Establishing the Role of Inflammatory Markers in the Diagnosis and Treatment of Acute Hand Infections in the Pediatric Population

John Schutz, BA[1,2]; Andy Lalka, MPH[1,2]; Micah Sinclair, MD; Sarah E. Sibbel, MD[1,2]

Children's Hospital Colorado
Musculoskeletal Research Center

Musculoskeletal Research Center, Orthopedics Institute, Children's Hospital Colorado, Aurora, CO[1]
Department of Orthopedics, University of Colorado Anschutz Medical Campus, Aurora, CO[2]

Orthopedics
UNIVERSITY OF COLORADO

Background

- Pediatric hand infections are complex clinical problems due to difficulty distinguishing infections of differing severity, presentation, and response to treatment.
- Inflammatory blood markers (WBC, CRP, and ESR) are reported to aid in determining severity of infection and response to treatment in adults.

Purpose

- Identify differences in inflammatory blood marker levels in pediatric patients with superficial vs. deep hand/wrist infections to determine the utility of markers in diagnosis and treatment.

Methods

- Retrospective multicenter cohort study including pediatric patients who received treatment for an acute hand or wrist infection.
- Exclusion criteria included: patients >18 y/o, chronic infection, open fractures, no inflammatory markers measured.

Statistical Methods:

- Logistic regression was used to assess predictive value of ESR, WBC, and CRP in treatment and diagnosis.

Results

Table 1: Difference In Inflammatory Markers Between Deep And Superficial Hand Infections

Lab	Deep Infection N=36	Superficial Infection N=75	Difference (95%CI)	p Value
CRP	5.3 (13.7)	2.4 (3.7)	2.6 (-2.1, 7.4)	0.2636
ESR	23.3 (25.7)	16.2 (10.1)	10.3 (-1.1, 15.4)	0.099
WBC	11.7 (6.4)	11.8 (5.0)	0.6 (-1.7, 3.0)	0.6052

Table 1: ESR, CRP, and WBC levels were not predictive of diagnosis when classifying infections as superficial or deep.

Table 2: Difference In Inflammatory Markers Between Patients Who Were Pretreated With Antibiotics At An Outside Hospital Prior To Definitive Management And Patients Who Were Not

Lab	No Pretreatment With Antibiotics	Pretreated With Antibiotics	Difference (95%CI)	p Value
CRP	3.1 (9.6)	4.1 (5.8)	-1.0 (-4.0, 2.0)	0.5123
ESR	17.4 (17.7)	20.7 (18.6)	-3.3 (-11.8, 5.3)	0.4421
WBC	12.1 (5.8)	10.4 (4.4)	1.7 (-0.3, 3.7)	0.0938

Table 2: No significant differences were found between inflammatory markers in those patients who were treated with antibiotics at an outside facility prior to definitive management and those who were not.

Table 3: Association Between Lab Parameters And Definitive Management

Lab	Operative Management	Bedside Procedure	Oral Antibiotics	p Value
CRP	3.1 (4.6)	1.9 (2.0)	4.4 (11.9)	0.6481
ESR	14.7 (11.3)	16.8 (8.4)	19.8 (21.2)	0.6560
WBC	12.9 (9.1)	10.9 (4.4)	11.0 (5.4)	0.6245

Table 3: No significant associations were found between lab values at time of presentation and the ultimate definitive management for the infection.

Table 4: Labs of Single MRSA Infections vs All Other Microbes

Lab	Single MRSA	All Other Microbes	Difference (95%CI)	p Value
CRP	1.9 (3.4)	3.6 (9.1)	1.7 (−0.88, 4.2)	0.20
ESR	14.1 (7.8)	19.7 (19.9)	5.6 (−1.1, 12.4)	0.10
WBC	11.9 (4.7)	11.7 (5.1)	−0.2 (−2.9, 2.6)	0.88

Table 4: While the mean ESR, CRP, and WBC values were similar between single MRSA and all other microbes, bedside and operative procedures were twice as likely to be performed in the isolated MRSA group (64.7%) compared with all other microbes (34.9%) (p = 0.02).

Conclusions

- Inflammatory markers are not predictive of level of infection severity or definitive management
- Inflammatory markers are not predictive of causative organism in pediatric hand infections
- Clinicians may use inflammatory markers to trend pediatric hand infections but should defer to clinical judgement for course of treatment.

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