Are we on the same page? Defining Consensus for Pediatric Open Fracture Management Among Level 1 Pediatric Trauma Centers

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INTRODUCTION: Open fractures require urgent management, including timely prophylactic antibiotics, to minimize infection and morbidity. Most pediatric treatment protocols are extrapolated from adult data, resulting in practice variation at pediatric centers regarding antibiotic timing and selection. In this study, we aimed to identify consensus regarding open fracture management protocols at Level-1 Pediatric Trauma Centers across the United States.

METHODS: A survey to determine antibiotic protocols for pediatric open fractures was administered to 17 institutions participating in “Children’s Orthopaedic Trauma and Infection Consortium for Evidence-Based Study” (CORTICES), representing approximately 25% of all Level-I Pediatric Trauma Centers nationwide. Data analysis was conducted using descriptive statistics with responses presented as frequencies and percentages.

RESULTS: In 9/17 (53%) of participating centers, antibiotics for open fractures are ordered by Emergency Department (ED) physicians exclusively. All 17 centers (100%) surveyed have formal protocols to give IV antibiotics <1 hour of presentation to the ED. Fifteen of 17 centers (88%) monitored antibiotic administration success rates regularly, through a hospital or trauma quality committee. Success rates of <1 hour antibiotic administration in the last year were 21-40% in 2/15 centers (13%), 41-60% in 3/15 centers (20%), 61-80% in 3/15 centers (20%), and 81-100% in 7/15 centers (47%). Of 17 sites surveyed, 15 (88%) have formal protocols for Gustilo-Anderson (GA) type-based antibiotic selection. Most centers with antibiotic selection policies (13/15, 87%) involved multiple departments in policy development, primarily infectious disease, orthopedic surgery, ED, pharmacy, and pediatrics in descending order. Across sites, antibiotic selection showed consensus for GA-type 1 (cefazolin) and near-complete consensus for GA-type 2 (14/15, 93% cefazolin), allergy alternatives for GA-type 1 (14/15, 93% clindamycin) and allergy alternatives for GA-type 2 (13/15, 87% clindamycin). There was minimal consensus in antibiotic recommendations for GA-type 3 (standard or allergy alternatives) or for soil/water contamination (see Figures 1A, 1B, 2A, 2B).

DISCUSSION AND CONCLUSION:

While most Pediatric Level-1 Trauma Centers have a formal, audited protocol for IV antibiotic administration for open fracture management, there is substantial variability in timing and selection of antibiotics. Multiple centers demonstrated that it is possible to administer antibiotics within an hour of ED arrival with high success if the right system is in place. The greatest variation in IV antibiotic administration was seen in GA-type 3 fractures which are associated with the greatest morbidity, infection risk and cost of care. Further standardization of antibiotic policies for these high-risk injuries is required to improve the quality of care delivered to pediatric open fracture patients. Our goal with this study is to encourage all pediatric centers to develop audited, consistent antibiotic administration protocols for open fractures which is likely to decrease time to administration of antibiotics and hopefully improve outcome for the most severely injured children.