Traumatic Big Wounds
from Accident Scene to Healing Initiatives

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

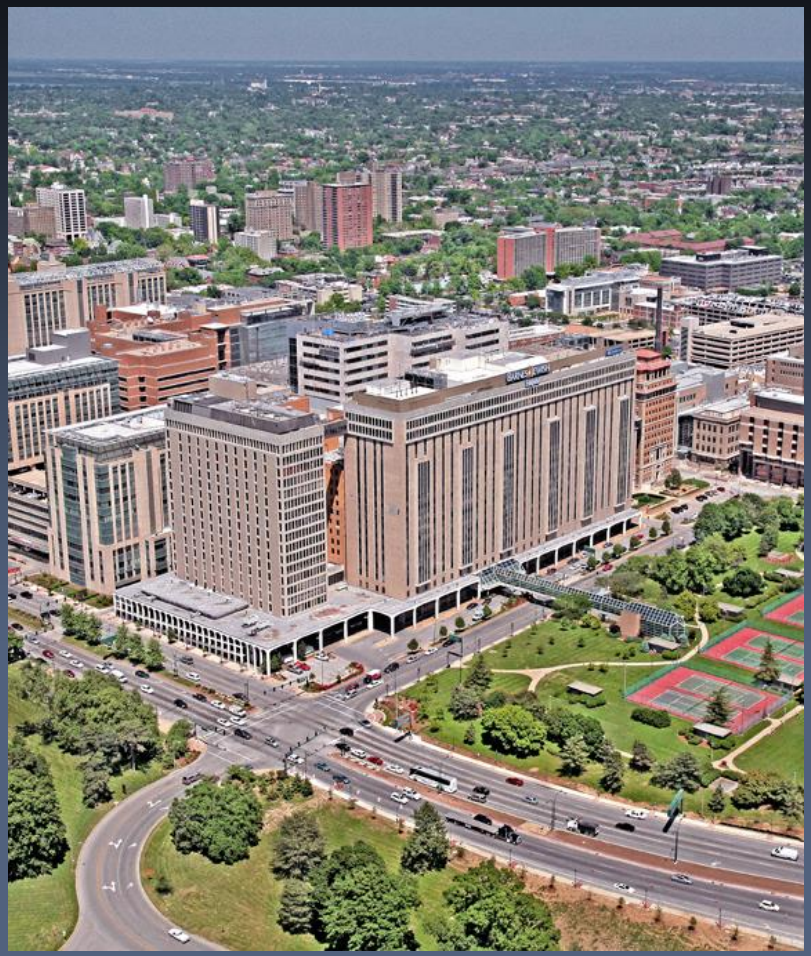
Overview

- 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

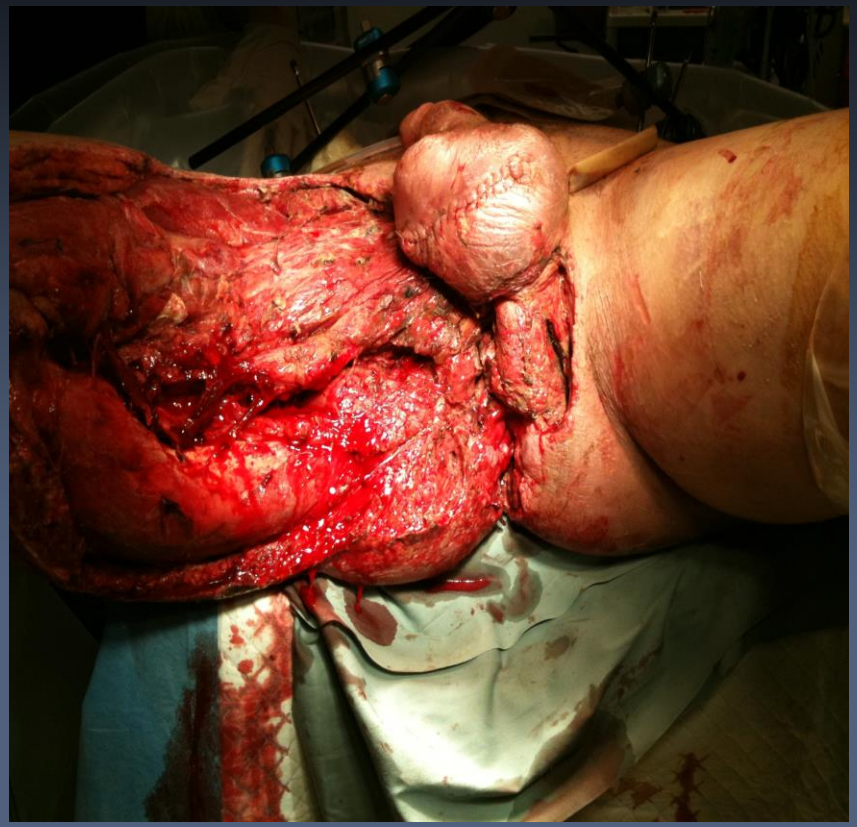
Big Wounds

- 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 innoculum
- 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 closued 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 Outomes

- Later you can
- Graft
- Recon
- Compensate

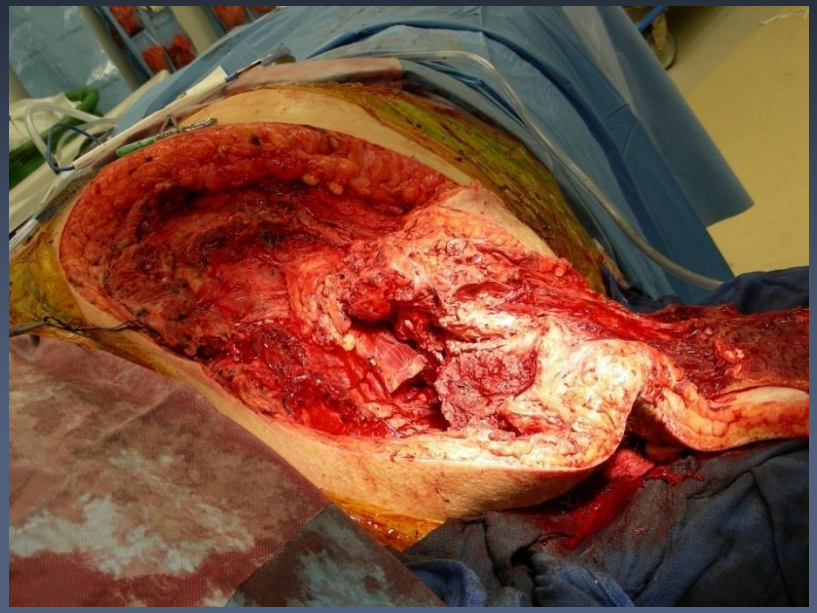
Compartment Syndromes

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

Second look @ 24 hours

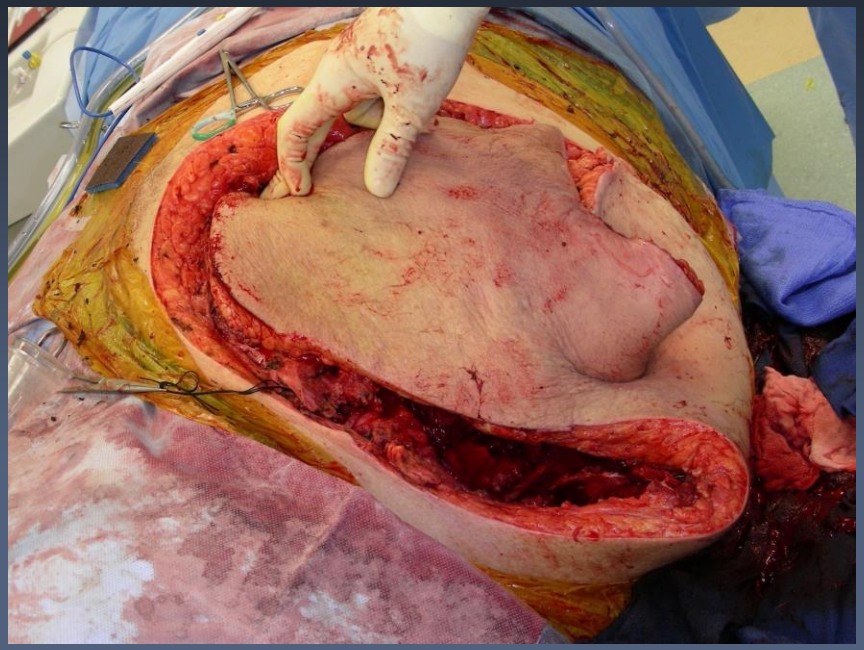
After serial debridement, good local care, negative pressure wound treatment and then grafting

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

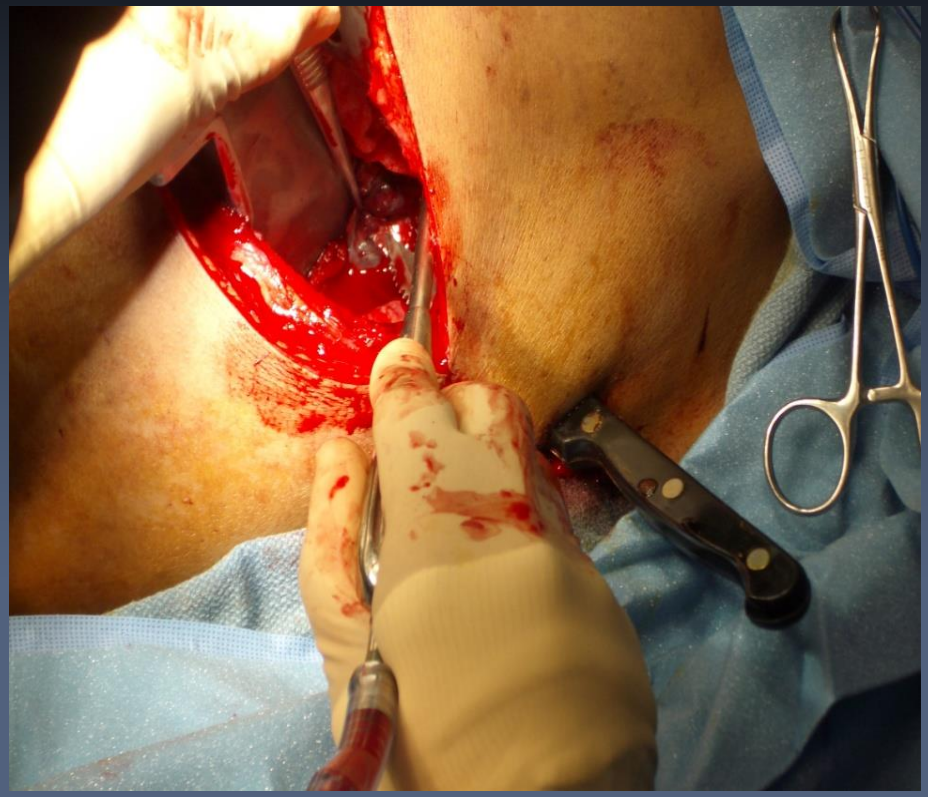


- Local flap for closure
- Negative pressure for staged closure
- Good follow up care
- Complete off-loading
- Good PT/OT
- Nutritional support
- Social services

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

- 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…

Selected References

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Thank You

- Trauma & Acute Care Services
- Department of Surgery
- Wendi Gordon Shelist Foundation
- Grant Bochicchio and my partners in the Section of ACCS
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