Many children recovering from even the most minor ambulatory surgery experience pain that is severe enough to warrant treatment with potent analgesics in the post anesthesia care recovery unit (PACU). Acute postoperative pain is associated with increased postoperative complications, prolonged post anesthesia care unit (PACU) and hospital stay, delayed ambulation, unplanned hospital admission, increased hospital costs, and may lead to chronic pain (1-3).

Furthermore, need for PACU pain intervention places enormous burden on the nurses, is time consuming and often delays the time patients are reunited with their children after surgery. Moreover, given the wide inter-individual variability in opioid requirements and biotransformation (3), there is increasing concern that administering opioid analgesia to some children in the PACU could significantly increase their risk for postoperative respiratory depression at home (2).

Given the growing number and complexity of pediatric outpatient procedures, a priori identification of predictors of supplemental PACU IV opioid analgesia requirement is an important clinical goal. To date these factors are largely unknown in the pediatric ambulatory surgical setting. Consequently, the objectives of this prospective, observational study were to determine the incidence and predictors of PACU IV opioid requirement among children who undergo elective ambulatory surgery.

**Hypothesis:** Early postoperative pain experience, assessed by PACU IV opioid requirement, is associated with identifiable baseline clinical phenotypic differences in children undergoing elective ambulatory surgery.

**Methods**

- Following IRB approval, clinical, demographic and anthropometric data were prospectively collected on 1256 children aged 4-17 yr who were scheduled for outpatient surgery required one form of analgesic in the PACU. It is concerning that 56.4% were boys. The mean age of the subjects was 9.7 (4.0) yr. Most patients underwent otorhinolaryngological procedures (Fig.1).

- **Primary outcome:** PACU administration of IV opioid (morphine or Fentanyl). Decision to treat was at the discretion of experienced PACU nurses, but institutional guidelines suggest treatment for pain scores ≥ 3.

- **Secondary outcomes:** included any analgesia use, PACU pain scores as well as PACU length of stay.

- Univariate factors associated with primary outcome variable were assessed with Chi-squared or t-test as necessary.

- Three multivariable logistic regression models to determine possible predictors of PACU IV opioid requirement were constructed based on (1) preoperative history and (2) history + intraoperative variables and (3) history + intraoperative variables + PACU variables. Candidate predictors were chosen from readily obtainable parameters routinely collected during the surgical visit. Predictive performance of each model was assessed by calculating the area under the ROC curve as well as the decision parameter calibration parameters are shown in Fig.3.

- Overall, 41.1% of patients required PACU analgesia while 29.5% received IV opioid (Fig.2).

- Factors identified in the three multivariable models are detailed in Table 1 and model calibration parameters are shown in Fig.3.

- Female gender, habitual snoring, history of witnessed apnea, and non-white ethnicity were significant predictors of IV opioid requirement in the history only model

- Adding intraoperative variables improved the model performance substantially.

- Factors identified in the three multivariable models are detailed in Table 1 and model calibration parameters are shown in Fig.3.

**Results**

We excluded 121 patients because there was no documented intraoperative administration of analgesia. Of the remaining 1135 children, 56.4% were boys. The mean age of the subjects was 9.7 (4.0) yr. Most patients underwent otorhinolaryngological procedures (Fig.1).

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- Adding intraoperative variables improved the model performance substantially. ASA status, surgical duration, and pharyngeal surgery were significant intraoperative factors.

- Expectedly, increasing first documented PACU pain score was a predictor of PACU IV opioid requirement. Adding this variable to the previous two significantly improved the model performance (Fig.3).

**Conclusion**

In this prospective, cross-sectional study, over one third of children undergoing outpatient surgery required one form of analgesic in the PACU. It is concerning that symptoms commonly associated with OSA diagnosis are strong predictors of PACU IV opioid requirement given the potential for delayed respiratory depression after PACU discharge. Children are discharged home. Knowledge of the factors identified in this report may help clinicians to better manage children undergoing perioperative analgesia in children undergoing ambulatory surgery.

**References**