

Traumatic Big Wounds

from Accident Scene to Healing Initiatives

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21st Annual Trends in Trauma
May, 14, 2015
Frontenac Missouri Hilton



NATIONAL LEADERS IN MEDICINE

Overview

- Big Wounds on the Scene
- What can be done immediately and en route?
- What sets us all up for optimal healing?
- What are Healing Initiatives?

But First Disclosures

- K30 Program
- BJH and WUSM Foundations
- Merck, Inc----research funding for intra-abdominal infections
- Neumedicines, Inc---research for novel immunomodulation in injury states
- Musculoskeletal Transplant Foundation—research in AWR
- Ethicon, Inc—research in topical hemostasis
- Cook, Inc—developing wound infomatics analyses
- Wendi Gordon Shelist Foundation—NF, Surg Infections & WH
- None of these disclosures represent conflicts of interests for this presentation

More Importantly Biases



- Bias Disclosures
 - Wound Care is a TEAM sport
 - MD's
 - RN's
 - APN's
 - PT's
 - OT's

 - EMT's – Paramedics—Medics
- Further Bias—Care should be continuous from
 - Scene to
 - Arrival and then
 - Admission to Discharge to
 - Outpatient Follow Up
- Great, exquisite care will be team care

Big Wounds



- Large Soft Tissue Injuries
- Partial Amputations
- Crushes to large portions of Extremities
- Full thickness Burns >20%
- Limb threats v Life threats
- AAST, EAST, ABA, AORN
- Surgeon General's Office of the Army
- AMSUS
- Lt. Comm Hitchcock
- Wounded Warrior Programs, Walter Reed
- Dr. Kirby's individual surgical practice

Priorities

- Scene security---the injured must be the one with the medical problem---not the first responders
- Quick en-scene time is the current directive
 - Exited stay and play
 - Scoop and run
 - Limited resuscitation en route
- All ATLS principles hold in good wound care
 - First Do No Harm
 - Primary Survey with Asterisk: Airway c **C**-spine c Hemorrhage **CONTROL**
 - Secondary Surrvey
 - **TRANSFER** to Definitive Care in a planned, organized, proficient manner once immediate life threats are identified and initially mitigated

Motorcyclist

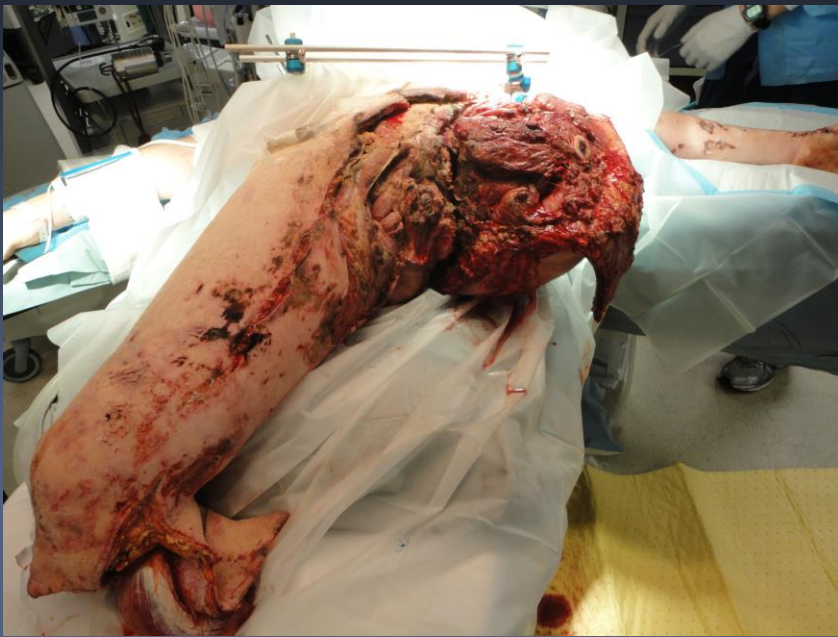


- Primary, secondary
- Look for vascular status
- Exsanguinating?
- No
- Soft tissue injury...
- Infection...

Massive Extremity Injury

- Airbags, better seatbelting, better crumple zones
- Body Armor
- Immediate—excessive force to truncal vital organs or brain/spine...or
- Exsanguinating Hemorrhage
- Heavy contamination
 - Soil
 - Other
 - Note soil has clostridium tetanii---rusty nail v. cow pasture
 - Ab response versus size of inoculum
- Later perfusion viability and then infection
- Then reconstruction and rehabilitation

Later Management



- On Scene
- Quick transport
- Hemorrhage C
- Resuscitation
- Immediate Operative Debridement
- Repeat Debridement

Tourniquets

- Earlier use now recommended by militaries
- Must abide by your sponsoring institution or programs guidelines
- Proper use of a tourniquet does not always commit to limb loss or later amputation
- Tourniquets in place for more than 2 hours are associated with limb loss
- Life vs Limb is a judgement call

Life v Limb

- Is the patient exsanguinating?
- Can the bleeding not be controlled with point pressure
 - 1-2 fingers above and also sometimes below injury?
- Capture and document the elements of your decision, including placement time
- Modifications---release times
- Hemostatic agents

References

- 21st Century Emergency War Surgery Textbook
- US Army Weapons Injuries, Triage, Shock, Anesthesia, Infections, Critical Care, Amputations, Burns, Specific Injury Treatment
- 2004 and updates

- Note—keep an eye out for
 - Progressive tourniquet use
 - Combined with topical hemostatics
 - Combined with limb salvage adjuncts such as hyperbaric oxygen

From Scene to Hospital for Healing?



- En Scene done
- Cleansing
- Low Pressure, high irrigation volume pulse lavage
- Surgical Debridement in
- Synergy and in
- Serial Repetition

No closed wounds

OPEN WOUND MANAGEMENT

- Simple, repetitive dressings
- Difficult to show benefits for early topical antibiotics
 - In either dressings or irrigation fluids
- Eventual transition to negative pressure and controlled tension dressings to
 - Preserve “open” quality of wound management
 - Allow for drainage—if not irrigation and self-cleansing
 - Preservation of tissue flaps
- Be wary of tension on flaps to early or conversion to negative pressure too early
- No substitute for



Team Challenges

Care of the overall patient

Wound care management: dressings, transitions, NPWT

Pain management

Infection surveillance

Edema

Impaired Nutrition

Impaired Mobility and Rehab---impact on Critical Care and then
impact on long term functionality

Better basics, Better Outcomes



- Later you can
- Graft
- Recon
- Compensate

Compartment Syndromes



- Suspect and
- Look for
- Earlier fasciotomies
- Too early or too late
- Easier to manage
- NPWT
- Neurovascular &
- Functional recovery

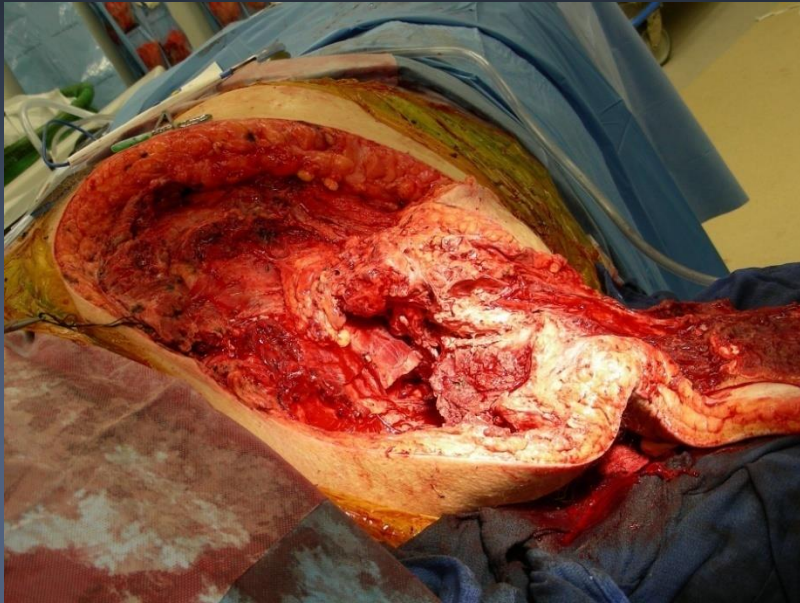
Second look @ 24 hours



After serial debridement, good local care, negative pressure wound treatment and then grafting

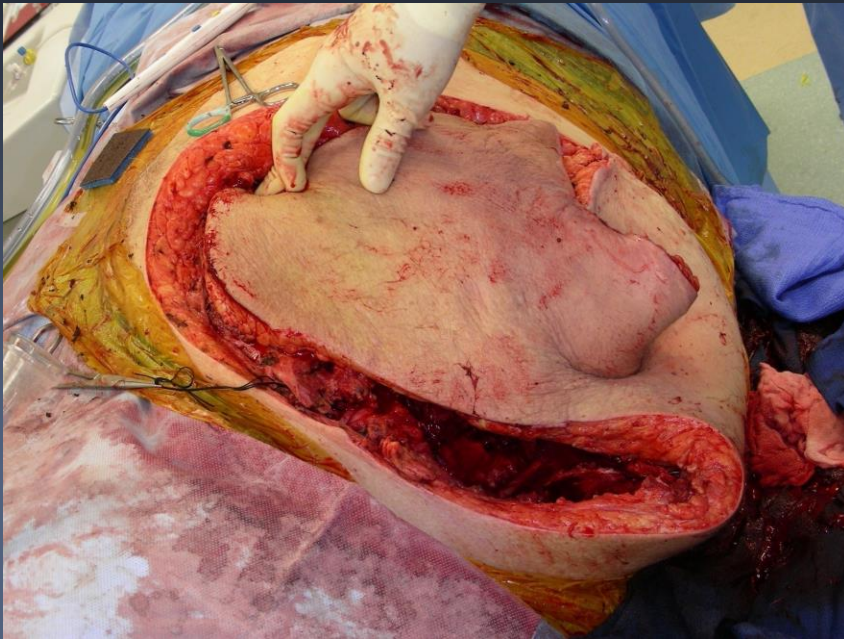


Principles remain the same



- Treat the whole patient
- Examine the wound
- Thorough surgical debridement
 - Diagnostic
 - Therapeutic
 - Plan for closure

Good Fundamentals lead to good outcomes



- Local flap for closure
- Negative pressure for staged closure
- Good follow up care
- Complete off-loading
- Good PT/OT
- Nutritional support

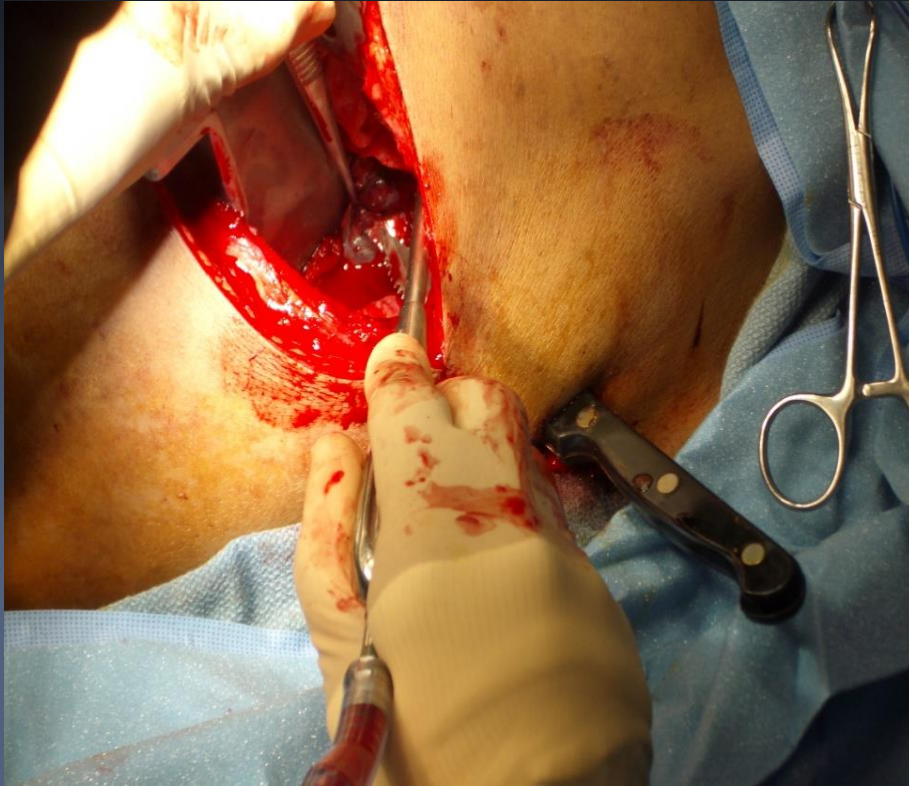
Much can be learned from CHRONIC Wounds



- Increase granulation, perfusion, neovascularization
- Decrease in edema, bacteria and surface area
- Conversion of emergent/urgent wound to a controlled/elective wound
- Alternative Therapy for the High Risk Patients
- Effective skin graft dressing
- Patient and Physician comfort



Be Careful



- Good immediate care
- Transition to definitive care with an eye
- Healing Mechanisms
- Healing Initiatives

Thank You



Recognize And Treat NECROTIZING FASCIITIS

To Avoid Life And Limb Threats

Compartment syndrome:
Swelling of muscle causing
compression of nerves and
blood vessels.



Blistering of skin
infection layer of
fascia
Infection site of necrotizing fasciitis of upper leg



NECROTIZING SOFT
TISSUE INFECTION



Superficial fascia - infection originating in underneath skin wall
Deep fascia - infection originating between subcutaneous tissue and muscle.



Fascial layer of anterior muscle tissue Advanced Necrotizing Fasciitis Myonecrosis of right thigh Infection site of necrotizing fasciitis of upper leg



NECROBIOSIS
LIPOIDICA
DIABETICORUM



EARLY RECOGNITION

Necrotizing fasciitis is a rare and life-threatening soft-tissue infection that is usually caused by toxin-producing bacteria. Its clinical course is characterized by widespread fascial necrosis with relative sparing of skin and underlying muscle. The infection can be associated with severe systemic toxicity and may rapidly progress to death unless promptly recognized and treated.

A large spectrum of skin and soft-tissue infections exist, which can be categorized anatomically. The superficial pyoderms do not extend beyond the skin (epidermis and dermis) and include erysipelas, impetigo, folliculitis, ecthyma, furunculosis, and carbuncles. Cellulitis is a deeper skin infection than erysipelas, but does not extend to the deep fascia. Necrotizing fasciitis involves the superficial fascia, subcutaneous fat, nerves, arteries, veins, and the deep fascia. Myonecrosis results in rapid necrosis of muscle, with delayed involvement of overlying soft tissue and skin.

Early symptoms were chills, nausea, vomiting (not severe), and weakness, fever, general ill feeling. Pain like a strained or sore muscle in the area where flesh-eating bacteria began.

Necrotizing Soft Tissue Infection is characterized by shiny plaques that vary in color from light yellowish to reddish-tan. May appear reddened, bronzed, bruised, or purple (purpuric). Severe pain, swelling, discoloration. Progresses to dusky, dark color. Bleeding into the skin. Visibly dead (necrotic) tissue. Skin color, patchy. Skin breaks (open wound). Skin around the wound feels hot and looks reddened, raised, or discolored (inflamed). Oozing fluid ranging from yellowish clear or yellowish bloody to puslike in quality.

EARLY CONFIRMATION

The appearance of the skin and underlying tissues and presence of gangrenous changes (black or dead tissue) indicates a necrotizing soft tissue infection. Imaging tests, such as CT scans, are sometimes helpful. Often a patient needs to go the operating room emergently, where a surgeon can diagnose such an infection. A Gram stain and culture of drainage or tissue from the area may reveal the causative bacteria.

EARLY DEFINITIVE TREATMENT

Early clinical recognition is difficult, and there is often a fatal delay in appropriate treatment. We evaluated the use of frozen-section biopsies for the rapid diagnosis of this disease in its early stages. Powerful broad-spectrum antibiotics must be administered immediately. They are given intravenously (in a vein) to obtain high blood levels of the antibiotic in an attempt to control the infection. Surgery is required to open and drain infected areas and remove (debride) dead tissue. Skin grafts may be required after the infection is cleared. If the infection is in a limb and cannot be contained or controlled, amputation of the limb may be considered. Sometimes pooled immunoglobulins (antibodies) are given by vein to help fight the infection. If the organism is determined to be an oxygen-avoiding bacteria (anaerobe) the patient may be placed in a hyperbaric oxygen chamber, a device in which the patient is exposed to 100% oxygen at several atmospheres of pressure.

- To our Patients—in particular the Wendy Gordon Shelist foundation
- To my partners at WUSM and BJH
 - Department of Surgery
 - Section of A&CCS
 - Wound RN's and APN's
- To the St Louis HBO Community...

NNFF- www.nnff.org

<http://health.carefer.com/health/disease-n.html>

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Thank You



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