Characterizing Hand Infections in an Underserved Population: The Role of Diabetic Status and Location of Infection

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INTRODUCTION

- Whether inflammatory markers like erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) vary predictably among zones of the hand in hand infections (HIs) is under debate.
- A high index of clinical suspicion enables providers to identify severe HIs early and maximize preservation of structure/function.

Study Goals

- This study aims to examine how ***common bacterial agents***, ***infection location***, and ***patients' laboratory findings*** **differ** based on diabetic status to determine which characteristics could raise clinical suspicions for closed-space HIs.

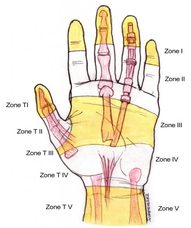

Figure 1. Flexor tendon zones of the hand.

METHODS

- Retrospective review of a prospectively collected, single-center database. Patients who presented from 2014-2016 with any hand infection were identified and then stratified by diabetic status and site of infection (proximal to digit [Proximal] or within digit [Distal]).
- Patients with recent history of surgery, comorbid infection proximal to the distal wrist crease, history of osteomyelitis, or human or animal bite mechanisms were excluded.
- Diabetes status, hemoglobin A1c (HbA1c), blood glucose, white blood cell count (WBC), ESR, CRP, and culture results were analyzed using parametric and non-parametric tests, where appropriate.
- Univariate and multivariate analyses controlling for age, gender, and diabetes status were employed to identify any significant independent predictors of laboratory values.

RESULTS

Lab Studies	Diabetics	Non-Diabetics	p-value	OR (95% CI)	β	p-value
ESR (mm/hr)	76.19	51.33	0.015	1.03 (1.01-1.05)	0.227	0.013
CRP (mg/L)	87.2	55.1	0.250	-	-	-
WBC (10^3/μL)	9.75	9.40	0.800	-	-	-

- Fifty-three patients met inclusion criteria (diabetics: n=24 [45.3%]; non-diabetics: n=24 [45.3%]; unknown status: n=5 [9.4%]).
- The rates of S. aureus, MRSA, and gram-negative organism identification in culture between these groups were **similar (p=0.610)**.
- **Mean ESR was significantly higher in diabetics** compared to non-diabetics (76.19 vs. 51.33, **p=0.015**). Mean overall WBC, CRP did not differ significantly.
- Regression analysis showed that **diabetics had higher odds of having increased ESR** (OR=1.03, Beta coefficient=0.227, **p=0.013**).

Lab Studies	Proximal	Distal	p-value	OR (95% CI)	β	p-value
ESR (mm/hr)	64.5	59.0	0.677	-	-	-
CRP (mg/L)	136.9	50.5	0.001	1.02 (1.01-1.03)	0.329	0.003
WBC (10^3/μL)	5.2	3.9	0.020	-	-	-

- Among known-diabetic HIs, **13/48 infections were Proximal**, and **35 were Distal**. **Proximal infections showed significantly higher mean CRP** (**136.9** vs. 50.5, **p=0.001**) and **WBC** (**5.19** vs. 3.9, p=0.02); ESR did not vary significantly.
- Regression analysis controlling for diabetic status showed that **proximal infections were more likely to have a higher CRP** (OR 1.02, Beta Coefficient=0.329, **p=0.003**).

CONCLUSIONS

- While ESR was significantly higher in diabetic patients, proximal infections had higher CRP and WBC.
- These findings suggest that infection location may have more profound effects on the inflammatory milieu of the hand than does diabetic status.
- Future assessment of the predictive utility of physical exam findings and lab findings is warranted to standardize a set of predictive criteria for HI severity. Any proposed criteria using ESR should be stratified by diabetic status.
- Our findings suggest if CRP is to be incorporated into predictive HI criteria, infection site must also be accounted for.

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