

1 **Establishing The Role Of Inflammatory Markers In The Diagnosis And Treatment Of Acute Hand**
2 **Infections In The Pediatric Population**

3 John Schutz BS^{1,2}; Morgan Williams BS³; Andy Lalka MPH^{1,2}; Sarah E. Sibbel MD^{1,2}; Micah Sinclair MD^{3,4}

4 ¹Department of Orthopedics, University of Colorado School of Medicine, ²Musculoskeletal Research Center, Children's Hospital
5 Colorado, ³University of Missouri-Kansas City School of Medicine, ⁴Children's Mercy Hospital, Kansas City.

6

7 Background: Pediatric hand infections are complex clinical problems due to difficulty distinguishing
8 infections of differing severity, presentation, and response to treatment.¹ Generally, superficial infections
9 can be managed non-surgically with antibiotics, while deeper infections may necessitate surgical
10 management and antibiotics. Inflammatory blood markers, including white blood cell (WBC) count,
11 erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP) are reported to aid in determining
12 severity of infection and response to treatment in adults.^{2,3}

13 Purpose: The purpose was to identify the difference in inflammatory marker levels in pediatric patients with
14 superficial vs. deep hand and wrist infections to determine the utility of markers in diagnosis and treatment.

15 Methods: This retrospective cohort study included pediatric patients who received treatment for an acute
16 hand or wrist infection at two freestanding children's hospitals. Chart review for demographics, diagnosis,
17 treatment, and cause of infection was conducted. Exclusion criteria included: patients >18 y/o, chronic
18 infection, open fractures, no inflammatory markers measured.

19 Results: 129 patients met inclusion criteria. Logistic regression was used to assess predictive value of
20 ESR, WBC, and CRP in treatment and diagnosis. Only intravenous (IV) antibiotic administration was
21 associated with elevated inflammatory markers. Every 1 unit (mg/L) increase in CRP was associated with a
22 2.14 increased odds (95%CI: 1.09, 4.17) of being given IV antibiotics. Every 1 unit (cells/mm³) increase in
23 WBC was associated with a 1.26 increased odds (95%CI: 1.06, 1.50) of being given IV antibiotics. Every 1

24 unit increase in WBC was associated with a 1.14 increased odds (95%CI: 1.02, 1.27) of a cellulitis
25 diagnosis. ESR and CRP were not significantly associated with cellulitis diagnosis.

26 Conclusion: Pediatric hand infections are complex problems and inflammatory blood markers can be a
27 useful tool for aiding in diagnosis and management, particularly in determining need for IV antibiotics and
28 for diagnosis of cellulitis.

29 Significance: Clinicians may use inflammatory markers to aid in treatment of pediatric hand and wrist
30 infections.

¹ Gauger, E. M., et al. (2021). "Acute-Phase Reactants in Operatively Treated Upper Extremity Infections: A Retrospective Review." Hand (N Y) 16(4): 546-550.

² Teo, W. Z. W. and K. C. Chung (2019). "Hand Infections." Clinics in Plastic Surgery 46(3): 371-381.

³ Harness, N. and P. E. Blazar (2005). "Causative microorganisms in surgically treated pediatric hand infections." J Hand Surg Am 30(6): 1294-1297.