Perioperative Pain Management in Pediatric Head and Neck Microvascular Free Tissue Transfer: A Case Series

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Introduction

- Head and neck defects caused by malignancies, craniofacial anomalies, and traumatic injuries can lead to severe functional and cosmetic deformities in pediatric patients.[1]
- Reconstructive surgery with head and neck microvascular free tissue transfer (HN-MFTT) can address these defects, restoring appearance and function.
- These complex surgeries require effective perioperative pain control that balances appropriate anesthesia with optimal recovery.[2]
- While studies have explored the intricate relationship between perioperative pain control – often involving narcotics – and recovery in adult patients, data on pain management strategies in pediatric patients is limited.[3,4]
- Our institution had a relatively high volume of pediatric head and neck free flap cases. By reviewing our experience, we sought to evaluate perioperative pain regimens, identify patterns and variability, and highlight opportunities for standardization.

Objectives

1. Characterize perioperative pain regimens in pediatric patients undergoing HN-MFTT
2. Evaluate variability in strategies and identify common patterns
3. Inform development of a standardized, multimodal pediatric pain protocol

Methods

- Design: Retrospective case series
- Setting: St. Jude Children's Research Hospital
- Period: January 2020 – January 2024
- Population: Pediatric patients (< 18 years) who underwent HN-MFTT
- Data collected:
  - Demographics and comorbidities
  - Surgical details and concomitant procedures
  - Pain regimens (intraoperative and postoperative)
  - Outcomes (ICU stay, hospital stay, complications)
  - Analysis: Descriptive review of pain management strategies

Results

Table 1: Characteristics of pediatrics patients undergoing HN-MFTT, n=8.

Age, median (range)	11 (5 – 13)
Sex	
Male	5 (62.5%)
Female	3 (37.5%)
Race	
African American or Black	3 (37.5%)
White	4 (50%)
Other	1 (12.5%)
Ethnicity	
Non-Hispanic/Latinx	8 (100%)
Pathology	
Benign tumor	4 (50%)
Malignancy	4 (50%)
Anatomic site	
Oral cavity / mandible	7 (87.5%)
Maxilla	1 (12.5%)
Donor Site	
Fibula	8 (100%)
Concomitant operations	
Tracheostomy	8 (100%)
Neck dissection (beyond levels I.II)	1 (12.5%)
Skin graft (second donor site)	1 (12.5%)
Operative time, min, median (range)	540 (475 – 703)
ICU Length of Stay, days, median (range)	3.5 (2 – 10)
Hospital Length of Stay, days, median (range)	12.5 (8 – 19)
Surgical complications	
Flap failure	0 (0%)
Hematoma / seroma	1 (12.5%)
Surgical site infection or breakdown	3 (37.5%)
OR takeback	1 (12.5)

Figure 1. Duration of Postoperative PCA Regimens

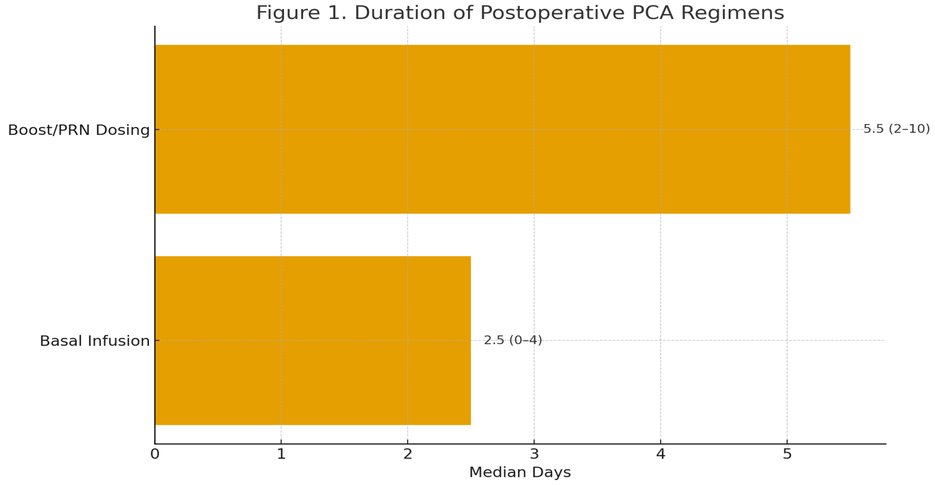
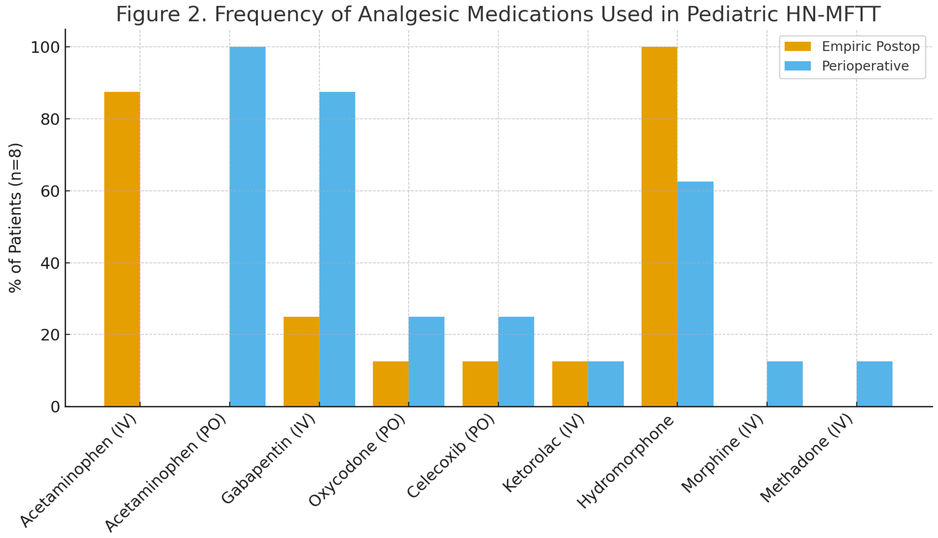


Figure 2. Frequency of Analgesic Medications Used in Pediatric HN-MFTT



Discussion

- Key finding: While PCA opioids were universal, adjunct strategies varied widely despite similar surgical procedures
- Adult comparison: In adult HN-MFTT, structured multimodal regimens reduce opioid exposure and improve recovery. Pediatric practice remains less standardized.[2,3]
- Clinical insights:
  - Opioid-centric regimens dominate
  - Adjuncts (gabapentin, acetaminophen, NSAIDs) are inconsistently applied
  - Patients requiring methadone or morphine suggest unmet analgesic needs
- Complications: No flap failures; wound complications occurred in 37.5% of cases. Whether prolonged opioid use contributes remains unclear
- Limitations: Small sample size, retrospective design, provider variability
- Future directions: Development of a structured multimodal pediatric pain protocol tailored to this population, followed by prospective evaluation

Conclusions

- Pain management after pediatric HN-MFTT is highly variable
- Opioids remain the foundation of therapy, but multimodal strategies are underutilized
- There is a major need for protocolized, evidence-based regimens to optimize outcomes and minimize opioid burden
- This series provides a foundation for developing and piloting standardized protocols in pediatric head and neck reconstruction

References

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