Seymour Fractures

A Retrospective Review of Infection Rates, Treatment and Timing of Antibiotic Administration

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BACKGROUND

- Open Seymour fractures are important to recognize and treat promptly as injuries may result in growth disturbance, nail deformity, or infection.
- Prior retrospective review of 34 patients suggested early surgical treatment is associated with a reduction in superficial infections and osteomyelitis.[1]
- The **purpose** of this study was to retrospectively determine the rates of infection in pediatric patients with Seymour fractures, focusing on timing and method of treatment.

HYPOTHESIS

It was hypothesized that the administration of antibiotics within 24 hours of injury would be associated with a decreased rate of infection.

METHODS

This study was a retrospective review of 75 patients with open Seymour fracture evaluated at a level one pediatric hospital between January 2002 and December 2017.

Inclusion: Patients less than 18 years of age with open physes who presented with clinical and radiologic findings of an open Seymour fracture.

Exclusion: Patients with less than 30 days of documented follow-up were excluded from analysis.

Evaluated Variables: Timing of antibiotic administration, procedures administered, treatment location, presence of infection, mechanism of injury, age and race.

Statistics: Descriptive statistics were used to summarize demographics and clinical characteristics of subjects.

Fisher exact and chi-squared tests were used to evaluate the probability of association between presence of infection and and timely administration of antibiotics, as well as delay in treatment, treatment type and location.

A regression model was used to evaluate if probability of infection was associated with age or race.

TABLES AND FIGURES

TABLE 1. Demographic Characteristics of the Study Population

Sex	Frequency (%)
Male	42 (80.8)
Female	10 (19.2)
Age, y	
Average (SD)	10.2 (4.0)
Range	1.2–17.5
Finger injured	
Long	18 (33.3)
Ring	17 (31.5)
Index	8 (14.8)
Thumb	7 (13.0)
Small	4 (7.4)
Mechanism of injury	
Crush	34 (63.0)
Jamming	8 (14.8)
Hyperflexion	4 (7.4)
Direct blow	3 (5.6)
Other/unknown	5 (9.3)

TABLE 2. Rates of Infection

Group	Frequency of Fracture (%)
Overall	15/54 Fractures (27.8)
Antibiotics within 24 h	2/29 (6.9)
Antibiotics after 24 h	*13/17 (76.5)
Unknown antibiotic timing and/or administration	0/8 (0)

*One pin site infection.

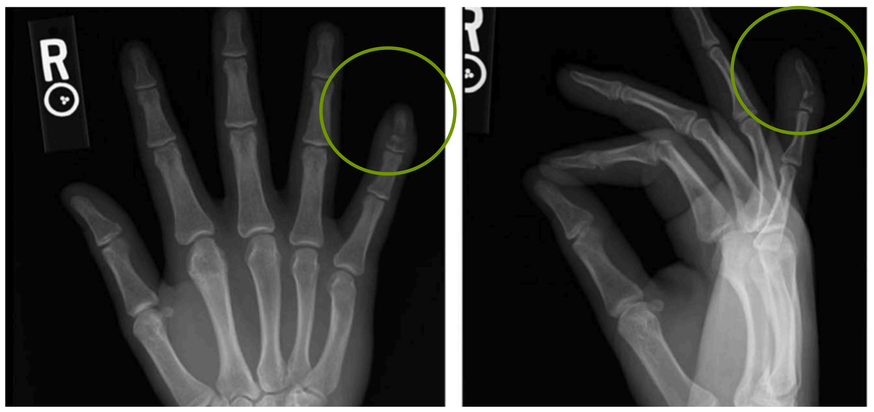

FIGURE 1. Right hand, radiographs of a 5th finger Seymour fracture (circled).

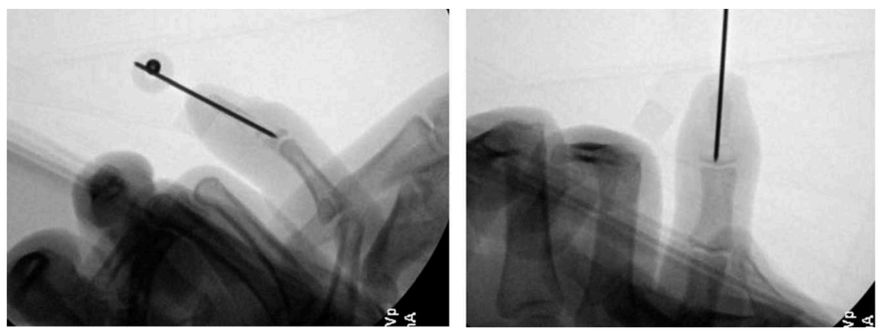

FIGURE 2. Right hand, intraoperative radiographs of open reduction internal fixation of an unstable Seymour fracture.

RESULTS

- The **overall infection rate was 27.8%** among 52 patients with 54 Seymour fractures.
- Among 27 patients who received **antibiotics within 24 hours**, **2 infections (6.9%)** were noted at final follow-up. Delayed administration of **antibiotics beyond 24 hours** post-injury was observed in 17 patients and associated with an **infection rate of 76.5%** (13/17, p=0.000)
- There was **no significant difference** in rate of infection based on location of definitive treatments: **emergency department vs. operating room** (p=0.291).
- Regression analysis demonstrated that **age** was associated with **increased risk of infection** (p=0.022, 95% CI 1.03-1.64), while race was not associated with a risk for infection (p=0.566, 95% CI 0.179-2.54).

CONCLUSION

- Early administration of antibiotics within 24 hours of injury is associated with a reduction in development of infection.
- A standardized protocol emphasizing the importance of early antibiotic administration may help minimize infectious complications.
- Emergency room physicians and orthopedic providers should be aware of Seymour fractures and the risk of infection due to the nature of concurrent nailbed injury.

REFERENCES

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DISCLOSURES

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