

Is There a Higher Risk of Infection with Delayed Treatment of Pediatric Seymour Fractures?

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Purpose: The purpose of this study is to describe treatment methods and complication rates of all Seymour fractures (open Salter-Harris I/II fractures of the distal phalanx of the hand with associated nailbed laceration; OTA 78) treated at or referred to a pediatric Level I trauma center over a 10-year time period. We hypothesized that delayed or inappropriately treated Seymour fractures would be associated with higher infectious complication rates.

Methods: All patients treated in the orthopaedic pediatric hand clinic at our institution with an ICD-9 diagnosis of 816.02 or 816.12 (closed or open fracture of distal phalanx or phalanges of hand, respectively) between August 2002 and December 2012 were identified. All charts and radiographs were retrospectively reviewed. 47 patients treated for 48 Seymour fractures were identified. Patients were divided into groups based on timing and quality of treatment. "Appropriate" treatment was defined as irrigation and debridement, fracture reduction, nailbed repair, and antibiotics. "Partial" treatment was defined as any type of incomplete treatment. "Acute" treatment was defined as management within 48 hours of the injury, and "delayed" as presenting for treatment past 48 hours from time of injury. Statistical comparisons were performed using Fisher's exact test.

Results: Average patient age was 8.7 years (range, 1-15 years), with 35 males and 12 females. Most common mechanism of injury was sports (32%, 15/47), followed by closed in door/window (30%, 14/47). 57% (27/47) were treated in an acute, appropriate manner; 15% (7/47) received acute, partial treatment; and 28% (13/47) received delayed treatment. One patient initially treated at an outside hospital had inadequate documentation to determine appropriateness of treatment but had no complications. There were 9 complications: 3 superficial infections, 5 osteomyelitis, and 1 malunion. With respect to infectious complications, only 1 (superficial infection) occurred in the acutely, appropriately treated group (infection rate 3.7%, 1/27); 1 (osteomyelitis) occurred in the acutely, partially treated group (14%, 1/7); and 6 (2 superficial, 4 osteomyelitis) occurred in the delayed treatment group (46%, 6/13). Differences in infection rates among the treatment groups were statistically significant ($P < 0.003$ including all infections; $P < 0.007$ including osteomyelitis only).

Conclusion: Timing and quality of treatment of Seymour fractures significantly influences infectious complication rates, as patients with delayed treatment had a 12-fold risk of infection compared to those treated early and appropriately. This study, the largest reported cohort of Seymour fractures, highlights the importance of timely, appropriate treatment of this outwardly benign fracture to reduce the risk of infection.