

Are Prophylactic Antibiotics Necessary in Pediatric Tuft Fractures?

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Introduction

Crush injuries to the nailbed are the most common hand injury in toddlers and preschool aged children (0-4 years of age), with tuft fractures accounting more than half of all hand fractures in this age group. Traditionally, these fractures have been treated with prophylactic antibiotics after repair, according to principles of open fracture treatment. Infection rates following crush injury to the fingertip range from 4% to 6%. However, few studies exist evaluating the efficacy of antibiotic prophylaxis in these injuries.

In adults, a single randomized controlled, double-blind, trial concluded that there was insufficient evidence to support prophylactic antibiotic use in open tuft fractures. In pediatric patients, one randomized controlled trial consisting of 135 patients had one patient in each group with an infection one week after injury. In this study there was a lack of statistical significance due to the low infection rate in each group.

The goal of this study was to evaluate if any difference exists in infection rates between pediatric patients with crush injuries to the fingertip who received prophylactic antibiotics and those who did not as part of their treatment.

Method

This retrospective study was conducted at Cincinnati Children's Hospital Medical Center, examining patients treated from 2010-2016 for fingertip crush injuries. Based on diagnosis and procedure codes, 1200 charts were selected for review.

Inclusion criteria were as follows:

- Patients sustaining crush injury to fingertip
- Initial evaluation and treatment within 12 hours of injury
- One clinical follow up visit after three days.

Exclusion criteria were as follows:

- Seymour fracture
- Antibiotics or steroid treatment at the time of injury
- Animal bite as the cause of injury.

395 patients with a total of 416 crush injuries to the fingertip met inclusion criteria.

Results

Of noted infections, 5 out of 351 (1.4%) occurred in patients treated with antibiotics compared to 3 out of 65 (4.6%) in patients who were not treated with antibiotic prophylaxis (p=0.114). The odds ratio for developing an infection without prophylactic antibiotics was 3.35 (95% CI (0.78-14.37)).

Table 1. Comparison of prophylactic antibiotic use and rate of infection based on injury demographics. Overall rate of infection was 1.9%. Prophylactic antibiotics were prescribed in 84.4% of all injuries.

		Antibiotics (%)	Infection (%)
Sex	Male	205 (83.7)	5 (2.0)
	Female	146 (85.4)	3 (1.8)
Age	≤4 years	167 (84.3)	5 (2.5)
	5-9 years	106 (86.9)	2 (1.6)
	10-14 years	58 (82.9)	1 (1.4)
	15+ years	20 (76.9)	0 (0.0)
Severity	Mild	76 (80.0)	1 (1.1)
	Moderate	226 (84.3)	5 (1.9)
	Severe	49 (92.4)*	2 (3.8)
Injury setting	Clean	262 (85.3)	5 (1.6)
	Contaminated	89 (81.7)	3 (2.8)
Fracture	Visible on x-ray	290 (87.3)	6 (1.8)
	Occult	61 (72.6)***	2 (2.4)

* Significant difference at p<0.05 level between antibiotic prescription in mild and severe injuries

*** Significant difference at p< 0.001 level between antibiotic prescription in injuries with visible versus occult fractures

Antibiotic prophylaxis did not significantly reduce rate of infection regardless of injury severity. In both clean and contaminated injuries, the rate of infection was lower in the group treated with antibiotic prophylaxis. Similarly, regardless of the presence of identifiable fracture on x-ray, infection rate was lower when injuries were treated with antibiotic prophylaxis. None of these differences reached the level of statistical significance.

Table 2. Differences in the effectiveness of antibiotic prophylaxis based on injury characteristic.

		Infection (%)	No Infection (%)	OR (95% CI)
Mild	Antibiotics	0 (0.0)	76 (100)	12.5 (0.49-316)
	No Antibiotics	1 (5.3)	18 (94.7)	
Moderate	Antibiotics	3 (1.3)	223 (98.7)	3.72 (0.60-23.0)
	No Antibiotics	2 (4.8)	40 (95.2)	
Severe	Antibiotics	2 (4.1)	47 (95.9)	2.11 (0.09-51.1)
	No Antibiotics	0 (0.0)	4 (100)	
Clean	Antibiotics	3 (1.1)	259 (98.9)	4.02 (0.65-24.7)
	No Antibiotics	2 (4.4)	43 (95.6)	
Contaminated	Antibiotics	2 (2.2)	87 (97.8)	2.29 (0.20-26.6)
	No Antibiotics	1 (5.0)	19 (95.0)	
No Fracture on x-ray	Antibiotics	1 (1.6)	60 (98.4)	2.73 (0.16-45.5)
	No Antibiotics	1 (4.3)	22 (95.7)	
Fracture	Antibiotics	4 (1.4)	286 (98.6)	3.58 (0.63-20.1)
	No Antibiotics	2 (4.8)	40 (95.2)	

Conclusions

While our data suggests a clinically significant reduction in rate of infection with antibiotic prophylaxis in pediatric tuft fractures, our data did not reach the level of statistical significance necessary to make definitive recommendations for or against the use of antibiotic prophylaxis in pediatric patients with open tuft fractures.

References

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