Trauma Surveys: Past, Present, and Future

Tracey Taulu, RN, BSN, MHS

Presentation Objectives

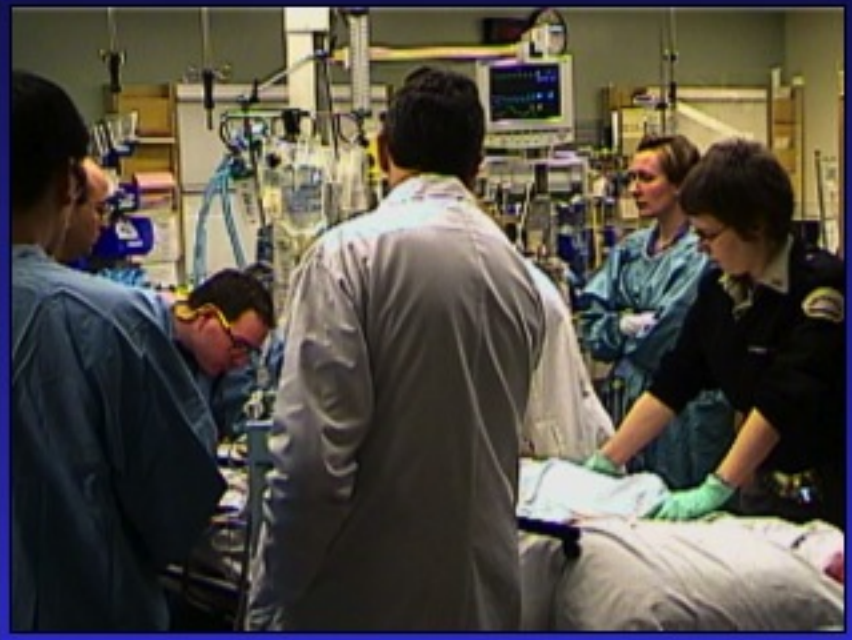
- Overview of Patient Surveys
  - Primary
  - Secondary
  - Tertiary
- Future
  - Quaternary

Background

- Trauma surveys are routinely done to assess trauma patients in during different phases of care
- Primary Goal:
  - Identify and treat all life threatening injuries as a priority
- Secondary Goal:
  - Decrease errors and delays in diagnosis
- Is there room for more? Are we missing anything?

Primary Survey

- Initial Rapid Assessment of a seriously injured patient
  - Life-threatening conditions are identified and management is begun **simultaneously**.
- Goal is 1-3 mins
- Airway with control of c-spine
- Breathing
- Circulation
- Disability
- Expose and Keep Warm
- Adjuncts
  - CXR, FAST, Labs, ABG's



The Secondary Survey

- Only done following the primary
  - After resuscitation efforts are well established
  - vital signs are normalizing
- The secondary survey is a head-to-toe (5-10 mins)
  - includes a complete history and physical examination,
  - reassessment of all vital signs
- Adjuncts
  - CT, Angio, Foley, NG's
- Goal is finalize the plan of care
  - OR, ICU, Ward
- If at any time the patient deteriorates go back another primary survey is carried out as a potential life threat may be present.

Trauma Team Activation - 88

TTA
CTAS 1
AUTOLAUNCH

Criteria for Trauma Team Activation - TTA

Physiologic Criteria
1. Respiratory rate <10 or >29
2. Systolic blood pressure <90
3. Glasgow Coma Scale ≤13

Anatomic Criteria
1. Penetrating injuries to head, neck, chest, abdomen, groin, and extremities proximal to knee and elbow
2. Flail chest
3. Combination trauma with burns >20% of BSA
4. Unstable pelvic fracture
5. Traumatic Limb amputation and or paralysis
6. Multiple Proximal long-bone fractures

Mechanism
1. Trauma in Pregnancy with Major Mechanism at any stage

Other Criteria
1. All transfers with a CTAS level 1 or 2 and all Autolaunch
2. In a multiple trauma scenario activate each patient

*TTA = System wide activation (Trauma Team, OR, Bloodbank, RT, Radiology, Anaesthesia)

Consider Trauma Team Consult

Mechanism - major mechanism signals major injuries
1. Fall >20 feet
2. MVC >65km/hr or rollover or ejection
   - Major deformity >50cm
   - Major intrusion >30cm
   - Extrication time >20 min
   - Death of passenger
3. Pedestrian struck >10km/hr or thrown >10ft or run over
4. Cyclist struck >10km/hr
5. Motorcyclist crash >30km/hr or separation from motorcycle
6. Major industrial accident
7. Significant assault

Other Considerations
1. Other significant co-morbidities

Pre-Hospital Report - MIVT

Estimated Time of Arrival

M – Mechanism
I – Injuries
V – Vitals Signs
T – Treatments

EP
- Airway
- Breathing
- Supervise

TTL

RT
- Airway
- Breathing
- ABG's

Resident Team Leader (RTL) - Primary/Secondary
- Decisions
- Delegate

Doctor 2
RN 2
- Procedures

Doctor 1
RN1
- Procedures

Surgeon TTL (Fellow/Attending) TNL
1. Guidance
2. Big Picture
3. Coaching
4. Decisions
5. Call OR/Admitting

Failure to Suspect = Failure to Detect

Team Management

PRIMARY (3 min)
- **A-** airway
- **B-** breathing
- **C-** circulation
  - pulse check
  - stop bleeding
  - IV's
- **D-** disability
  - GCS
  - pupils
- **E-** expose and keep warm

SECONDARY (5-10 min)
- **F-** full set of repeated vitals
  - family presence
  - focussed adjuncts
- **G-** give comfort
- **H-** head to toe
- **I-** inspect posterior

Secondary Adjuncts (15 min)
CTI/Angio/foley/NG

Primary Adjuncts
Labs, ABG's, CXR, FAST, ETCO2

PLAN (30min)
OR/ICU/Unit

Teamwork: Working together with good Communication towards a Common Goal

Reduce Morbidity and Mortality – Consider

Activation – low threshold
- Alerts the hospital wide system (OR, blood bank, anaesthesia)
- Early activation is proactive vs. reactive
- Multiple traumas = multiple activations (alerting system readiness)

Early Consultation - (Ortho, Neuro, Spine, Angio)

Triad of Death
- Hypothermia (temperature within 15 minutes)
- Acidosis (ABG's on all trauma patients within 10 minutes)
- Coagulopathy (anticipate and treat empirically)

IV fluids
- Permissive hypotension
  - Exceptions: head, spine, cardiac
- Limit crystalloids use plasmalyte
- Whole blood resuscitation
  - Massive Transfusion/ Trauma Exsanguination Protocol Activation

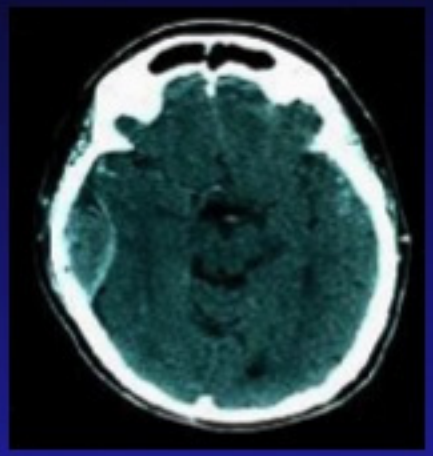
Diagnostics
- X-ray/FAST/CT (RIPIT stable vs. unstable)

Other factors to consider that may increase risks
- Co-morbidities (cardiac pathology, coagulation, renal function)
- Pregnancy
- Age
- Drugs/Alcohol

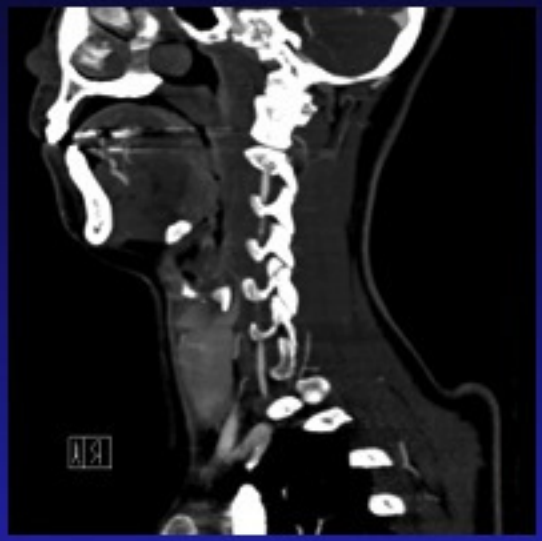
Expect Bad Injuries with Bad Mechanisms

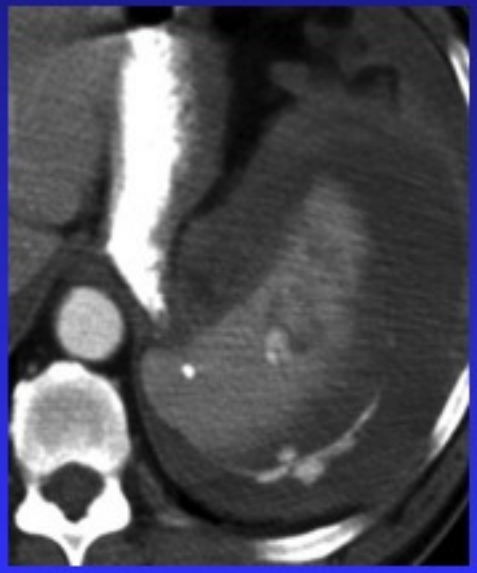
- Recognition of major trauma patient
  - Definition: ISS, triage tool, gut instinct?
- Mechanism
  - Extrication time >20min
  - Major auto deformity >50cm
    Fatality in same vehicle
    Ejection
  - MCC with separation
  - Pedestrian/cyclist struck
  - Fall > 5 meters

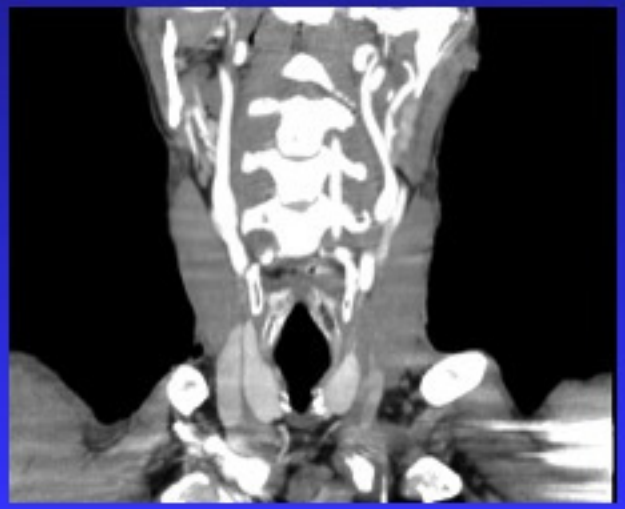
Some Bad injuries can be missed



- EDH/SDH
- C-spine
- BVNI
- Abdomen







Errors and Delays still exist

- Missed injures are inevitable with the major trauma population
- Occur in 9 – 65% of trauma patients
- The majority of which are not evident in the primary assessment due to
  - Urgency of major trauma – ABC's
  - Goal for damage control and definitive care
  - Inability to assess due to compliance of pt
  - Evolving symptoms not evident at time of Primary and Secondary assessment

Tertiary Survey

- The role of the Tertiary survey is not to pick up major missed injuries
  - The primary and secondary done correctly and thoroughly done will achieve this
- However we need to accept that some missed minor injures are inevitable
  - Not always a priority during resuscitation
  - Signs and symptoms are not evident and need to time to evolve – (12-24 hours)
  - Patients can be hard to assess due to their NVS status

Tertiary Survey

- Complete head to toe examination done in the first 12-24 hours following a trauma patient admission
- Used to indentify injuries that may have been overlooked in the initial assessment
- Critical in patients with multiple injuries
- Minor injuries missed are common – look for them
- Enables physicians to repeat detailed examinations with precision
- Standardized form ensures consistency between providers
- Thorough review diagnostic findings in a controlled environment with radiologist within first 24 hrs
  - CT / X-ray / US / Angio

Tertiary Survey
Comprehensive Detailed Physician Assessment

- Head and Scalp
- Neck
- Chest
- Pelvis
- Abdomen
- Back
- Extremities
- Nerves
- Review of all diagnostics
- Summary of findings

- mental status
- Pain on movement
- lacerations, abrasions,
- swelling, ecchymosis
- dysphagia, dysphonia, SQ air, tenderness
- distention, peritonitis
- hematuria
- deformities
- ect…

Does a Tertiary Survey Work?

VGH Before (1997)

- Missed injuries had a higher degree of severity
- Multiple missed spinal column injuries
- Numerous delays in time to definitive treatment for some injuries
- Total audited Errors
  - N = 453
  - 31 (6.8%)
  - Unacceptable errors 18 (4%)

VGH After (2009)

- Significant Reduction in severity of missed injuries
- No spinal column injuries are missed
- Fewer delays to definitive treatment
- Total audited errors
  - occurred when trauma patients were admitted to a non-trauma service and the Tertiary survey was not completed
  - N= 394
  - 14 (3.6%)
  - Unacceptable 2 (< 1%)

Reality

- Missed injuries can potentially be lethal , however the majority are not severe in their nature
  - Often considered provider related
  - Usually preventable in nature
  - Primarily minor orthopedic hand and foot
- Usually due to system failure
  - Formalized trauma programs mitigated missed injuries with standardized process' s
- Missed injuries cause increased M&M
  - Not to mention personal grief

Is there a Need for Improvement ?

- Primary, Secondary done during resuscitative phase of care
  - Everyone want to participate
  - Lots of adrenalin, everyone is engaged
- Tertiary is done during acute phases of care
  - Medical teams are still engaged but are busy
  - NP's and advanced nurse practitioners are starting to do this work
- Organizational need to get patients out the door
  - Due to limited capacity
  - Increasing philosophy of home is best

The Quaternary Survey

- Comprehensive holistic survey done prior to discharge
  - Goal is to
    - Decrease unnecessary readmissions
    - Refer to services as needed
    - Patient teaching
    - Opportunity to
      - Diagnose Acute Stress Syndrome
      - Decrease recidivistic behaviors
        - Brief Intervention for ETOH
        - Brief Intervention for “stupid high risk behaviors”

Quaternary Survey
Comprehensive Detailed Physician Assessment

- Final Assessment
  - Head to Toe
  - Mental status (sleep, acute stress syndrome, pain)
  - Review of all diagnostics
  - Summary of findings
- Interventions
  - Refer to community resources
  - Prescriptions, follow-up clinics

- Baseline Functional Outcomes
- Brief Intervention
  - Have the talk
  - Patients may be finally ready to listen
  - Opportunity not to be missed

Outcome Measures in Trauma

- Significant, unrecognized burden of residual disability
  - Physical, mental, social, occupational
- Disability often prolonged, life changing
- Populations has significant barriers to accessing service
- Data is rich with little or no intervention
  - Endless opportunities for prevention with early intervention

VGH Trauma Services Pilot Study Principle Findings

- 'Opt in' protocol: significant bias
  - If asked they don't want to participate
- Prolonged physical disability & delayed RTW
- Unrecognized acute stress reaction
  - Predictor of subsequent PTSD
- Low utilization of specialty services
- Identification of high risk groups
  - Low SES, unemployed
- Opportunity for intervention/prevention

Standardize Process's

- Goal is to Reduce long term disability through early recognition & timely interventions
  - Mandatory 'Opt-Off' rather than 'Opt-In' protocol
  - Integrate in within existing care models
  - Add to routine date collection and surveillance
  - Create standard intervention role
    - Debate is out as to who's role it should be

Brief Intervention

- Direct relationship between Alcohol and substance related incidence of injury.
- Largest proportion are not dependant but are engaged in high risk drinking/recreational drug use
- Over 50% have positive BAC and positive self-report of drugs
- Strategy
  - Increase awareness about sensible use of Alcohol
  - Recommendation of Brief Intervention (SBI)
  - ACS COT and the CDC and have developed mandatory guidelines for all level I/II trauma centres using SBI as the standard

SBI

- Intervention in many studies show
  - Significant decrease in Alcohol consumption 6-9 months following,
  - reduced injury mortality rate at 6 months to 1 years following SBI
  - 6 state RCT (540,000 pts) showed a 67.5% reduction in rate of drug use following SBI
- Three stages:
  - Screening – on admission
  - Intervention – when appropriate and ready
  - Follow-up & referral - prior to discharge
- Who's Role
  - Registrar, Trauma Coordinator, Consultant

SBI for Injury Prevention?

- SBI proven to decrease recidivistic behaviors with drugs and alcohol
  - Why not implement following injury
- Most Injuries are from high risk taking behaviors
  - Distracted driving
  - Distracted walking, cycling
  - Lack of helmet use
  - Falls from ladders
  - Random acts of stupidity
  - The list is endless….
- Model the same principles as SBI
  - Screen (easy – they have been admitted from injury)
  - Have the Brief Chat
  - Interventions with referrals or information needed

Conclusion

- Primary, Secondary, Tertiary are all now standard practice
- Quaternary survey could be the next gold standard:
  - Inexpensive, and allows for a comprehensive final assessment
  - Allows for baseline functional outcome assessment
  - Early Identification Acute Stress Syndrome
  - Provides and opportunity to link much needed resources needed
  - Decrease recidivistic activity through for Brief Intervention
  - Link Injury Prevention within Acute Care
  - Increase awareness through education and Discussion

Questions?