Locoregional Microbiology Differs by Mechanism, Location, Type, and First Intervention at Initial Evaluation: Novel Findings in Hand Infection Epidemiology

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INTRODUCTION: Hand infections confer significant functional morbidity due to prolonged recovery, loss of time at work, and diminished ability with activities of daily living. Prior investigations have focused exclusively on patients who were operated on. Delineating the locoregional microbiology of hand infections, including patients drained non-operatively who may have a different pathologic microbiome, can lead to a superior understanding of infection epidemiology and optimize initial antibiotic regimen.

MATERIALS AND METHODS: A prospective registry enrolled surgical hand infection patients. Infections were categorized by mechanism, location, and type. Patients were stratified by first intervention at initial evaluation. Chi-squared analysis compared microbiology by covariate.

RESULTS: 177 patients presented with a total of N = 238 culture results. Mechanisms were as follows: 5% burn, 4% fight bite, 34% trauma, 17% IVDA, 10% animal bite, 1% cancer-related, 2% dermatologic lesion, 1% sepsis, 1% foreign body, and 44% idiopathic. Locations occurred as follows: 10% thumb, 50% digit, 22% hand, 23% wrist, 20% forearm. Type was as follows: 9% paronychia, 5% felon, 57% abscess, 4% tenosynovitis, 5% osteomyelitis, 2% fasciitis, 18% joint. At initial evaluation, 23% were discharged after bedside drainage, 11% were admitted without drainage, 26% were admitted after bedside drainage, while 40% went to the OR.

From cultures, 71% grew Gram-positive microorganisms, 13% Gram-negative, 1% fungal, 5% few mixed, and 11% showed no growth. The overall prevalence of Staph aureus was 41%, with 19% MRSA. The prevalence of Staph aureus was significantly different in patients with mechanisms that were traumatic (51%, p=0.03), IVDA (18%, p=0.01), animal bites (21%, p<0.05), and idiopathic (62%, p<0.01), in locations in the digits (51%, p<0.01), wrist (23%, p=0.05), and forearm (20%, p<0.01), in infection types that were felon (69%, p<0.04) and joint (28%, p=0.05), and in patients who went to the OR at initial evaluation (30%, p<0.01).

CONCLUSIONS: These findings suggest that our locoregional infection microbiology varies significantly by mechanism, location, type, and in patients initially triaged for operative drainage. Coupled with sensitivity data, these findings can develop a risk-stratified, optimized algorithm for initial empiric antibiotic choice at presentation as a function of mechanism, location, type, and triage, which could potentially reduce inpatient length-of-stay and hasten recovery to normal functional status in this patient population.

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Analysis of Thumb and First Webspace Injuries Due to Fireworks

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INTRODUCTION: Fireworks-related hand injuries can be devastating. We hypothesize that thumb and first webspace injuries are common among fireworks blasts and have distinct patterns of injury.

MATERIALS AND METHODS: We reviewed our hospital database to identify patients with fireworks-related injuries from 2005–2015. Patients with operative hand injuries were included. Chart review identified demographic information, injury characteristics, and operative details.

RESULTS: 105 patients had operative fireworks-related hand injuries. There were 102 males, 3 females, and mean age was 28 years. 6 underwent complete hand amputation through wrist or forearm. 16 patients (16%) had bilateral injuries. In the thumb and/or first webspace injury group, 88 patients (84%) sustained 92 hand injuries and there were: 80 thumb fractures, 8 thumb soft tissue-only injuries, 52 thumb carpometacarpal (CMC) joint fracture dislocations, and 36 thumb fractures outside the thumb CMC joint. 15 had both thumb CMC joint fracture dislocations as well as additional thumb fractures. 23 required thumb revision amputation. 63 hands had deep first webspace injuries, and 11 required flaps for first webspace reconstruction. 6 required second-ary reconstruction of a first webspace contracture (4 local tissue rearrangement, 1 flap, 1 skin graft). An external fixator was applied to 6 hands to maintain the first webspace; none of these required secondary web reconstruction. The number of surgeries for acute reconstruction ranged 1 to 7 (mean 1.6), with 19% requiring 3 or more. Later-stage surgeries included: pin removal (35), flap debulking (1), tenolysis (3), osteotomy (2), nail ablation (2), stump revision (5),
flap (groin or toe transfer) (3), neuroma excision (1), digital nerve reconstruction (1), capsulotomy (5), first webspace deepening (6), dressing changes in children (3). Excluding isolated pin removals and dressing changes under anesthesia, 17 patients (20%) required later-stage surgeries.

CONCLUSION: Thumb injuries from fireworks result from high-energy avulsion, hyperextension, and hyperabduction, frequently injuring the thumb, destabilizing the CMC joint, and seriously damaging the first webspace. The first webspace requires particular consideration as deep injury may result in adduction contracture and require secondary reconstruction with tissue outside the zone of injury if not prevented. In our experience, application of thumb stabilization with either a miniature external fixation device or Kirschner wires to stabilize the CMC joint is imperative to maintain the first webspace and prevent thumb adduction contracture.

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Fracture Patterns Following Gunshot Wounds to the Upper Extremity

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INTRODUCTION: Upper extremity fractures following gunshots are a commonly encountered scenario for surgeons in the emergency room. Despite this, there is sparse data published on fracture patterns associated with this mechanism of injury within a civilian population. The aim of this study was to describe fracture patterns in the upper extremity associated with gunshots at a Level 1 Trauma Center.

MATERIALS AND METHODS: A retrospective review of data collected from 2010 to 2014 at a Level 1 Trauma center based on a single Hand Surgeon’s experience was performed. Demographic data and information on fracture patterns were collected and analyzed.

RESULTS: Two hundred fifty-nine patients were included in this study. A majority were male (90%) and African American (90%). Mean age was 31 years. 66.9% of upper extremity gunshot wounds affected the hand. The most prevalent forearm fractures involved the distal radius (39.65%) of which 18.97% were associated with concurrent hand injury. The most prevalent hand fractures were those of the metacarpal (25%) and phalangeal (22.8%) bones. Deeper structures of the hand and wrist were affected in only 13.4% and 6.8% of patients with minor hand and wrist lacerations, respectively. 39.1% of patients underwent operative intervention, 19.7% were admitted to the ICU for management of other injuries and 4.8% expired in the ED.

CONCLUSION: Analysis of upper extremity fractures identifies the most common fracture sites and their characteristics. This is the first study to describe fracture patterns in the UE resulting from gunshots within a civilian population. Further comparison of complication rates may permit broader insight into how patients are currently managed.

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Upper Extremity Injuries Seen at a Level 1 Trauma Center: Does Insurance Status Matter?

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INTRODUCTION: Hand and upper extremity injuries are one of the leading causes of injury in the United States, making up 10% of all emergency department visits and 9.2 billion dollars in yearly health care expenditures.1–5 The purpose of this study was to determine if there are any demographic differences between patient groups presenting initially to our emergency department for upper extremity related injuries versus those transferred from other hospitals for the same diagnoses.

METHODS: A retrospective review of our hand trauma database was performed between 2011 and 2014. All patients within this time period with ICD 9 codes suggestive of upper extremity injuries were included in this study. Patients were stratified into two groups: those presenting directly to our emergency department (group 1) and those that first presented to another hospital and were accepted as transfers to our institution (group 2).