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Self-Reported Anxiety Independently Predicts Increased Perioperative Opioid Usage in Pediatric Craniofacial Surgeries

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BACKGROUND

Patients born with congenital craniofacial anomalies, such as cleft lip and palate or craniofacial microsomia, are a unique group of pediatric surgical patients. Both the visibility of facial congenital anomalies and the multiple reconstructive procedures throughout childhood contribute as psychosocial stressors. In addition, during the perioperative period of each of these surgeries, opioids are universally prescribed for pain management, thereby presenting a potential for long-term chronic use. The recent awareness of the severity of the opioid epidemic in the United States has led to heightened efforts within the medical community towards identification and reduction of narcotics. In this work, we evaluated the relationships between patient-reported psychosocial functioning and perioperative opioid use in children after craniofacial surgeries.

METHODS

84 patients diagnosed with cleft lip and palate or craniofacial microsomia were retrospectively reviewed for patient characteristics, perioperative pain medications, and patient-reported psychosocial functioning. Four surgeries (alveolar bone graft, mandibular distraction, first stage ear reconstruction, and second stage ear reconstruction) were included due to their similarities in the timing of surgery as well as the length of inpatient stay. Perioperative pain medications were separated into 3 categories: acetaminophen, fentanyl (administered intraoperatively or immediately postoperative), and all other narcotics (administered postoperatively). Narcotic dosages were converted into morphine equivalent dosage (MED) for comparison. 4 validated, quantitative, self-reported instruments measuring anger, anxiety, depressive symptoms, and peer relationships from the Patient Reported Outcomes Measurement Information System (PROMIS) prospectively administered to each patient during annual multi-disciplinary craniofacial clinics were reviewed. Pearson correlations were performed between specified variables and total MED of postoperative narcotics. A linear regression model was developed and the influence of each PROMIS score was evaluated as a predictor for opioid usage.

RESULTS

Patient characteristics are detailed in Table 1. To develop a unified model accounting for postoperative narcotic use, we first performed univariate correlations between potential contributory variables including age at the time of surgery, surgery types, and quantity of other pain medications (Table 2). Significant or near-significant variables were then used to develop a robust multivariate linear regression model that explained 43.4% of the variance in the amount of postoperative narcotic use (Table 3). Psychosocial PROMIS scores were then evaluated one at a time within the regression model. Self-reported anxiety scores predicted an increased quantity of postoperative narcotic use (Table 4). All other scores were not significant predictors of postoperative opioid use.

Table 1. Patient Characteristics (n=84)

Age at surgery, y (mean±SD)	12.9±4.9
Age at PROMIS evaluation, y (mean±SD)	13.6±5.0
Female, n(%)	44 (52.4)
Diagnosis, n(%)	
Cleft lip and palate (CLP)	49 (58.3)
Craniofacial microsomia (CFM)	35 (41.7)
Surgery Types, n(%)	
Alveolar Bone Graft	48 (57.1)
Mandibular Distraction	11 (13.1)
1st stage Ear Reconstruction	13 (15.4)
2nd stage Ear Reconstruction	12 (14.3)
Pain Medication Usage, mg (mean±SD)	
Acetaminophen	1962.0±1694.9
Fentanyl, MED units (intraoperative/immediate postop)	11.9±29.9
Oxycodone, Hydromorphone, Morphine, MED units	15.0±34.3
PROMIS Scores, mean±SD	
Anger	43.4±6.8
Anxiety	49.2±8,8
Depressive Symptoms	47.8±8.2
Peer Relationships	48.4±6.8

Table 2. Correlations with Postoperative Opioid Use

Variable	Pearson's r	P value
Age at surgery	0.204	0.06
Female	0.154	0.16
Surgery Types		
Alveolar Bone Graft	-0.134	0.22
Mandibular Distraction	0.225	0.04
1st stage Ear Reconstruction	0.118	0.29
2nd stage Ear Reconstruction	-0.149	0.18
Other Pain Medication Usage		
Acetaminophen	0.613	<0.001
Fentanyl (intraoperative/immediate postop)	0.212	0.05

RESULTS

Table 3. Development of Linear Regression Model of Predictors for Postoperative Opioid Use

	R^2=0.434 F(5,78)=11.954, p<0.001	
Variable	**β**	**P value**
Age at surgery	0.078	NS
Female	-0.009	NS
Mandibular Distraction	0.113	NS
Other Pain Medication Usage		
Acetaminophen	0.575	<0.001
Fentanyl (intraoperative/immediate postop)	0.198	0.02

Table 4. Self-Reported Anxiety is a Independent Positive Predictor of Postoperative Opioid Use

	R^2=0.463 F(6,77)=11.072, p<0.001	
Variable	**β**	**P value**
Age at surgery	0.056	NS
Female	0.029	NS
Mandibular Distraction	0.162	NS
Other Pain Medication Usage		
Acetaminophen	0.561	<0.001
Fentanyl (intraoperative/immediate postop)	0.213	0.01
Anxiety	0.184	0.04

CONCLUSIONS

Reduction of opioid use in the postoperative period is an important and timely component of quality improvement in surgical care. Within our cohort of pediatric craniofacial surgical patients, the variance in quantity of postoperative narcotic usage was positively predicted by the quantity of acetaminophen and intraoperative or immediate postoperative fentanyl usage. Other demographic factors and type of surgery were not significantly predictive of postoperative narcotic use when accounting for acetaminophen and fentanyl dosage. Upon evaluation of each individual psychosocial PROMIS score within the linear regression model, self-reported anxiety scores independently and positively predicted increased postoperative opioid usage.