Hands

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PGY-2
General Surgery
Dura est manus cirurgi, sed sanans. The hand of the surgeon is hard, but healing.

-Map, Walter c.1181 De Nugis Curialium, Distinction 4, ch.4.
Trauma

- role of plastic surgery in urban level I trauma is undefined
- Denver, 2003: 29 months prospective data following initiation of a full-time plastic surgery position at an established urban level I trauma center
- 1009 operative reports comprising 1104 procedures
- upper extremity was the most common anatomic area of operation
- significant role for plastic surgeons in a level I trauma center
Case Report: WS

• 10/3/2010
• 44 yo female high speed MVC, restrained
• No LOC
• VS: 120/80, 100, 25, 36.3, GSC 15, 100% on 15L
• PMH/PSH: MCC 20 yrs ago
• Meds: none
• SH: negative
Injuries

• LUE avulsion and degloving
• Visible vessels on forearm
• 1+ weak but palpable radial pulse
• L hand sensation intact
• CXR negative and no other injuries noted
• Taken to OR immediately for brachial a. injury
• Repair of brachialis anterior joint capsule
• I&D
• Grafted repair of brachial artery with reverse saphenous vein
• Grafted repair median nerve
• Soft tissue coverage with lat dorsi (fasciocutaneous flap)
• STSG – 500 cm²
Degloving

- one of the most difficult problems in hand surgery
- neurovascular avulsion injury leaving underlying structures intact
- coverage with pliable, sensitive, and cosmetically similar tissue with revascularization as goal
- emergency procedure
- 1988-1995, nine patients with degloving injuries of the hand and fingers were treated by microsurgical replantation (Italy 1998)
- Cosmesis, early mobilization with good recovery of joint movement
- reestablishing sensibility unsatisfactory
Images

- Fig 2, 3
- Table 3
Treatment methods

• immediate revascularization under microscope
• vein grafts taken from the wrist
• reimplantation of original skin when possible
• flaps taken from big toe or distally based radial forearm flap
• in isolated single finger degloving, consider amputation
• Secondary grafting
## Results

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<th>Case</th>
<th>Follow-up (months)</th>
<th>Motility (degrees)</th>
<th>Cold Intolerance</th>
<th>Scar Contracture</th>
<th>Cosmetic Results</th>
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<td>Long</td>
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Crush and ACS

Crush injury

• severe crush is associated with a poor prognosis.
• Spanish group (2002) investigated the hypothesis that compartment syndrome complicates such injuries.
• 1996 to 2000. N=11 of patients after closed crush who developed AC
• 2 centers experiencing ~600 injuries per year
Compartment syndrome

- most commonly results from crush injury of the hand
- rare causes include gunshot wounds, burns, snakebites, IVs, infections, neoplasms, bleeding from coagulopathy
- fasciotomies
Diagnosis

- clinical grounds in 2 patients, intracompartmental pressures in the rest
- clinical clues were massive hand swelling, tenseness to palpation, and paresthesias.
- excruciating pain was absent or attributed to trauma
- classic signs such as intrinsic muscle minus position and pain on stretching were absent in 6 and 3 patients
- stretch test impossible in 5 due to associated injuries
Treatment

- complete fasciotomies
- complete closure of the carpal tunnel to protect the median nerve
- primary skin closure when able
Results

- crush injury doesn’t in itself carry a poor functional prognosis
- elevated subfascial pressure may be present despite the absence of classic signs and symptoms.
- failure to recognize ACS of the hand leads to contracture and loss of function
- none of the patients developed contracture or sequelae that could be attributed to compartment syndrome.

"any hand crush injury accompanied by massive swelling and tenseness on palpation should alert the surgeon to the possibility of acute hand compartment syndrome, despite the absence of classic signs and symptoms. We recommend that practitioners systematically record intracompartmental pressure in any patient with a severe crush injury to all or part of the hand, and that a fasciotomy be routinely considered...We firmly believe that occult-unrecognized compartment syndromes are involved in the frozen hand, first web retraction, limited motion, and other sequelae attributed to the "crush hand syndrome."
Infection

• Before the advent of antibiotics, infections of the hand often resulted in severe disabilities, including stiffness, contracture, and amputation.
• ~60 % of hand infections are the result of trauma
  – 25-30% human bites, 10-15 % drug abuse, 5-10 % animal bites
• Infections include: cellulitis (35%), paronychia-eponychia (35%), felons (15%), tenosynovitis (10%), deep-space abscesses (2%), septic arthritis (2%), osteomyelitis (1%)
• Risk factors for infection – ischemia, presence of foreign bodies, acute contaminants of trauma or hardware
• Ischemia seen after trauma that disrupts blood supply
• Immunosuppressed states like diabetes, steroid use, IVDA
Pathogens

• Staphylococcus aureus, Staphylococcus epidermidis in implant surgery

• Gram -, anaerobic, fungal, and mixed infections in open, contaminated wounds

• no evidence to support the use of antibiotics in brief, clean hand surgery procedures or routine hand lacerations or simple soft tissue injuries

• procedures involving implants or bone, and those lasting more than 2 hours may warrant a 1st gen cephalosporin

• grossly contaminated wounds, severe contusion and soft-tissue loss warrant an aminoglycoside and penicillin for G- coverage
Treatment

- Paronychia - point the scalpel away from the nail bed to prevent scarring, ridging, and subsequent deformity of the nail and remove the affected portion of the nail

- Felon - incise on the noncontact side of the digit directly to the periosteum (radial side of thumb and ulnar side of fingers), should not extend around the tip of the finger, drain all septal compartments
• **Flexor tenosynovitis** - open debridement through a midaxial and palmar incision
  – 81% preserve all function

• **Abscesses** - web space, midpalmar space, thenar space, and hypothenar space
  – drain palmar and dorsal, incise longitudinally or transversely to avoid contracture

• **Septic arthritis** - drain and leave drainage catheter for 48-72 hours
Bites

• Bites - 1% of visits to the ED, dog bites
• clenched-fist injuries most common
• highly contaminated
• risk penetration of the skin, joint space, subtendinous space, dorsal subcutaneous space, deep-space infection, septic arthritis, and osteomyelitis
• Penetration occurs in a direct line while the fist is clenched
• examine the hand in this position to avoid missing deeper wounds
• leave bite wounds open with frequent washout and debridement, abx
• Complications: loss of ROM, amputation
References


