum pain score and opioid dosing in the PACU.
- One possible explanation for a lack of effect of hydromorphone may be the timing or the magnitude of the intraoperative doses. It is possible that the hydromorphone was given too early or in too small a dose and the analgesic effect had worn off. This would not explain the paradoxical effect.
- This paradoxical effect could represent acute tolerance (AT) or opioid-induced hyperalgesia (OIH). Each phenomena is associated with higher than expected pain levels and opioid requirements following acute opioid administration.
- This is an observational study limited by its retrospective nature. The findings were of a very small effect of intra-operative hydromorphone dose on post-operative pain scores and opiate consumption that reached statistical significance through the large number of cases examined.

References