

Analysis of Pediatric Pain Service and Opioid Usage in Open Repair of Non-syndromic Craniosynostosis

Ava Niknahad, Christopher D. Lopez, Ainsley L. Taylor, Cynthia T. Yusuf, and Isabel V. Lake,
Richard J Redett III, Robin Yang – Department of Plastic Surgery
Johns Hopkins University School of Medicine, Baltimore, Maryland, USA

BACKGROUND

- Craniosynostosis – premature fusion of cranial vault sutures – requires surgery within the first year of life
- Open craniosynostosis repair surgery can result in severe postoperative pain
- Patients can be prescribed opioids, bringing the challenge of maximizing post-op comfort levels while minimizing unnecessary opioid use
- Pediatric pain services are established to optimize such control but their impact on pain management in this field is understudied

Table 1. Current Pain Control Practices at JHH

	Post-Op Analgesic Plan	Discharge Analgesic Plan
Pediatric Pain Service On-Board	Acetaminophen + PCA (hydromorphone, fentanyl, or morphine)	Surgeon-determined
Only Surgical Team On-Board	Acetaminophen + Oxycodone	Acetaminophen (1 wk) + Oxycodone

STUDY OBJECTIVE

- To characterize the intervention and efficacy of Johns Hopkins pediatric pain service, especially in optimizing opioid use, for post-operative pain management of patients undergoing open craniosynostosis surgery

METHODS

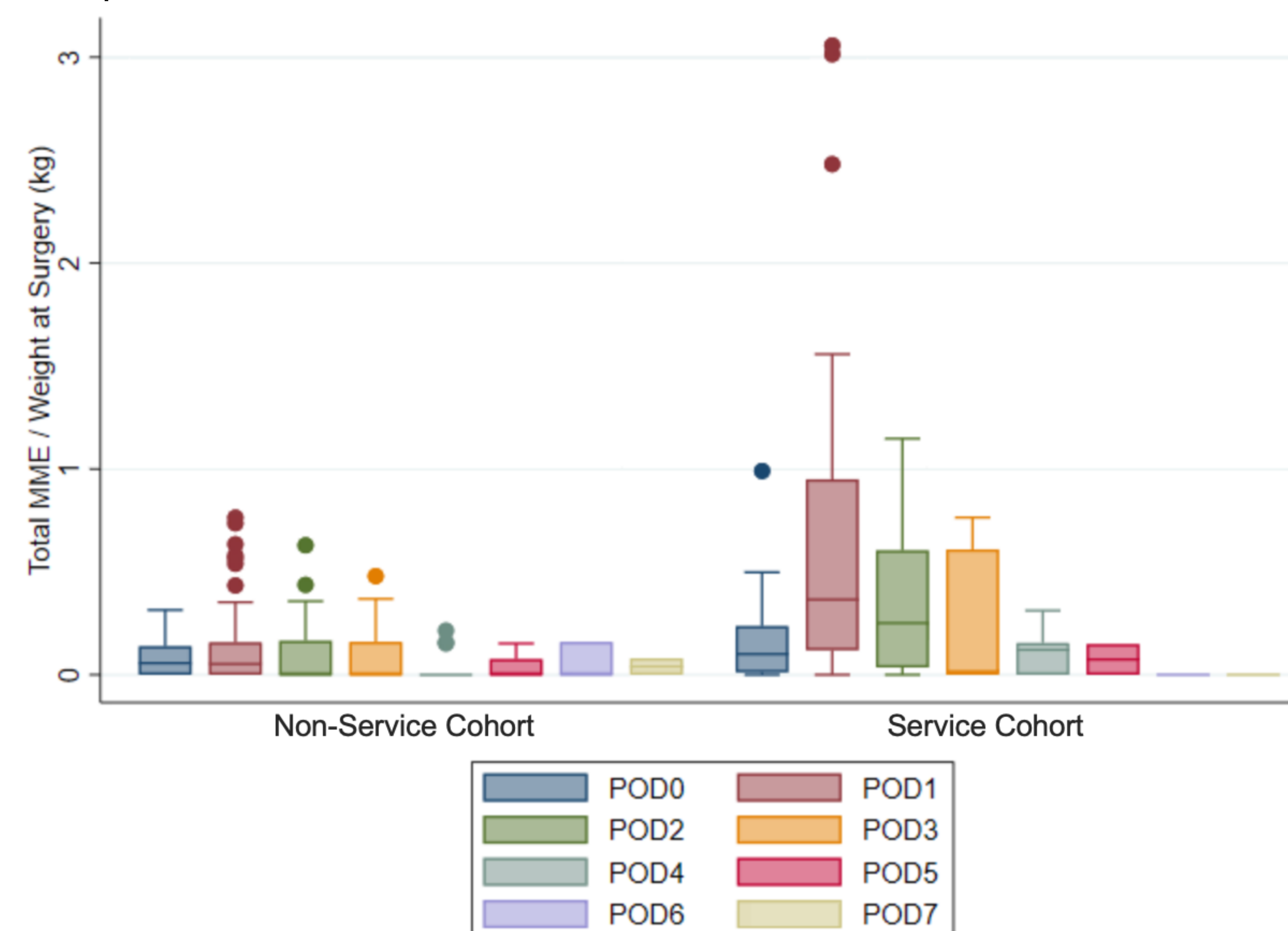
- Retrospective cohort study
- Study population was patients undergoing primary open craniosynostosis repair at Johns Hopkins from 2016 to 2021
- Main outcomes included:
 - demographics and clinical characteristics
 - analgesics, intra-operative/post-operative/discharge opioids, and post-operative course
- Variables were compared between:
 - patients who received pain service consultation (service cohort) and those who did not (non-service)
- Statistical analysis included generalized linear models, controlling for age at surgery
 - *p<0.05 between service and non-service cohorts

RESULTS

Table 2. Characteristics of Non-Service and Service Cohorts. All analysis except for age at surgery were controlled for age at surgery.

	Overall (N=68)	Non-Service Cohort (N=48)	Service Cohort (N=20)	P-values
Age at Surgery (months)	12.53 +/- 16.29	11.55 +/- 17.93	14.87 +/- 11.50	0.0005*
Post op emesis	35 (51.5%)	20 (41.7%)	15 (75.0%)	0.014*
PCA pump	19 (27.9%)	0 (0%)	19 (95.0%)	0.000*
Post op				
Total MME	6.47 +/- 9.00	3.43 +/- 4.44	13.76 +/- 12.55	0.000*
Total Enteral MME	3.60 +/- 4.14	3.24 +/- 3.93	4.36 +/- 4.58	0.466
Total MME/kg/day	0.18 +/- 0.27	0.09 +/- 0.11	0.40 +/- 0.40	0.000*
Discharge				
Total MME	17.58 +/- 22.72	12.67 +/- 19.67	29.13 +/- 25.62	0.012*
Total MME/kg	1.85 +/- 2.35	1.37 +/- 2.00	2.98 +/- 2.75	0.011*
Pain controlled				
pod0	53/68 (77.9%)	39/48 (81.3%)	14/20 (70.0%)	0.269
pod1	64/68 (94.1%)	46/48 (95.8%)	18/20 (90.0%)	0.344

Figure 1. Total MME/kg in each post-operative day (POD) separated by pediatric pain service on-board status



Secondary Analyses: Between the two cohorts, race, sex, gestational age, number of sutures, length of stay, ICU/PICU admission, intra-op MME/kg, POD transition from IV to enteral opioids, and multimodal pain control were not significantly different.

CONCLUSIONS

- Pediatric pain service is appropriately consulted for pediatric patients undergoing open craniosynostosis repair
- Pediatric pain service prescribes a multimodal analgesic regime consisting of acetaminophen and an opioid-based PCA pump, which are successfully managing patients' post-operative pain
- High amounts of opioids are prescribed for discharge by the primary team

LIMITATIONS

- The study only focuses on pain management at Johns Hopkins Hospitals
- The study only includes patients undergoing open surgery, rather than endoscopic surgery which is less complicated and requires lower amounts of pain control

IMPLICATIONS

- Considering the high amounts of discharge opioids, the pediatric pain service should be considered for consult at discharge
- Future studies are needed to evaluate analgesic prescription at discharge, especially in regard to current practices and what pediatric pain services would suggest

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