HIGH RISK WOUNDS: CLINICAL PEARLS

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DISCLOSURES

- None
OBJECTIVES

At the end of this presentation participants should be able to:

1) Detail current best practices for laceration management

2) Identify key clinical features and management of four high-risk wounds commonly seen in practice

3) Outline a rational approach for a) antibiotics and b) surgical consultation in high-risk wounds

4) Describe one new controversy/old myth for each entity discussed
WHY IS THIS IMPORTANT?

**Primary:** “The Needs of the Patient Come First”

**Secondary:** “High Risk” not only from a medical standpoint but from a malpractice standpoint.

*Traumatic wounds make up only 5.4% of ED visits, but account for 24% of malpractice litigation.* (1)
Question 1: A 30 year-old healthy male presents with an uncomplicated finger laceration from a utility knife. What intervention is most effective in reducing the likelihood of infection?

a) Prophylactic antibiotics  
b) Irrigation  
c) Soaking  
d) Use of sterile gloves

courtesy safetytooltopics.com
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Question 2: A 50 year-old diabetic male presents a swollen, erythematous index finger. He holds it in flexion and has pain on extension and upon palpation over the palmar aspect of the finger.

What is the most appropriate management?

a) Oral antibiotics and next day recheck
b) Send to the ED for IV antibiotics
c) Splinting, anti-inflammatory and next day recheck
d) Send to the ED for surgical evaluation
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Question 3: A 21 year-old male presents with a laceration over his 2nd MCP joint 2 hours after punching another guy in the mouth.

Which of the following is NOT an appropriate part of management?

a) Dismiss on prophylactic cephalexin
b) Plain radiograph for fracture or foreign body
c) Exploration for joint or tendon involvement
d) Irrigation with tap water
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Courtesy Ohio State University, Department of Emergency Medicine
Question 4: A 73 year-old female presents 12 hours after being bitten by her cat on the hand with redness, swelling, and lymphangitis.

The most likely causative agent of her soft tissue infection is:

a) Eikenella corrodens
b) Staphylococcus aureus
c) Pasturella multocida
d) Captncytrophagia canimorsus

(courtesy Howcast.com 2013)
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Question 5: A healthy 25 year-old construction worker presents with a plantar puncture wound after stepping on a nail that came through his work boot. What is most important in his care from a risk management standpoint?

a) Plain radiographs
b) Dismissal on cephalexin
c) Dismissal on ciprofloxacin
d) Provider educating the patient
PRETEST – HIGH RISK WOUNDS

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courtesy footdoctorscolorado.com
CASE 1: HAND LACERATION

**Key Features of Management**

1. **DO EXAMINE** to full depth, dry field, full range of motion
   - Tendon/tendon sheath
   - Joint/Joint capsule
   - Foreign body**

2. **DO ASSESS** for digital nerve injury (2 point)
CASE 1: HAND LACERATION

Key Features of Management (continued)

3. DO DECONTAMINATE wound → IRRIGATION

4. DO provide tetanus and/or rabies vaccines when appropriate

5. DO CONSIDER wound type and location and host factors when considering prophylactic antibiotics
IRRIGATION

Most beneficial preventing infection and optimizing wound healing (2,3)

Physical decontamination with pressure

- 5-8 PSI (4)
- 16-19 gauge catheter on 35-65 ml syringe

Saline and Tap Water equally safe and effective (5,6)

**AVOID SOAKING (3)**

**AVOID DETERGENTS/IODINE in wound (2)**
PROPHYLACTIC ANTIBIOTICS: WHO GETS THEM?

- Two high-risk features (1)
  - Wound
  - Host

- Antibiotics are NOT valuable in simple, uncomplicated wounds (7)
WOUNDS CHARACTERISTICS AND RISK OF INFECTION

**High Risk**
- Tears, crush, or puncture
- Stellate
- Bites
- Contaminated (feces, soil)
- Foreign body
- Deep structure exposure
- Extremities (hand)

**Low Risk**
- Linear
- Well vascularized (head, neck, scalp)
HOST FEATURES AND RISK OF INFECTION

**High**
- Elderly (>65)
- Diabetes
- Vascular Disease
- Immunocompromised

**Low**
- Age <65
- No comorbid illness
STERILE GLOVES REQUIRED…likely not (2)

- latex free
- no powder

AGE of WOUND has major impact on infection rate

…..maybe not

Zehtabchi et.al., 2012 (8)

- no golden period
- no evidence that increased wound age increases infection risk
LACERATION TAKE-HOMES

- Thorough exam
- Wound prep key – IRRIGATION
- Antibiotics for high risk wounds/patients only
- Take time to educate your patient

Best Newer Article

CASE 2: PYOGENIC FLEXOR TENOSYNOVITIS (PFT)
KEY CLINICAL FEATURES: PFT

- Puncture wound to palmar finger – flexor crease, 2-5 days prior to presentation (9)
- Diabetics, immune compromised greater risk (10)
KEY CLINICAL FEATURES: PFT

KANAVEL’S SIGNS (1925)

1) uniform, symmetric swelling of the digit*
2) digit held in flexion
3) tenderness along entire tendon sheath
4) pain on passive extension**

Tenosynovitis is a *clinical* diagnosis (11)
All 4 present in just over half of cases (9)
PFT: MANAGEMENT

• EARLY SURGICAL CONSULTATION

• IV antibiotic therapy
  • Bacteriology: Staph aureus (40-75%), other Staph and Strep species
  • PCN plus first generation cephalosporin OR beta-lactamase inhibitor

• Treatment delay = adhesions, necrosis, spreading infection
Bedside Ultrasound may aid diagnosis

courtesy Western Journal of Emergency Medicine 2015
PFT: TAKE HOMES

- Early recognition → clinical diagnosis
- Prompt referral for *surgical* evaluation
- Antibiotics
  - IV not PO
  - Broad coverage – first generation cephalosporin alone NOT adequate

CASE 3: “FIGHT BITE” – CLENCHED FIST INJURY

FIGHT BITE: KEY FEATURES

- Small, but high risk wound
- Hand anatomy = structures close to the surface
  - tendon
  - nerve
  - joint
  - bone
- MCP joint most common – teeth penetrate tendon sheath/joint capsule in 67% of cases (12)
- Polymicrobial: *Staph, Strep, GNR, Eikinella corrodens*, anaerobes

 Courtesy Bing images
FIGHT BITE: KEYS IN MANAGEMENT

• Careful wound evaluation
• Plain Radiographs – fracture, foreign body, air in joint space
• Copious irrigation
• Low threshold for referral if deep structures involved
FIGHT BITE: KEYS IN MANAGEMENT

- **Provide Prophylactic Antibiotics**
  - AVOID mono-treatment with cephalexin, dicloxacillin, and erythromycin. Poor activity against *Eikenella*
  - Amoxicillin-clavulanate is agent of choice

- **Avoid suturing**

- **Recheck in 24 hours**
FIGHT BITE: TAKE HOMES

- Appreciate the high incidence of underlying structure involvement
- Early referral for deep structure involvement or active infection
- Appropriate antibiotic prophylaxis – NOT cephalexin alone
- Patient education

CASE 4: CAT BITE

courtesy www.eplasty.com and Nocera NF et.al. Rutgers Department of Surgery
CATS ARE THE WORST!

courtesy allthebestpets.com
CAT BITES

**Epidemiology** (13)
- 5-15% of all bites (dogs = 80-90%)
- adult women
- 2/3 to hand

**Virulence** (14)
- Up to 80% of cat bites get infected (20% for dogs)
- 37% required hospital admission
- 12% required surgery
CAT BITES

- *Paturella Multicoda* (15)
  - Most common organism infection after cats
  - Gram negative coccobacillus
  - Rapid onset infection (12 hours)
  - Intense erythema and swelling
  - Poorly responsive to cephalexin, dicloxacillin, and erythromycin

*courtesy Partners Infectious Disease Images*
CAT BITES: KEYS TO MANAGEMENT

• Wound evaluation and decontamination

• Radiographs (broken teeth, boney injury)

• Prophylactic antibiotics for ALL cat bites – All are high risk (13)
  • Amoxicillin-clavulanate 875/125mg BID
  • 3-7 days of therapy
  • doxycycline, ciprofloxacin plus clindamycin, penicillin plus dicloxacillin are alternatives

• Tetanus and rabies as indicated

• If infection already present, IV antibiotics and admission for most
WHAT’S NEW IN BITES?

What about antibiotic prophylaxis in the MRSA era?

Ogden et al 2012, Journal of Pediatric Infectious Disease

- Most cultures grew Pasturella species
- MSSA and Streptococcus in remainder
- No MRSA isolates

Conclusion: Currently no evidence to support covering for MRSA in bite wounds (16)
CAT BITE: TAKE HOMES

✦ Cats are the worst!

✦ Prophylaxis for all cat bites – drug of choice
  amoxicillin-clavulanate

  13% in bite study did not get appropriate antibiotic
  for bite! (16)

✦ IV antibiotics and admission for infected bites

  • Best Article : Ellis and Ellis, *Dog and Cat Bites*,
    American Family Physician, August 2014. (13)
CASE 5: PLANTAR PUNCTURE WOUND
PLANTAR PUNCTURE WOUNDS

- 90% involve stepping on a nail – occupational (17)
- Management is controversial, not evidence based
- Very real complications in 5-10% (18)
  - Cellulitis
  - *Pseudomonas* osteomyelitis (2-4 weeks post injury), metatarsal heads greatest risk
- Even following all best practices, complications will occur
- Patient education paramount!
PLANTAR PUNCTURE WOUND: KEYS TO MANAGEMENT

• Attentive and thorough exam – foreign body
• Radiographs if foreign body expected
• Clean site to extent possible
  • avoid aggressive surgical coring
  • remove any foreign body/material
• Never close
• Non weight-bearing for 48 hours
PLANTAR PUNCTURE WOUND MYTHS

Prophylactic ciprofloxacin is effective in preventing *Pseudomonas* osteomyelitis - **FALSE**

Prophylactic anti-streptococcal/anti-staphylococcal coverage is indicated in all plantar puncture wounds - **FALSE**

*No indication for prophylactic antibiotics except in high risk hosts (17,18)*
PLANTAR PUNCTURE WOUNDS: TAKE HOMES

- Attentive, thorough wound evaluation and good patient education are key
- Evaluate for foreign body
- Reserve antibiotics for high risk hosts or patients who already demonstrate infection

THANK YOU!
BIBLIOGRAPHY


