Surgical Site Infections in Pediatric Plastic Surgery: Risk Factors and Implications for Quality Improvement from a Nationwide Assessment of 11,656 Operations

Disclosure/Financial Support: None of the authors has a financial interest in any of the products, devices, or drugs mentioned in this manuscript.

INTRODUCTION: Surgical site infections (SSIs) are responsible for significant morbidity and healthcare costs. The US Department of Health and Human Services has identified the reduction of SSIs as a national priority for patient safety and quality improvement. Preventing SSIs is dependent on a clear understanding of modifiable risk factors for targeted intervention. In Pediatric Plastic Surgery, our understanding of risk factors for SSIs has been limited by small sample size, nonstandard definitions, and single-center retrospective data. The objective of this study is to use a large prospective national database to analyze clinical risk factors for SSI in children undergoing plastic surgery operations.

METHODS & MATERIALS: The American College of Surgeons National Surgical Quality Improvement Program-Pediatric (NSQIP-Peds) is a quality improvement database that prospectively collects demographic data, perioperative risk factors, and 30-day postoperative morbidity outcomes across 56 participating pediatric institutions. Data for patients less than 18 years old undergoing plastic surgery operations were extracted from the NSQIP-Peds 2012 and 2013 databases using CPT codes. Risk factors for SSI were determined with univariate analyses and multivariate logistic regression.

RESULTS: Among 11,656 patients, there were 5520 (47%) craniofacial, 4431 (38%) skin/soft tissue, 747 (6.4%) extremity, 728 (6.2%) transcranial, 211 (1.8%) breast/chest wall, and 19 (0.2%) gastrointestinal/genitourinary operations. Mean age at surgery was 5.5 (± 3.8) years and 52% were male. The overall rate of SSI was 0.7%. There were 57 (0.5%) superficial SSIs, 11 (0.1%) deep SSIs, and 10 (0.1%) organ space SSIs. On univariate analysis, inpatient status ($p<0.05$), increased total operative time ($p<0.01$), increased length of hospital stay ($p<0.01$), and younger age at time of surgery ($p<0.05$) were risk factors for SSI. Following multivariate logistic regression analyses, increased total operative time ($p<0.01$) was an independent predictor of SSI. Children undergoing extremity or transcranial operations had a higher proportion of SSI than children undergoing skin/soft tissue, craniofacial, breast/chest wall, and/or gastrointestinal/genitourinary operations ($p<0.05$). Wound classification and ASA classification were not predictive of SSI.

CONCLUSIONS: The overall rate of SSI in children undergoing plastic surgery operations is low. This analysis of a large prospective multicenter database provides a high level of evidence regarding risk factors for SSI in the pediatric plastic surgery population and has implications for quality improvement by identifying modifiable factors for targeted intervention.