Emergency and Trauma Symposium

The Times They Are A’Changin

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Disclosures

• I have not no relevant financial or nonfinancial relationships to disclose
Objectives

• Understand Advanced Trauma Life Support key changes from the new 10th Edition ATLS Manual

• Apply current Advanced Burn Life Support guidelines to practice
Progressive Case Scenario 1 – On Scene

M – 88 year-old male tripped over dog & fell. The neighbor called 911. Now he is found laying on his stomach, on the sidewalk.


S – RR 26; HR 64; BP 170/80; GCS 14; L hip pain

T - Unknown
Audience Response

• What injuries would you suspect?
• What components of SAMPLE are you concerned with in this population?
MOVIE Mnemonic
(Not an ATLS Change)

M – Monitor – Narrow/irregular at a rate of 64
O – Oxygen – Saturation 90%
V – Ventilation & Airway – talking & moaning
I – IV or IO
E – 12 lead ECG (Geriatric fall) Atrial fibrillation

Audience Response

What minimum size angiocatheters that are recommended in the 10 edition for adult trauma victims?
Case Scenario Progression - Enroute

• VS: RR 30’s & shallow; HR 64; BP trending down 140/80 next BP 98/84; GCS remains 14
• More bruising noted over L chest wall (lower ribs) anteriorly & L hip
• Less movement upper vs lower extremities
• Shortening & external rotation of L leg
• Medication list in wallet – Beta blocker for hypertension, rivaroxaban (Xarelto) & Lasix
Audience Discussion

• What are your concerns based on MOI & findings so far?
• What are medical conditions that you find effect morbidity & mortality from trauma?
• Based on the patient changes and information you now have available, what information do you communicate as a prehospital provider to the trauma facility or (if a nurse or physician in the ED) need from prehospital providers?
Audience Response

• What do you think is the ATLS 10\textsuperscript{th} Edition recommendation for blood pressure maintenance in a patient with possible traumatic brain injury in the geriatric population?
• If the patients needs fluid resuscitation due to blood loss, the initial fluid bolus would be?

\textit{ATLS supports the use of Tranexamic acid (TXA) in the prehospital setting.}
Changes in Terminology/GCS

- Drug Assisted Intubation vs Rapid Sequence Intubation
- Mild vs Minor head trauma/injury
- Restriction of spinal movement vs spinal immobilization
- New GCS score with the inclusion of NT for non-testable with no numeric score
- A GCS score of 8 or less is accepted as the definition of coma or severe brain injury
- If asymmetry of upper/lower extremities use the best motor response, but document & communicate the response
Case Progression - Enroute

- After 2-500cc fluid boluses & splinting of L femur
- RR - rapid with increased work of breathing; decreased breath sounds over the left chest; HR 64; BP 104/82; GCS remains 14
- Skin remains cool, pale, sluggish capillary refill
- Neck veins difficult to see, appear flat
Audience Response

• What are the different findings between a tension pneumothorax & a massive hemothorax?

• 2\textsuperscript{nd} ICS needle decompression may be unsuccessful for a patient with tension pneumothorax due to variable thickness of the chest wall, kinking or other technical complications. What other methods &/or sites are now approved by the ACS Committee on Trauma?
Differentiating Tension Pneumothorax & Massive Hemothorax

<table>
<thead>
<tr>
<th>Condition</th>
<th>Breath Sounds</th>
<th>Percussion</th>
<th>Tracheal Position</th>
<th>Neck Veins</th>
<th>Chest Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tension Pneumothorax</td>
<td>Decreased or Absent</td>
<td>Hyperresonant</td>
<td>Deviated Away</td>
<td>Distended</td>
<td>Expanded Immobile</td>
</tr>
<tr>
<td>Massive Hemothorax</td>
<td>Decreased</td>
<td>Dull</td>
<td>Midline</td>
<td>Flat</td>
<td>Mobile</td>
</tr>
</tbody>
</table>

**Clinical Findings**
- **Tension Pneumothorax**
  - Breath sounds absent
  - Cyanosis
  - Shock

- **Massive Hemothorax**
  - Breathing difficulty as a late symptom
  - Neck veins flat
A = 2nd Intercostal Space - Mid Clavicular Line
B = 4th/5th Intercostal Space - Mid Axillary Line
C = 4th/5th Intercostal Space - Anterior Axillary Line

NEEDLE DECOMPRESSION

AXILLARY
Avg depth 3.42cm
FAILS 8-22% OF THE TIME

CLAVICULAR
Avg depth: 4.28cm
FAILS 24-54% OF THE TIME

ATLS: >50% WILL FAIL WITH 5cm NEEDLE at 2nd ICS MCL
40-70% CAN NOT IDENTIFY 2nd ICS MCL

GO BIG (8cm) or GO 4/5th ICS AAL

Update 2018
Can We Give Them The Finger Yet?

Finger Thoracostomy for Tension Pneumothorax

Dr. Cynthia Griffin
@ CMGriffin
For Updated Slide set please visit www.foamfrat.com
Upon Arrival in the Emergency Department

- **Primary Assessment findings**
  - Airway intact
  - Respiratory distress – air hunger
  - Signs & symptoms of shock
  - Pupils equal, but sluggish. GCS remains 14

- **Secondary Assessment findings**
  - Facial Fractures – Nose & orbit
  - L Rib fractures, massive hemothorax & L femur neck fracture
  - Continue to note decreased strength in the upper extremities

- RR 36; HR 64; BP 98/82;
- A 32 French chest tube is placed
- Drug Assisted Intubation
- 1\textsuperscript{st} unit O Negative pRBC hung; closely followed by 2\textsuperscript{nd} unit
New Anticoagulation Reversal Chart

1. **Aspirin & Plavix** – Platelets consider Desmopressin Acetate
2. **Coumadin/Warfarin** – FFP, Vitamine K, prothrombin complex concentrate, Factor VIIa
3. **Heparin** – Protamine sulfate
4. **Low molecular weight heparin** – Protamine sulfate
5. **Direct thrombin inhibitors/Pradaxa** – idarucizumab/Praxbind (May benefit from prothrombin complex concentrate/Kcentra)
6. **Xarelto/rivaroxaban** – (May benefit from prothrombin complex concentrate/Kcentra)

https://www.kcentra.com/mechanism-of-action
CT scan shows a C₂ fracture, possible traumatic aortic aneurism - small aortic arch intimal tear & a small subdural hematoma on the L parietal area

• What do you think would be the recommended treatment to prevent aneurism rupture?

• In the patient with traumatic brain injury is prolonged prophylactic hyperventilation to keep the PaCO₂ 25 mm HG is recommended?

• Does the ALTS manual recommend palpation of the prostate gland as a reliable indicator of urethral injury?
Case Scenario Progression - Discussion

The $C_2$ fracture & weakness noted in the upper extremities noted by the prehospital providers could be associated with what type of spinal cord injury?
Changes in Geriatric Material ATLS

Patients with pelvic fracture are 4 times more likely to die than those without

• Need blood transfusions even if fracture stable

• Have longer hospital stays & fewer return to independence

- High-dose barbiturate administration is recommended to control elevated ICP refractory to other treatments.
- Administration of burst barbiturates as prophylaxis suppression of EEG is not recommended.
- Caution with high-dose propofol to control ICP.
- Hyperosmolar therapy is carried over, but not supported by evidence.
- Massive transfusion >10 units pRBC in 24 hours or 4 pRBC in 1 hour.
Case Scenario Progression

• The patient had spent two weeks in the Critical Care Unit postoperatively after pinning of L hip; stenting of aorta; & ventilatory management due to a L pulmonary contusion & atelectasis.

• He was placed in a Halo Brace for the C2 fractures resulting in difficulty swallowing, aspiration & placement of a G-tube for feeding.

• After 4 weeks he was sent to rehab, but returned to UWHC two days later after suffering a seizure.
Case Scenario Progression - Audience Response

• What do you think are the new ATLS recommendations for seizure prophylaxis post Traumatic Brain Injury (TBI)?

After another week in the hospital the patient was transferred back to rehab. He ended up requiring a skilled nursing facility in Minocqua, WI for further swallowing, PT, OT & was discharged home (son present in home) 5 months after initial injury.
ATLS Changes that Did Not Fit the Case

• An indication of amniotic fluid leak is a vaginal pH > 4.5
• Weight based IV antibiotic recommendations for open fractures. New table
• Avoid CT scanning in primary hospital before transfer. It results in delay to definitive care, repeated scanning, increased exposure to radiation & additional cost.
Progressive Case Scenario 2 – On Scene

Called to the home for a 22 month old with a scald injury.

**M** – Toddler burned. Pulled hot soup off the front burner

**I** – Burns to face, chest abdomen, upper R leg

**S** – Screaming, thrashing toddler in arms of caregiver

**T** – Shirt removed. Cold water on towel to chest & abdomen
Case Scenario Progression - Audience Response

• ~ What is the depth & approximate TBSA burn in this toddler – Burns to all of anterior face, chest, abdomen & anterior surface of R thigh?

• How much fluid would be given Enroute to your local hospital based on UW Health Emergency Quick Reference?

• What methods could you use to control the child’s pain?
Case Scenario Progression

- Plastic wrap to the child's chest, abdomen & leg
- Transported on stretcher in child restraint
- VS: RR 20-40’s, crying; HR 130; BP 120/80; GCS 15 on Peds GCS
New Pediatric ATLS Guidelines

• If the intubated child deteriorates use the DOPE Mnemonic.
• If suspect a pneumothorax, use the 2\textsuperscript{nd} ICS mid-clavicular line
• For trauma patients use 20 ml/kg boluses, which may be repeated. pRBC’s should be considered after the 2\textsuperscript{nd} or 3\textsuperscript{rd} bolus.
New Pediatric ATLS Guidelines

New Damage Control Guidelines to limit crystalloid resuscitation volume in pediatric trauma patients

- 20 ml/kg crystalloid bolus
- 10-20 ml/dg of pRBC
- 10-20 ml/kg of FFP & Platelets as part of massive transfusion protocol
Case Scenario Progression - Arrival at the Burn Center – Audience Response

• Fluid resuscitation is different for children & adults. What is the formula used in the Burn Center for pediatric fluid resuscitation?

• Fluid resuscitation is titrated by what indicator?

• In children with burns, fluid boluses are used for resuscitation?
Case Scenario 2 Progression

- After the primary & secondary survey. The child estimated to have 27% TBSA partial thickness burns. Weight 10 kgs.
- Fluids are started at 3 ml/kg TBSA burned. 810 ml in first 24 hours. ½ is given in the first 8 hours (405 ml) the remaining; ½ over the next 16 hours
- The amount is increased or decreased each hour based on urine output.
Case Scenario Progression

- Mepilex Ag is applied to the burned areas
- Child Protective Services notified. Investigation showed no signs of neglect or intentional injury
- On day 5 the toddler was discharged home. Some of the more superficial partial thickness burns had healed. Mepilex Ag to the healing partial thickness burns
Key Take Aways

• An initial bolus of 1 liter warmed saline may be required for adult trauma resuscitation.
• Providers should be judicious in administration of fluids to prevent an increase in mortality from over-aggressive resuscitation.
• Massive transfusion protocols with blood components prevent coagulopathies
• Tranexamic acid may be administered to severely injured patients in the field
• Follow burn guidelines for pre-hospital resuscitation
• Keep them warm & control pain (plastic wrap) but no need to do burn care prior to transport to a burn center
• Urine output is a great way to measure fluid resuscitative efforts.
• SBAR is a great way to organize communications
References

• American Burn Association 2019 Updates
• Advanced Trauma Life Support Student Course Manual 10\textsuperscript{th} Edition (2018). American College of Surgeons. Chicago, IL.
• Griffin, Cynthia, Update 2018: Can We Give Them the Finger Yet. Finger Thoracostomy for Tension Pneumothorax. Podcast.