Understanding Variation in Pediatric Regional Anesthesia: A National Surgical Quality Improvement Program-Pediatric (NSQIP-Pediatric) Analysis

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Background

- Regional anesthesia provides targeted analgesia and promotes enhanced recovery after surgery
- Limited understanding of prevalence & variation of regional anesthesia use in children
- Previously identified, underexplored relationship between regional anesthesia and higher opioid use
- **Aims of study:** examine factors associated with regional anesthesia use and evaluate relationship with opioid prescribing practices

Methods

- Prospective cohort study (2021-23) using expanded National Surgical Quality Improvement Program-Pediatric (NSQIP-Pediatric) chart-abstracted data from 4 Illinois hospitals
- Children (5-18y) undergoing any surgery in NSQIP-Pediatric (representing CPTs across multiple surgical specialties)
- Outcomes:

  Regional anesthesia (RA): cryoablation, epidural/spinal, caudal, transversus abdominis plane, or other nerve blocks

  Discharge opioid exposure: opioid prescribed at discharge

  Discharge opioid dose intensity: total morphine milligram equivalents (MMEs)

- Analyses:
  Fischer's exact tests - RA across hospitals and specialties,
  Multivariable logistic regression - factors associated with RA
  Chi-square and Wilcoxon rank sum - opioid outcomes by RA for spine surgery & abdominal laparotomy (p<0.05)

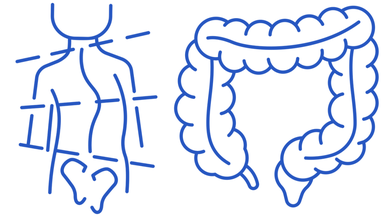
Results

- Cohort: 1,666 patients (52% male, 50% White, 74% privately insured)
  - **347 (21%) received RA**, mostly nerve blocks (N=116, 33%) and epidural/spinal anesthesia (N=100, 29%)

Table. Regional Block Use by Hospital & Surgical Specialty

Specialty	Total	Hospital 1	Hospital 2	Hospital 3	Hospital 4	p
General Surgery	135/74 (18%)	101/413 (24%)	32/47 (68%)	2/134 (1%)	0/150 (0%)	**<0.001**
Gynecology	1/27 (4%)	-	1/3 (33%)	0/14 (0%)	0/10 (0%)	0.11
Neurosurgery	10/161 (6%)	9/114 (8%)	1/4 (25%)	0/23 (0%)	0/20 (0%)	0.12
Orthopedic Surgery	118/312 (38%)	110/177 (62%)	7/18 (39%)	0/43 (0%)	1/74 (1%)	**<0.001**
Otolaryngology	28/211 (13%)	25/132 (19%)	3/28 (11%)	0/30 (0%)	0/21 (0%)	**0.004**
Plastic Surgery	18/84 (21%)	12/51 (24%)	4/12 (33%)	2/19 (11%)	0/2 (0%)	0.41
Urology	37/127 (29%)	34/94 (36%)	1/2 (50%)	2/19 (11%)	0/12 (0%)	**0.004**
Total	347/1666 (21%)	291/981 (30%)	49/114 (43%)	6/282 (2%)	1/289 (0.4%)	**<0.001**

- For logistic regression, in addition to hospital and surgical specialty,
  - The following were associated with *higher* odds of RA use:
    - **open surgery** (OR=4.56; 95%CI [2.9,7.3]; p<0.001),
    - **elective cases** (2.52; [1.5,4.1]; p<0.001), and
    - **use of preoperative non-opioid analgesia** (18.9; [11.3,31.6]; p<0.001) had *higher* odds of RA use
  - **Black race** (OR=0.33; 95%CI [0.18, 0.62]; p<0.001) was associated with *lower* odds of RA use
  - Neither having an existing opioid prescription prior to surgery (N=31, 1.9%) or undergoing Orthopedic surgery were associated with RA use



- For spine surgery (N=81/147, 55%), patients with RA use had
  - **Higher** odds of discharge opioid exposure (96%, OR=13.5, 95%CI[3.81, 47.9])
  - **Greater** dose intensity (median total MME: 45, IQR [45-60] v. 30 [20-45], p<0.001)
- For laparotomy (N=41/82, 50%), patients with RA use had
  - **Higher** odds of discharge opioid exposure (54%, 2.49, [1.01, 6.13])
  - No difference in dose intensity

Conclusions

- <1/4 of NSQIP-Pediatric cases utilized RA, varying significantly by hospital and surgical specialty
- RA may not be fulfilling its intended goal of minimizing opioid use, as seen on procedure-level analysis, where for certain procedures, RA was associated with increased opioid prescribing
- Next steps should:
  1) Explore how opioid prescribing decisions are made for patients who receive RA, particularly those with demographic & clinical factors associated with RA use
  2) Investigate the quality of implementation of multimodal analgesic approaches (including effectiveness of RA)

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