

Squad Review

MCEMS

Spring/Summer 2012

Trauma Destination and MCEMS

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Goals:

- 1) Review State trauma destination guidelines, and the logic behind them.
- 2) Remind ourselves of some of the lessons presented in the "Does Scene Time Matter" trauma literature review from Squad Review in late 2011.
- 3) Review MCEMS Trauma Destination Guidelines protocols.
- 4) Discuss MCEMS "Trauma Alert" charting requirements.
- 5) Review some recent MCEMS PCR's with interesting Trauma Destination lessons.
- 6) Avoid putting you to sleep.

Memories....

Squad Review Mesa County EMS

October- December 2011

EMS Times in Trauma

The take-home point:

“The results of early studies evaluating regionalized trauma care systems demonstrated that the reduction of time between injury and definitive care, as well as treatment at a properly staffed and equipped trauma center, were important determinants in reducing trauma-related mortality.”

Sampalis et al, Journal of Trauma, 1993

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Brief Intermission- where are we now (circa 1995)?

- Theme: this body of literature begins to demonstrate shorter EMS times for:
 - those who die, or who appear "sicker" to EMS;and longer times for:
 - those who survive, or who appear "not sick" to EMS.
- Even with good studies, it is hard to tease out which survivors lived because of efficient EMS times; or which non-survivors died because of longer EMS times.
- Theme: this body of literature begins to demonstrate an adverse effect of ALS care/treatments on survival. Why?

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Does Scene Time matter?

1995, American Journal of Emergency Medicine, Feero et al:

"Does Out-of Hospital EMS Time Affect Trauma Survival."

Design:

- Urban population; Portland OR; 1990; retrospective. N=848 "major trauma cases".
- Looked at "unexpected survivors" and "unexpected deaths"
- Used TRISS method to predict who should have lived or died. (composite of trauma score, ISS, MOI, age)
- 13 unexpected survivors and 20 unexpected deaths; only 12 and 18 used in study due to missing times in 3 cases ($\approx 10\%$).

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Take home points/Conclusions:

- "Overall, the total EMS time interval was significantly shorter for "unexpected survivors" than for "unexpected deaths". Why?
- Unfortunately they only compared the two unexpected groups to each other.
 - Comparing "expected survivors" to "unexpected deaths" would have been very instructive (initially appeared "not-sick" to EMS?).
- "...a timely EMS response in an urban setting...may contribute to beneficial survival outcome."

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Some Details:

<u>Parameter</u>	<u>US's</u>	<u>UD's</u>	<u>p value</u>
Age	29.5 yrs.	50.8 yrs	.01 ←
Response time	3.5 min	5.9	.04 ←
Scene time	7.8	11.6	.06
Trans. Time	9.5	11.7	.17
Total EMS time	20.8	29.3	.02 ←

Where are we now (circa 2010)?

- Appear “sick” to EMS: shorter EMS times, and tend to have worse outcomes.
- Appear “well” to EMS: longer EMS times, and tend to have better outcomes...
- Except: when “expected survivor” (well) turns out to be “unexpected death” - i. e. EMS vibe is wrong.
- Theme: EMS vibe is key determinant in EMS times; and...
- Longer times in patients we most stand to be able to help (Unexpected Deaths) have an adverse effect on mortality.
- “Unexpected Deaths” are difficult for EMS to identify on-scene- you will be wrong.

State Destination Guidelines:

- Guidelines have been nationally validated which identify high-risk EMS trauma patients with a likelihood for “badness”.
- The State of Colorado has adopted a version of these guidelines for all EMS systems in our State.
- See: www.cdphe.state.us/em/SEMTAC .
- The point: if an EMS patient meets any of these criteria, they should be taken to the appropriate level trauma center- *bypassing lower-level Trauma Centers if necessary*.
- MCEMS: Most patients who meet one of these criteria must be taken to the Level II Center (SMH); with a small proportion being allowed to go to the Level IV Center (CH).

State Destination Guidelines:

- These Guidelines look at five (5) different sets of criteria to determine if your patient has high-risk features.
- There are Adult and Pediatric guidelines- they are similar, but do vary in a few important respects.
- MCEMS: Adult- pages Trauma 5 and 6
Peds- pages Trauma 8 and 9
- You MUST know these Destination Guidelines, and assure that all trauma patients in MCEMS are taken to the appropriate facility.
- Notice: These criteria do NOT necessitate that your patient is currently unstable. They DO predict that your currently stable patient may become unstable...or require special services.

State Destination Guidelines:

- These Guidelines look at five (5) different sets of criteria. Details to come, but for now:
 1. Unable to adequately ventilate patient:
 2. Physiologic Criteria: VS; respiratory insufficiency; GCS.
 3. Anatomic Criteria: location or type on injuries.
 4. Mechanism of Injury Criteria: ejection, burns, etc.
- Notice: Any patient who meets any one of the findings in these 4 categories may ONLY be transported to SMH.

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State Destination Guidelines:

- These Guidelines look at five (5) different sets of criteria to determine if your patient has potential for “badness”.
 1. Unable to adequately ventilate patient:
 2. Physiologic Criteria: VS; respiratory insufficiency; GCS.
 3. Anatomic Criteria: location or type of injuries.
 4. Mechanism of Injury Criteria: ejection, burns, etc.
 5. Other Considerations: age, NAT, anticoagulation, etc.
- Notice: Patients who meet Other Considerations criteria may ONLY be transported to CH or SMH

MCEMS Adult Destination protocol:

ADULT TRAUMA DESTINATION GUIDELINES (15 AND OLDER)

(In accordance with Colorado guidelines: www.cdphe.state.us/em/SEMTAC)

The following criteria divide serious trauma patients into two groups:

GROUP A: high-risk patients who **must** only go to SMH.

GROUP B: high-risk patients who **must** only go to either CH or SMH.

- Patients meeting none of these criteria may potentially be taken to any facility.
- Only stable, minor, isolated extremity trauma may be taken to VA or FHW.
- When in doubt, transport trauma patients to SMH.

ANY PATIENT MEETING ANY OF THESE CRITERIA SHOULD HAVE:

- A SCENE TIME OF LESS THAN 10 MINUTES; AND
- THE "STAT TRAUMA" PROVIDER IMPRESSION USED

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ADULT GROUP A: TRANSPORT ONLY TO SMH IF-

1. UNABLE TO ADEQUATELY VENTILATE PATIENT

2. PHYSIOLOGIC CRITERIA (ANY ONE- KNOWN OR SUSPECTED):

- a. Intubation or assisted ventilation.
- b. Respiratory Rate <10 or >29 .
- c. Systolic blood pressure < 90 mmHg.
- d. GCS < 13 (See Trauma 11- "GCS").

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ADULT GROUP A: TRANSPORT ONLY TO SMH IF-

3. ANATOMIC CRITERIA (ANY ONE- KNOWN OR SUSPECTED):

- a. Penetrating injury of head, neck, torso, or extremities above the elbow or knee.
- b. Flail chest.
- c. Two or more proximal long-bone fractures (humerus and/or femur).
- d. Unstable or suspected unstable pelvic fracture.
- e. Paralysis or other evidence of spinal cord injury.
- f. Amputation above the wrist or ankle.
- g. Crushed, degloved or mangled extremity.
- h. Extremity injury with vascular compromise.
- i. Open or depressed skull fracture.

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ADULT GROUP A: TRANSPORT ONLY TO SMH IF-

4. MOI CRITERIA: (ANY ONE- KNOWN OR SUSPECTED):

- a. Falls >20 feet.
- b. High-Risk vehicle crash:
 - Intrusion >12 inches occupant site; > 18 inches any site.
 - Ejection (partial or complete) from vehicle.
 - Death in same passenger compartment.
- c. Vehicle vs. pedestrian/bicyclist thrown, run over, or with significant impact (vehicle going >20 mph).
- d. Motorcycle crash > 20 mph.
- e. High Energy events, such as:
 - Ejection from vehicle or animal.
 - Striking fixed object with momentum.
 - Blast or explosion.
- f. Burns > 10% of TBSA (2nd or 3rd degree), and/or burns to hands, face, feet, groin and or inhalation injury.
- g. High voltage electrical injury.

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- g. High voltage electrical injury.

!! STOP and please notice !!

- ALL trauma patients...
- who meet ANY of the previous criteria ("known or suspected")...
 1. Ventilation
 2. Physiologic
 3. Anatomic
 4. MOI
- transport ONLY to SMH.

ADULT GROUP B: TRANSPORT ONLY TO CH OR SMH IF-

5. OTHER CONSIDERATIONS (ANY ONE- KNOWN OR SUSPECTED):

- a. Older Adults: risk of death increases after 55 years.
- b. Anticoagulation or bleeding disorders (Coumadin use).
- c. End-stage renal disease requiring dialysis.
- d. Pregnancy >20 weeks- consider any pregnant patient → SMH.
- e. Suspicion of severe hypothermia.
- f. EMS judgment. When in doubt, transport to SMH.

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- b. Any signs or symptoms of respiratory insufficiency, such as:
 - i. Severe hypoxia.
 - ii. Accessory muscle use, grunting or abdominal breathing.
- c. Any signs or symptoms of abnormal perfusion, such as:
 - i. Decreased cap refill (> 2 seconds).
 - ii. Low systolic BP for age:
 1. < 1y/o → SBP < 60mmHg.
 2. 1-10 y/o → SBP < (age x 2) + 70.
 3. >10 y/o → SBP < 90mmHg.
- d. Only responsive to pain, or unresponsive (AVPU).

Notice: these Physiologic criteria are quite different from the Adult Physiologic Criteria.

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- f. Amputation above the wrist or ankle.
- g. Crushed, degloved or mangled extremity.
- h. Extremity injury with vascular compromise.
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Notice: these Anatomic criteria are exactly the same as the Adult Physiologic Criteria.

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PEDIATRIC GROUP A: TRANSPORT ONLY TO SMH IF-

4. MOI CRITERIA: (ANY ONE- KNOWN OR SUSPECTED):

- a. Falls >15 feet **OR** 3x the height of the child.
- b. High-Risk vehicle crash:
 - Intrusion >12 inches occupant site; > 18 inches any site.
 - Ejection (partial or complete) from vehicle.
 - Death in same passenger compartment.
- c. Vehicle vs. pedestrian/bicyclist thrown, run over, or with significant impact (vehicle going >20 mph).
- d. Motorcycle crash > 20 mph.
- e. High Energy events, such as:
 - Ejection from vehicle or animal.
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PEDIATRIC GROUP B: TRANSPORT ONLY TO CH OR SMH IF-

5. OTHER CONSIDERATIONS (ANY ONE- KNOWN OR SUSPECTED):

- a. Suspicion for Non-Accidental trauma.
- b. Anticoagulation or bleeding disorders (Coumadin use).
- c. End-stage renal disease requiring dialysis.
- d. Pregnancy >20 weeks- consider any pregnant patient → SMH.
- e. Suspicion of intra-abdominal injury (tenderness, distention, bruises)
- f. Suspicion of severe hypothermia.
- g. EMS judgment. When in doubt, transport to SMH.

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Trauma Alerts

MCEMS STATEMENT ON TRAUMA CARE/SCENE TIMES

See Trauma 5- "Adult Trauma Destination Guidelines" as warranted.

See Trauma 8- "Pediatric Trauma Destination Guidelines" as warranted.

See Trauma 13- "Hypovolemic Shock" as warranted.

See Trauma 16- "Spinal Immobilization Protocol" as warranted.

See Trauma 17- "Spinal Trauma" as warranted.

1. Trauma is a surgical disease.
2. Trauma patients need to be delivered to the ED as quickly and safely as possible.
3. Even with stable vital signs, patients with significant injuries do not receive "stabilization" in the field.
4. With major injuries or unstable VS, the very most you can do is buy minutes or seconds via aggressive ABCDE management **while enroute**.
5. **Scene time should be less than 10 minutes in any patient who meets any of the Adult or Pediatric Trauma Destination Guidelines criteria.**
6. The "**Stat Trauma**" Provider Impression (PI) must be one of your PI's for all trauma patients who meet any of the Adult or Pediatric Trauma Destination Guidelines criteria.
7. The four themes which MUST guide all trauma care are:
 - a. As brief a scene time as is safely possible- our standard is <10 minutes for all trauma patients.
 - b. Safe, rapid transport to an appropriate facility.
 - c. As much assessment, physical exam, bleeding control, vascular access, etc. as possible done ENROUTE.
 - d. Early notification to the ED of the impending arrival of any critical/unstable trauma patient.
8. There is medical literature which suggests that starting a pre-hospital IV on-scene in the severely injured trauma patient may actually increase their mortality- it uses up valuable seconds and minutes. Again- do everything enroute when possible.
9. YOU DO NOT HAVE TO NORMALIZE SBP TO 120mmHg. Use hemorrhage control and fluid boluses for a target SBP of **90mmHg** in adults, or age specific SBP in pediatrics.
 - a. In general a mentating patient with good radial pulses has an adequate SBP.
10. Be very aware of fluids and do not over resuscitate the stable patient.
11. Assessment and stabilization of the possible cervical spine fracture is of paramount importance in trauma patients → when in doubt, immobilize.

Benchmark Box:

Please see Trauma 1 for EMS System "best practice" benchmarks for Trauma Scene Times, Stat Trauma PI.

See Trauma 5- "Adult Trauma Destination Guidelines" as warranted.

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5. Scene time should be less than 10 minutes in any patient who meets any of the Adult or Pediatric Trauma Destination Guidelines criteria.

Destination Guidelines criteria.

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MCEMS Trauma Alerts:

- I believe, and the current literature supports, that short EMS times in Trauma likely saves lives.
- EMS Scene Time of less than 10 minutes in ANY patient who meets any of the Adult or Pediatric Destination Guidelines is one of our system CQI/QA Benchmarks.
- I believe this is a logical CQI/QA measure of Quality:
 1. These State Guidelines identify high-risk patients;
 2. Any high-risk patient may be an “Unexpected Death”;
 3. ALL of these patients should have brief scene times.
- Now that our HP update is completed, I am going to begin to follow this 10 minute Benchmark closely.

Trauma Alert tab in High Plain's:

- This is one of 3 Alerts you can check on the Alerts Tab.
- It is to be checked for ANY patient who meets ANY of the State Trauma Destination Guidelines- whether that patient is "sick" or "not sick" while in your care.
- All of these patients should have a scene time of less than 10 minutes; or charting as to why this was not feasible.
- Our EMS "Trauma Alert" is VERY different than the hospitals Level I Trauma activation- totally different fish.
- *Not your job to call a Level I-* just give us a good report (VS, injuries, MOI) and we will take care of that.
- All Level I's are unstable. Most EMS Trauma Alerts will not be unstable.

Ok, so...

- Short EMS times do matter in certain trauma patients;
- Knowing which ones is tricky, and you will be wrong;
- Unexpected Deaths are a real thing, let's have none;
- Modern Destination Guidelines are prospectively validated to predict which patients have high-risk criteria;
- You **MUST** know and follow the Destination Guidelines in our protocols (consider a pocket cheat-sheet);
- Scene time of less than 10 minutes is our standard;
- Use the Trauma Alert tab for all who meet the Destination Guidelines- this is our high-risk trauma patient population;
- When in doubt, transport trauma patients to SMH.