

# Acute Care Physical Therapy: Treating a critically ill trauma patient

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# Objectives

1. To understand how the trauma and rehabilitation teams work collaboratively to provide best practice for trauma patients.
2. To understand the healing/recovery process of a trauma patient.
3. To understand when consults to other providers are necessary for a multi-trauma patient.

# Trauma

- Trauma is an unusual, life-alerting event
- Vulnerable
- Movement/body based physical therapy
- Emotional support
  - Not mental health providers, but.....
    - Treat whole person, not just the body
- Collaborative approach

# What makes an event traumatic?

- Elicits a response of overwhelming fear, helplessness, and horror
- Initial reactions to trauma include:
  - Exhaustion
  - Confusion
  - Sadness
  - Anxiety
  - Agitation
  - Numbness
  - Dissociation
  - Physical arousal
  - Blunted affect
- 5-10% will develop PTSD
  - Biological, psychological, social factors

“Long-lasting responses to trauma result not simply from the from the experience of fear and helplessness but from how our bodies interpret those experiences.” Dr. Rachel Yehuda, a pioneering researcher in field of PTSD



# Trauma: US

- One of today's most important public health problems
- 240,000 deaths per year
- Leading cause of death ages 1-45
- 3<sup>rd</sup> leading cause of death for ALL age groups
- Most expensive disease
  - Estimated annual cost \$671 billion

# Trauma Etiologies

- Motorized vehicles: leading cause of serious injury
- MVC: leading cause of death (worldwide) for ages 5-29
- Over 2.5 million injuries in the US a year
- Approximately 40,500 deaths a year in US (MVC)
- Other etiologies:
  - Falls
  - Firearms
  - Fire and Burn injuries
  - Suffocation, poisoning, drowning

# Returning to Society

- Mortality has decreased significantly
  - re-organization of trauma care
- Focus needs to shift
  - “Improving quality of life and outcome”
- Gaps exist between patients’ transition from acute care to rehabilitation and then their return to society
- American Trauma Society developed a post-clinical psychological support group
  - Self-management, peer support

# EMPOWER SURVIVORS

## The Tenets of Trauma Informed Approach

1. Safety
2. Trustworthiness and transparency
3. Peer support
4. Collaboration and mutuality
5. Empowerment, voice and choice
6. Cultural, historical and gender issues



# Critical Illness

- *“For 3 weeks I was held in a room, I was tied to the bed if I tried to get away. I couldn’t talk; I couldn’t eat; I was not allowed to sleep; Groups of people would enter the room and look at me and talk about me and I was sometimes undressed in front a small audience. I was shot full of drugs. I was too weak to move. I could not see my body, but it had been cut nearly in half. Insects crawled on the walls and ceilings...”*
- Survivor of critical illness who developed delirium



# Sequelae Of the ICU

- ICU- Acquired Weakness
  - Critical illness polyneuropathy
  - Critical myopathy
- Neuropathy and myopathy in conjunction with weakness five years post-ICU
- Anxiety and depression
  - 50% at five years post-ICU discharge
- Neuro-cognitive problems
- Factors

“What happened to me in the hospital? Yes, my life was saved, and I am grateful for that, but life AFTER the ICU was extraordinarily difficult, not only physically but also mentally.” -Nancy Andrews

# Treating the Individual

- A day that will be replayed in Lily's and her family's mind frequently
- MVC, restrained driver
- EMS: 20 yo F alpha eta 1030
- Found unresponsive in vehicle
- Came in as an Alpha alert
- Immediately chest tubes placed, intubated, coded, MTP, lines placed
- OR emergently for intra-abdominal fluid noted on CT



# Admission 6/16/2018 to Discharge 8/4/2018

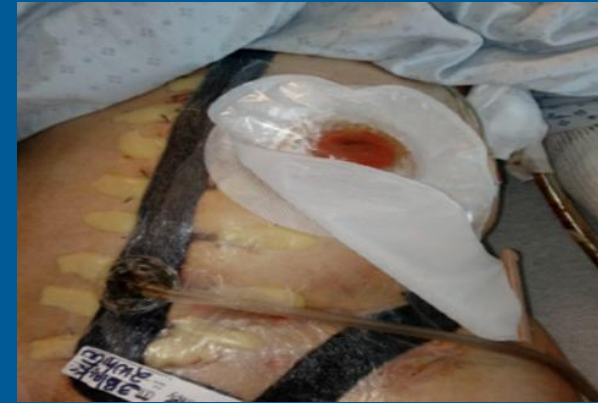
- Injury to sigmoid mesentery, traumatic RP hematoma
- Bilateral pneumothoraces, pulmonary contusions
- Basilar skull fracture, pelvic fracture
- Cervical and thoracic transverse process fractures
- Fracture three ribs on right, one on left
- TBI, GCS 8



.....a lot more unknown diagnoses to come....

# ED to OR

- Trauma Exploratory Laparotomy
  - Control of bleeding
  - Small bowel resection
  - Colectomy
  - Sigmoid resection



Postoperative diagnosis: retroperitoneal hemorrhage and laceration of mesentery

# OR to ICU

- Hemodynamically unstable, continued MTP
- OR team to ICU multiple times
- ECMO 3 days, CRRT
- OR for embolectomy upper extremity for arterial thrombus
- Care of the family through extubation and waking up, feeling pain, and confusion

# Code ECMO

- ECMO for three days
- Whole ECMO team: CT surgeon/Intensivist, Cardiologist, nurses, perfusionists, Palliative Care
- ECMO is prolonged form of bypass to supports patients with potentially reversible cardiac and respiratory failure; basically take venous blood from patient to a gas exchange device that enriches blood with Oxygen and take carbon dioxide, then goes back to the patient.



# ICU to Floor

- Aggressive PT/OT/SLP
- Ongoing wound care
- Continued IV antibiotics
- Pain Control
- Disposition to Acute Rehab





# Consultants

- Neurosurgery, Neurology
- Orthopedics
- Cardiology
- Renal
- Vascular Surgery
- Palliative Care
- Infectious Disease
- Hematology

Intensivists  
Wound Care  
PT/OT/SLP  
RT  
Nutrition  
Pre-hospital, Lifenet  
Care Management  
Pharmacy

# Interdisciplinary Rounding

- ICU: MD, APC, Nutrition, RT, Pharmacy, Nursing
- Floor: MD, APC, Nutrition, RT, Pharmacy, PT/OT, Wound Care, Nursing
- Structured Interdisciplinary Bedside Rounding

# Interdisciplinary Rounding

- Decreases LOS through clear communication with all providers on the team, on complex patients
- Decreases complications, cost
- Short duration and goal focused communication make rounds sustainable
- Increases patient satisfaction and team satisfaction



Right medial thigh wound.



right thigh



Left lower back



Right thigh wound



Right thigh



LAC



Left AC



# Acute Care Physical Therapy

- Physician ordered
- Patients typically don't seek PT while hospitalized
- May or may not be expecting PT
- Sales pitch
- PT role
- AIDET
- Managing up
- EDUCATION



# Physical Therapy Consult

- Hospital day 7
- 6/22/2019
- Patient intubated/sedated
- Cervical collar on
- On EEG monitoring
- On CRRT for renal failure
- Evaluation for positioning and fitting of multipodus boot
  - To be switched right/left every two hours
- Family not present during evaluation
- Pain: 0/8 per CPOT scale
- On vent: CMV FiO2 55% PEEP 10
- Wound care RN present during evaluation for addition of secondary wound vac canister secondary to increase output (abdomen)
- Right increased foot/ankle tone (inversion) noted
- Left lower extremity flaccid
- ROM WFL of lower extremities
- PT discontinued



# Physical Therapy New Orders

- Hospital day **12**
- Remains on CRRT
- Follows simple commands (one step) 75% of the time
- Nods/shakes head appropriately 75% of the time

# Social History

## Home Living Arrangements:

Living Arrangements: Family members

Assistance Available: Full time , 24 hour supervision, 24 hour assistance

Type of Home: House

Home Layout: Two level, with no stairs to enter, partial bath on main living level. The patient's parents report they plan to turn a main living level room into the patient's bedroom upon her arrival back home.

## Prior Level of Function:

Community ambulation

Mobility: Independent with No assistive device

Additional comments: The patient was working as an archeology intern at her father's workplace

Fall history: No

DME available at home:

None





# Re-Evaluation

- No verbalization of words
- Follows one step commands 75% of the time
- No pain
- Lines/tube included: telemetry, continuous pulse oximeter, CRRT, central line, NGT, wound vac, colostomy, chest tubes, permcath, foley, oxygen (nasal cannula)
- Vitals: BP 99/71mmHg HR at rest 115bpm HR with activity 1116bpm SpO2 97% 2LNC at rest SpO2 with activity 97% 2LNC
- Inability to sensate light touch to lower extremities
- ROM: WFL throughout lower extremities, except right ankle DF limited by 10 degrees and left ankle limited by 20-25 degrees
- Strength: Bilaterally : hip flexion 1+/5, knee flex/ext 0/5, hip abd/add 2/5, ankle PF/DF 1/5, ankle inversion/eversion 2/5
- **Family training: ROM/lower extremity exercises , purpose/wearing schedule of multipodus boot**
  
- **Frequency of visits: 4-5x/week**
- STG (4-5 visits)
  1. The patient/patient's family will be independent with ROM/lower extremity exercise HEP to improve lower extremity range of motion and strength in prep for weight bearing activities.
  2. The patient will perform bed mobility with maximal assistance x2 in prep for out of bed activity.
  3. The patient will tolerate sitting edge of bed with moderate assistance x1 x 5 minutes in prep for out of bed activity.

\*\*further goals to be established as patient demonstrates progress and completion of above goals.

# OT Initial Evaluation



- **Range of motion:**

- Right Elbow Flexion: WFL
- Right Elbow Extension: WFL
- Right Wrist Flexion: WFL
- Right Wrist Extension: Limited by 25%
- Right Finger Flexion: WFL
- Right Finger Extension: WFL
- Left Finger Flexion limited by 75%
- Left Finger Extension limited by 50%
- Additional left UE not tested due to swelling, skin abrasions, bruising, and stitches - possible distal ulna fracture

- **Strength:**

- Right Grip Strength: 3/5
- Right Elbow Flexion: 3+/5
- Right Elbow Extension: 3/5
- Left UE: Not tested due to swelling, skin abrasions, bruising and stitches

- **Sensory/Oculomotor Examination:**

- Auditory: WFL=intact
- Visual Acuity: WFL=intact

# Visit #3

7/5/2019

16 minute session

- Progressed to sitting edge of bed- maximal assistance required for 7 minutes (pain and fatigue limiting duration)
- Maximal assistance x2 required for bed mobility
- Supine therapeutic exercise performed and reviewed with family
- Re-intubated via tracheostomy (after returning to OR between last visit and this visit)
  - CMV FiO2 30% PEEP 5
- Stable vitals with activity
- Alert, trying to use sign language and mouthing words
- Continue multipodus boot



# Visit 4

- 7/6/2019
- 26 minute session
- Non-weight bearing bilateral lower extremities
- Remains on vent Fio2 30% PEEP 5
- Continues to attempt mouthing words and using hand gestures
- Dependent for all bed mobility
- Sat edge of bed greater than 8 minutes with right upper extremity support and moderate assistance x1
  - Increased neck flexion/downward gaze, right head rotation- unable to correct despite increased verbal/tactile cues secondary to pain
- Performance and review of lower extremity exercises with family

# Therapy continued....

- Refused next day secondary to pain associated with dressing changes
- Next session 7/10/2019
  - Similar to last session
    - 19 minutes, seated activity (moderate assistance)
    - Alert and oriented x 4





# Psychiatry

- July 7, 2018 Evaluation for depression

- Nonverbal due to trach
- Able to acknowledge no questions, writes on paper
- Family supplements information
- More withdrawn over last couple days per nursing
- Has been A&Ox4
- Able to recall incident
- “fair” day- today
- Acknowledged having anxiety and nightmares about previous trauma
- Having difficulty with reality testing
- Denies specific depression, seems discouraged
- “some days are good and some are bad”
- Family states she has made strides both physically and emotionally since being hospitalized
- Mother spoke of troublesome relationship with boy who was manipulative and conniving- exploiting her both finically and emotionally
- Family denies suspicion of outpatient intentionally harming herself ; had plans next day
- **Plan:** Zoloft for anxiety and depression- only medication approved by FDA for PTSD. Off label use for nightmares, hypervigilance ; has literature
- Frequent orientation, minimize sleep disturbances, redirection, maintaining a low stimulus environment
- Reviewed warning signs, treatments, and medications for PTSD
- Lower Zyprexa for ICU delirium; eventually d/c if not delirious; avoid delirants if possible that may worsen confusion.
- Education provided on the psychological happenings following a traumatic incidents including grief, depression, acute stress, posttraumatic stress as well as possible delirium associated with medical comorbidities. Dr. Nardelli

# Physical Therapy

Visit 5 July 10, 2018	Visit 6 July 11, 2018	Visit 7 July 12, 2018	Hold Therapy	Visit 8 July 17, 2018	Visit 9 July 18, 2018
<ul style="list-style-type: none"> <li>• 19 minutes</li> <li>• BLE NWB</li> <li>• &gt; 8 min seated activity with mod/max assist</li> <li>• Subjective: legs hurt, but better than last session</li> <li>• 0-6/10 pain (PCA)</li> <li>• Dependent (Ax2)</li> <li>• PROM (LEs)</li> </ul>	<ul style="list-style-type: none"> <li>• 15 min</li> <li>• BLE NWB</li> <li>• &lt;1 min sitting 2/2 abdominal pain</li> <li>• Family continues PROM/HEP</li> <li>• 9-10/10</li> <li>• Dependent bed mob</li> <li>• Recommending LTACH- remains trach/vent</li> </ul>	<ul style="list-style-type: none"> <li>• 20 min</li> <li>• BLE NWB</li> <li>• Strength: 0/5 ankles, knee ext: 1+/5</li> <li>• Improved head control in sitting, 30 seconds x 3 trials unsupported in chair sitting (max A)</li> <li>• LAQ seated: 5 reps (AAROM)-focus eccentric cont</li> <li>• Ultradash and break the ice game w/ right UE</li> <li>• Family participation</li> <li>• Transition supported to unsupported sitting: dependent x 4 reps</li> <li>• 4/10 BLE pain</li> <li>• Trach/vent</li> <li>• LTACH</li> </ul>	<ul style="list-style-type: none"> <li>• July 13<sup>th</sup>- wound care and permcath placed</li> <li>• July 16<sup>th</sup>- dialysis, wound care (pt requested PT return next day 2/2 eventful day)</li> </ul>	<ul style="list-style-type: none"> <li>• 25 minutes</li> <li>• BLE NWB</li> <li>• More interactive</li> <li>• Unsupported sitting at edge of chair</li> <li>• Max A without UE support</li> <li>• Forearm support on tray table-min A for 20 sec intervals</li> <li>• 6 reps completed (30-90 sec)</li> <li>• AAROM: AP, HS, hip abd: 10x</li> <li>• Trach collar (FiO2 40%)</li> <li>• Follows 1 step commands w/ repetition</li> <li>• 0/10 pain</li> <li>• Acute Rehab Vs LTACH</li> </ul>	<ul style="list-style-type: none"> <li>• 11 min</li> <li>• BLE NWB</li> <li>• Emotional lability</li> <li>• Assisted supine LE exercise</li> <li>• Non-verbal, no attempt to communicate other than head motion</li> <li>• 0/10 pain</li> <li>• Trach collar 40%</li> <li>• Abbreviated session due to HD starting soon</li> </ul>

Visit 10 July 19 2018	Visit 11 July 20, 2018	Visit 12 July 23, 2018	Visit 13 July 24, 2018
<ul style="list-style-type: none"> <li>• 24minutes</li> <li>• BLE NWB</li> <li>• More engaged</li> <li>• Sat edge of bed x 14 min with max A</li> <li>• Supine LE Exercise (active-assisted)</li> <li>• Mother mentioned main goal of therapy for patient: being able to play ukulele</li> <li>• PT/OT further discussed working this into session/POC</li> <li>• “Sherando”</li> <li>• Few words attempted by patient</li> <li>• Trach collar</li> <li>• HR 120’s w/seated activity</li> <li>• Max Ax2 bed mobility</li> </ul>	<ul style="list-style-type: none"> <li>• 29 min</li> <li>• BLE NWB</li> <li>• “music therapy”</li> <li>• Working on “disco move” with right UE</li> <li>• Played Ukulele with left hand over hand assist progressed to Independent- left hand fatigues quickly</li> <li>• Pillows to support left UE at correct elevation required to hold ukulele with left forearm/palm in supination</li> <li>• Smiling😊</li> <li>• First lollipop</li> <li>• BLE supine active-assisted exercise (min to max A)</li> <li>• 0/10</li> <li>• Acute Rehab</li> </ul> 	<ul style="list-style-type: none"> <li>• 41 min</li> <li>• BLE NWB</li> <li>• Improved rolling (max Ax1), able to lie on left side x3 min for hoyer lift transfer</li> <li>• Ukulele and board game activities in sitting</li> <li>• Cleared for full diet</li> <li>• 7-8/10 abdomen, LUE</li> <li>• Room air</li> <li>• A&amp;Ox4</li> <li>• Supported sitting in chair with max A for trunk lean for reaching activity</li> </ul>   	<ul style="list-style-type: none"> <li>• 52 min</li> <li>• BLE WBAT</li> <li>• Sliding board transfer (Max Ax2)</li> <li>• Sit to stand transfers from chair (Max Ax2)</li> <li>• Seated activity: unsupported sitting with supervision</li> <li>• Reaching activity to participate in board game (dynamic sitting)</li> <li>• Improving trunk control and balance</li> <li>• New goals</li> <li>• Increased frequency to 6-7x/wk</li> <li>• Tolerated 6 hours in chair with nsg</li> <li>• 4/10 abdominal &amp;LUE pain</li> <li>• Partial standing 2 trials with max Ax2 (10-20 sec holds)</li> <li>• Continue wearing multipodus boot (right)</li> <li>• Transferred to 4 Surgical</li> </ul>




## A few things that will make you smile while in the ICU



Today was a better day! She had hemodialysis for



Visit 14 July 25, 2018	Visit 15 July 27, 2018	Visit 16 July 28, 2018	Visit 17 July 29, 2018	Visit 18 July 30, 2018
<ul style="list-style-type: none"> <li>• 27 min</li> <li>• Very interactive</li> <li>• Log roll mod Ax2</li> <li>• Supine &gt;Sit max Ax2</li> <li>• Max Ax2 to stand</li> <li>• Steady for transfer</li> <li>• Mother stated increased participation and performance of LE HEP</li> <li>• 5 min sitting EOB with close supervision</li> <li>• 0/10 pain</li> <li>• <b>LE Exercise:</b></li> <li>• PF SPV</li> <li>• DF Max A</li> <li>• Knee flex/ext Max A</li> <li>• LAQ SPV</li> </ul>	<ul style="list-style-type: none"> <li>• 27 min</li> <li>• Highly motivated</li> <li>• Sliding board transfer (pt prefers vs Stedy)</li> <li>• Max Ax2 Slide board</li> <li>• Max Ax1 bear hug technique stand</li> <li>• New goal for slide board</li> <li>• 4-7/10 LBP</li> <li>• <b>LE Exercise</b></li> <li>• Assisted PF/DF</li> <li>• LAQ independent against gravity</li> <li>• Assisted hip flexion</li> </ul> 	<ul style="list-style-type: none"> <li>• 29 min</li> <li>• Max Ax2 Slide board transfer</li> <li>• 4-7/10 LBP</li> <li>• Mod A required for sitting (back pain)</li> <li>• Max Ax2 sup&gt;sit</li> <li>• <b>LE Exercise:</b></li> <li>• AAROM (AP, HS, abd/add, SAQ, LAQ, knee flex/ext)</li> <li>• Left quad contraction better than right</li> <li>• Visited ICU staff in wheelchair</li> <li>• Family then transported her outside</li> </ul>	<ul style="list-style-type: none"> <li>• 36 min</li> <li>• Max Ax2 bed mobility</li> <li>• Max A x3 sliding board transfer</li> <li>• 2 reps partial stands with max Ax2</li> <li>• Vomited after slide board transfer; however wanted to continue session</li> <li>• 4-6/10 abdomen</li> <li>• Spending more time in wheelchair outside of PT sessions</li> </ul>	<ul style="list-style-type: none"> <li>• 48 min</li> <li>• Max Ax2 sit to stand from wheelchair</li> <li>• Max Ax1 Stand pivot transfer (bed to WC)</li> <li>• Self propelled WC x 10ft with lower extremities, 20ft with lower extremities and right UE with min A</li> <li>• &gt;15 min Wii Sports participation (bowling, tennis, boxing) – dynamic seated activity, UE strengthening, activity tolerance</li> <li>• Stood from WC with Max Ax2 (20 sec hold)</li> <li>• 0-2/10 LBP</li> </ul>

# Psychiatry

- Visit #2 July 27, 2018 (20 days later)
- Reason for visit: follow up
- Acute Stress Disorder with Depressive Symptoms
- On surgical floor
- “I’m nervous about being out on the floor now.”
- Less nightmares
- She recalls that the accident happened when she swerved to miss a large bird on the road. She recalls that in the days following the accident that, “I became the bird and I was flying over the water. The bird's name was Galapagos. She states that it was not a pleasant dream like experience. Today she reports that the "Little Mermaid" was one of her favorite movies and that she, like the character Ariel, is trying to learn to walk. She is receiving visitors and her parents are currently by her side.
- Assessment: appears to be coping effectively with her recovery. She is focusing on getting stronger and being able to walk. Quiet and reserved. She is able to share recollections of the accident without difficulty.
- Plan: continue Zoloft



# Physical Therapy

Visit 19 July 31, 2018	Visit 20 August 2, 2018	Visit 21 August 3, 2018
<ul style="list-style-type: none"> <li>• 34 min</li> <li>• Stand pivot transfers (WC&gt;&lt;mat table) x 2 trials with max Ax2</li> <li>• Standing trials with max Ax2 (20 sec x 2 trials)</li> <li>• 40ft WC propulsion (UEs) and min A</li> <li>• Ball throwing and ping pong ball toss into cups seated activity (mat table) with close supervision for sitting, min A required for LUE (10 min activity)</li> <li>• 0/10 pain</li> <li>• <b>LE Exercise</b></li> <li>• LAQ (mod A to complete) 10x</li> </ul>	<ul style="list-style-type: none"> <li>• Hold medical/refusal 7/31 due to emesis/not felling well , psychiatry on way to see patient</li> <li>• 18 min</li> <li>• Painful and nauseous (4/10 abdomen)</li> <li>• Bed mobility Mod Ax2</li> <li>• Stand pivot transfer Max Ax2 (bear hug technique)</li> <li>• &lt;15 sec static standing (max Ax2)</li> </ul>	<ul style="list-style-type: none"> <li>• 29 min</li> <li>• Stand pivot transfer x 2 trials (BSC &gt;&lt;WC) with max Ax2</li> <li>• WC mobility 60ft with min A</li> <li>• 0/10</li> <li>• Seated ball throwing activity x 4 minutes: supervision to min A required; min A required for LUE</li> <li>• Static standing: 20 sec with max Ax2; bilateral lateral weight shifting x 10 sec</li> <li>• Patient able to unlock right/left locks independently on WC today</li> </ul>



Midline abdomen



# Psychiatry

- Visit #3 (8/1/2018)
- Very tired
- Having a very difficult day due to n/v following a review of the MVA with descriptions and photos describing her injuries in great detail.
- Too tired for psych visit today
- Visit #4 (8/2/2018)
- Spoke with BHS therapist to look for potential OP psych for follow up based on patient's location

# HAPPY DAYS



# Life After a Traumatic Event



# References

1. <https://hermanwallace.com/blog/trauma-informed-treatment-approach>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5282878/>
3. <http://info.womenshealthapta.org/blog/just-relax-meeting-with-trauma-in-the-physical-therapy-setting>
4. Early mobilization on continuous renal replacement therapy is safe and may improve filter life. Wang Y, et al. Crit Care. 2014; 18(4): R161. Published online 2014 Jul 28. doi: [10.1186/cc14001](https://doi.org/10.1186/cc14001)
5. The Journal of Trauma: Injury, Infection, and Critical Care: [November 2003 - Volume 55 - Issue 5 - p 913-919](#) doi: 10.1097/01.TA.0000093395.34097.56
6. The Journal of Trauma: Injury, Infection, and Critical Care: [March 2009 - Volume 66 - Issue 3 - p 880-887](#) doi: 10.1097/TA.0b013e31818cacf8
7. Structured Interdisciplinary Rounds (SIR) on a Trauma Ward, A. E. Liepert<sup>1</sup>, D. Segersten<sup>1</sup>, H. Jung<sup>1</sup>, A. O'Rourke<sup>1</sup>, S. Agarwal<sup>1</sup> <sup>1</sup>University Of Wisconsin, Department Of Surgery, Madison, WI, USA—Academic Surgical Congress
8. Trauma Care After Resuscitation (TCAR). Urbanski, J. Pineville, North Carolina. 2019