

Interfacility Trauma Transfers

Taking Decisive Action to Definitive Care

By Dr. Wenzel Tirheimer, Assistant Medical Director, UCH ED

Trauma--a catastrophic, life threatening injury--is the leading cause of death of Americans under the age 44. In cases of severe trauma, especially internal bleeding, nothing can replace the care provided by a cohesive trauma team. Complications such as shock, DIC, and ultimately, death may occur if the patient is not managed appropriately and expeditiously. It is therefore necessary to transport victims as fast as possible to specialists who are most often found at a hospital trauma center. Because some injuries can cause a trauma victim to decompensate extremely rapidly, the lag time between injury and treatment should ideally be kept to a bare minimum.

Without an organized, regionalized system of emergency medical care, it is easy to imagine how the "Golden Hour" can tick away before the trauma patient receives definitive care. To help prevent this unnecessarily tragic situation, and to better serve its residents, the Hillsborough County Trauma Agency has revised the guidelines for transfer of a trauma patient to a trauma center. It is well documented that a trauma victim's chances of survival increase dramatically if trained professionals stop the bleeding, treat the injury, and restore blood pressure. Conversely, mortality rates increase by 15-20 percent when a seriously injured patient is treated at a non-trauma center.

Although in an ideal situation, severely injured patients meeting trauma criteria are identified by EMS and transported immediately to a trauma center, these patients sometimes end up in community hospital emergency departments. The four trauma cases outlined here are all patients that presented to the Emergency Department at UCH Carrollwood, and were appropriately identified, stabilized, and transferred out to a trauma center within a reasonable time frame. In all instances, the patients were transferred out after stabilization efforts were initiated and

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Who Makes the Trauma Transportation Decisions?

Indecisive about who on scene determines the trauma transport destination ?

The question keeps coming up. It seems like whenever there's an incident involving multiple units responding to a scene and someone (a hospital) asks why the patient wasn't taken to a trauma center, people are uncertain about who really has the last say in deciding the transport destination. There still isn't universal knowledge of this!

The senior medic (or senior caregiver) on scene, not the senior officer, should be the professional to make the decision, and after soliciting input from all health care providers involved. This decision should be made after considering what would be the worst possible case scenario, and who would be the best qualified to transport this patient to the facility most qualified to evaluate and manage the problem.

Disagreement over care level or transport destination?

What happens in our community when a BLS provider questions a senior fire department caregiver over the level of care, or the transport destination for the patient? Is it fair to say that in the current culture, there is great fear and loathing of coming across as being argumentative or not a team player?

We can tell you that among the cases referred to the County's Trauma Audit Committee wherein ALS transferred to BLS a patient who was either an undeclared trauma alert, or should have been transported to a trauma center, a couple of familiar themes keep recurring. It seems that these BLS crews on the receiving end were either afraid to speak up, lacked sufficient self-confidence in their assessment skills, or weren't clear on what their responsibilities, or options, were.

Have you heard of the ALS to BLS determination protocols? Tampa Fire developed these back in 1998, and recently revised them this past summer. It's what they use to decide when to summon BLS from the scene for patients fitting these BLS criteria.

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Interfacility Trauma Transfers

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without ordering in depth diagnostic studies. None of the patients had CT scans or lab results back before they were transferred out, since the decision to transfer to a trauma center was a clinical one, and did not require any in-depth testing. Although there are certainly borderline cases which require adjunctive testing before the decision to transfer, those patients with unstable vital signs or evidence of deterioration may not survive if transfer is delayed by the decision to order a CT scan or to wait for lab results.

These cases illustrate that with vigilance and teamwork by the emergency physicians and nurses at our community hospitals, we can help to save the lives of critically injured patients which present to our ED's. In the critically injured trauma patient, minutes count... a transfer to a trauma center should not be delayed for labs or radiologic tests.

So what does an efficient non-trauma center transfer to a trauma center look like?

These are characteristics of 4 actual interfacility transfer cases that occurred in our County:

Nature of trauma:	Blunt head, blunt abdominal, penetrating chest, penetrating lower extremity
Age range:	25 to 85 years
Door to door time between arrival at non-TC and TC:	Range: 34 minutes - 1 hr 53 min
Immediate Outcomes:	Three survived: two to be discharged from the hospital, the third (eldest) expired on post trauma day 30
Pre-transfer workup/intervention: x-rays, transfusions and/or chest tubes	Door-to-door time: between arrival at non TC & TC (hours & minutes)
BLUNT HEAD TRAUMA No imaging studies performed prior to transfer	0:40
PENETRATING CHEST TRAUMA CXR chest tube transfusion	1:10
PENETRATING LOWER EXTREMITY TRAUMA No imaging studies	0:34
BLUNT ABDOMINAL TRAUMA CXR	1:53

Transportation Decisions

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Rescue Chief Nick LoCicero states: "It is our hope that BLS providers will consider using these same protocols to call for ALS assistance from the scene. Of course, in the real world, no written protocol can cover all patient care scenarios. Therefore, it is our hope that our services will remain flexible, and approach patient care interactions in a cooperative manner. We welcome feedback from your service concerning any problems that your service may encounter with this revision."

If you haven't seen a copy of these protocols, ask your training department for a copy, or go online to the Trauma Agency's Web site and download them from the section "Coordination of care at the scene". By familiarizing yourself with these distinctions between ALS and BLS, as well as knowing what the Elder Gray-Area Criteria criteria is, you can supplement your decision-making with field-tested evidence.

Dr. Doug shares his feelings about this subject by drawing an analogy to a parallel world that he thinks might help us look more constructively at these dynamics.

Years ago, the military was very concerned about the number of aviation accidents that were occurring. After much honest and in-depth study, it was felt that a major contributing factor was the senior officer, i.e. the pilot, was not listening or would not allow input from the flight crew as to the safety or hazards of flight conditions. The Army implemented a program that permitted and encouraged all members of the flight crew, or anyone involved in the operations of that flight, no matter what rank, to speak when they identified a concern about the safety of the flight. And the pilot had to acknowledge this information. The end result was a dramatic decrease in aviation accidents.

This program was translated into a civilian health care model called MedTeams, whereby anybody on the healthcare team, no matter what rank (First Responder, EMT, Medic, Nurse, Doctor, x-ray tech, etc.), is empowered and obligated to bring an issue related to patient safety to the attention of the Team Leader (Senior Medic, ED Physician, Trauma Surgeon), and this information must be acknowledged. What this means in real world practice, be it in the street, the ED, the OR, or anywhere else, is there must be a cultural change that says everyone comes to the table (the patient) with varying skill sets, and the Team Leader has the obligation, in the best interest of the patient, to seek pertinent input about the patient from all those eyes and ears. Just think how many years experience of patient care comes to the scene of a major auto accident. Draw on that experience. And then if you still cannot decide, contact Medical Control as the arbiter!

New Medical Director



After 15 years as the medical director for the Hillsborough County Trauma Agency (HCTA), Dr. Cathy Carrubba is taking a well-deserved break. Effective August 1, 2007, Dr. Doug Scott became HCTA's medical director and chair of Hillsborough's Trauma Audit Committee (TAC).

Though relatively new to our community, Dr. Scott quickly became involved with the TAC upon moving to the area to take the position of medical director of Brandon Regional's emergency department in the summer of 2006. Don't let that non-trauma center "façade" fool you for a minute though. He has an extensive prehospital, emergency medicine, trauma center and trauma system development background.

Dr. Scott embarked on his medical career back in Mansfield, Ohio by working as an EMT for a service that covered several counties. In those days, their ambulances were actually converted hearses, made so by flipping over the rollers to accommodate stretchers. He went on to become a paramedic, start the ALS system in that county, and serve as chief paramedic while studying pre-med. He continued his EMS calling through med school in Cincinnati, doing critical care interfacility transfers (streptokinase, balloon pumps, the works). He has taught ACLS and the paramedic curriculum for years, and was one of the first National Registry medics in the country. In fact, he proctored that exam, and received a 20-year award with that organization.

While serving in the Army, Dr. Scott did an Emergency

Medicine (EM) residency at a Level I trauma Center in San Antonio. He started the San Antonio ALS flight program with Army helicopters and flying senior residents to scenes in Hueys. He spent several years in Hawaii, setting up the Oahu Army medevac system, as well as all the AED and ALS programs on the different Army posts and Air Force bases. He trained in nuclear, biologic and chemical (NBC) warfare management and was the Officer in Charge on the Army Rapid Response Team in the Pacific Theatre for all NBC incidents (of which there were several, some never in the news).

Back on the mainland, Dr. Scott was the medical director for Alachua General's ED as well as Gainesville Fire Rescue for several years. He went on to hold medical director positions at Shands Gainesville, Ocala and Tallahassee EDs. Other medically related appointments/activities during this time included physician support for the NASA Shuttle launches and landings for the past 10 years, EM faculty for the University of Florida for 10 years, Board of Directors for North Central Florida Trauma Agency, involvement in Shands Level I trauma center designation, and Central Florida DMAT, participating in multiple deployments, most recent being several Hurricane Katrina sites. Despite all this activity, he hungered again for a cosmopolitan ambience and allowed himself to be lured to the challenge of becoming the medical director for Brandon's ED.

Among other credentials, our Jack "Doug" Scott, M.D. is board certified in emergency medicine, holds MBA and Business of Medicine degrees, is an ACEP Fellow, an FCEP member, and keeps up with the NDMS DMAT FL-6. He is married to a nurse, has five children (yes, you read that right - 5 kids!), is into martial arts and loves roller coasters (though we'd never guess this guy could be an adrenaline junkie, right?)

Spotlight: New Faces

Sherry Morris is Tampa General's new trauma program manager. She started her trek into trauma in their operating room in 1999. Two years later she transferred to TGH's Trauma Office to assist with trauma research protocols. In 2003, she made another career change, moving to the hospital's risk management department. During that time, she completed her Masters in Health Law. She left Risk Management to return to the Trauma Office as its program manager in May. Welcome back, Sherry!



Brenda McCarthy is back! After a three-year sabbatical, she's back at UCH. As many of you know, Brenda began the Tampa leg of her nursing career at TGH's ED in 1989 as a clinical nurse and worked up to assistant nurse manager. In 1999, she became the ED director UCH-Carrollwood. She left in 2004 to take the

ED director's position at Sun Coast Hospital, but she couldn't stay away and now crosses the bay for UCH Fletcher. Welcome back!

Sharon Benson is the new manager in St Joseph's Adult Emergency Center. Sharon, who is board certified in Occupational Health, has done just about everything at SJH during her 25-year tenure. She has held various management positions in the hospital, including responsibilities for Employee Health, Pt Safety, Team Member Safety, Team Member Relations, and manager over the 6th floor and 3NA (medsurg units). Welcome, Sharon!



Randy Spivey is the new nursing "head honcho" at Brandon Regional's ED. He hails from Stonecrest Medical Center in Smyrna, Tennessee where he also was the Director of Emergency Services. Welcome, Randy!



A 90's something male fell at home, striking his face on the sink. An engine company saw him first; he complained to them of both head and neck pain. The initial VS were BP 139/81, Pulse 68, RR 16, GCS 15, O₂ Sat 98%

which by itself is enough to call one. When you take his age into consideration, should that have ensured him a ride to a trauma center?

- Looked at from another angle, what about that elder gray-area criteria? Wouldn't the combination of his age (easily over 65) and antiplatelet therapy, have suggested he would be better off at a trauma center?

Let that elder gray-area criteria work to help you make the best decision for your patients. Age extremes, both young and old, are independent risk factors for poorer outcomes in trauma. The elder gray-area criteria is just that little extra-something, that's in black and white, on which to justify your intuition.

Unfortunately, the elder gray isn't quite a household name yet, even though it has been out for two years! There's plenty of anecdotal evidence around to suggest that ED personnel haven't quite caught up with this yet. Hopefully when the Trauma Agency distributes the elder gray-area reference cards, it will increase recognition. That way, when you're calling in report on a patient and inform the trauma center why you're coming to them, they won't say "elder what?"

He had multiple medical problems, and was on multiple meds including Plavix and ASA. His care was transferred to BLS, who documented numbness in fingers in addition to the previously reported complaints. They transported him to a non-trauma center, where he quickly deteriorated, requiring intubation for subdural hematoma. A CT of neck revealed a C6 fracture. He was transferred to trauma center, where he went to OR, but died 9 days later.

Do you see anything wrong with this picture?

- Do you think this patient meet trauma alert criteria? The pt did demonstrate symptoms that were suspicious of a possible spinal cord injury,



An 80-plus year-old female restrained passenger was in the back seat of a vehicle involved in an MVC. An engine and BLS car were dispatched to the scene.

The EMTs found the patient c/o SOB and DIB with chest pain. They immobilized her, placed her in the back of their unit and started O₂. When they did their assessment, they were disturbed by the paradoxical chest wall motion and abnormal lung sounds. The engine medic reassessed her and reassured the crew that it was "it looks like pneumonia; that she'll probably get antibiotics while she is in the ER".

This represents a very dangerous problem in patient care known as a logic error. Does it make sense that grandma's abnormal chest rise would be due to a medical cause (as opposed to a traumatic one) right after being in an MVC? You've no doubt heard the expression, "When you hear hoof beats, think horses, not zebras!"

This is where classroom instruction and regular continuing education helps to improve your ability to consider multiple possibilities (differential diagnoses) when in the field. ED physicians have to do this too. Every patient has to prove to you they are NOT sick or injured; not the other way around. So every patient you see should prompt a differential diagnosis list in your mind, and you adjust the list in your brain based on the information you gather from your assessment and everyone you interview: the patient, the family, bystanders, etc. At the top of the list should always be "what is the worst thing this patient could have?" And if flail chest is on the top of the list, think trauma center.

Now back to the story. The family members on scene asked BLS to take this elderly lady to the nearby non-trauma center where her medical records were. During that quick 9-10 minute transport, the patient became cool, pale and clammy. On arrival, her VS were 96/56 HR 106 RR 40. The ED doctor jumped on

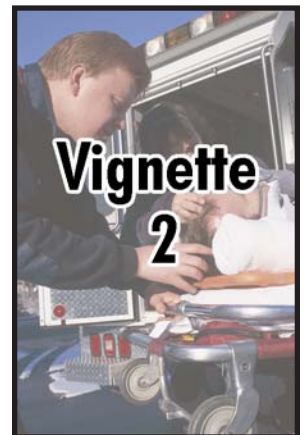
the case and rapidly attempted stabilization with intubation, central line, chest tube (lots of blood draining) and foley, all the while beginning transfer arrangements. The time of arrival at the non-trauma center to time of departure/transfer to the trauma center was just under two hours. The BLS crew was amazed at how rapidly the patient de-compensated but also impressed with the fast action of the ED personnel.

The ED initiated transfer proceedings promptly; the pt arrived at the trauma center ED with a systolic BP of 65. The trauma team took her rapidly to the OR for repair of diaphragmatic hernia with gastric perforation, a splenectomy, and evaluation/stabilization of a retroperitoneal hematoma. The surgeons also found a small liver laceration, and a subdural hematoma. She survived surgery but succumbed a month later after a rocky postop course. Her cause of death was bronchopneumonia with respiratory failure as a consequence of her injuries.

What, if anything, would you have done differently on scene?

- Did the patient meet trauma alert criteria? Yes, difficulty breathing and mechanical disruption of the chest wall.
- Did the patient meet "Elder Gray-Area" Criteria? Yes, Yes, Yes.
- Should Elder Gray-Area Criteria be mandatory instead of suggested guidelines? Maybe? We hope that it has at least raised the level of awareness about this frail population.

- Kudos to that hospital for a great resuscitation by the ED team.



This includes two similar cases of head injuries in elderly pts on anticoag/antiplatelet tx taken to the same non trauma center.

A septagenarian restrained driver was hit by a car that went airborne. Alt LOC was observed at scene. Initial VS were 138/92 HR 68 RR 20 GCS 14. The patient c/o head and arm pain on scene. He was on Coumadin for A-fib, also had history of hypertension. An Accucheck was performed, an IV started, and the trauma victim was transported semi-fowler's to a non-trauma center. There the patient was found to have a SDH, a pneumothorax and rib fractures. Four hours later, he required transfer to a trauma center, intubated, with a chest tube, and GCS of 8. His poor prognosis was discussed with family; life support was withdrawn and he expired the next day.

A few months later, another septuagenarian male was involved in an MVC, lateral impact restrained driver, heavy damage to driver's side. On scene, pt c/o DIB, sternal pain, "hard to breathe", + LOC, VS 159/94 84 16 GCS 15. Meds included Plavix, ASA, Coumadin. The patient requested to go to a non-trauma center. Given O2 4L NC, Accucheck, IV, immobilized. In ED, he was alert and oriented, found to have extensive cardiac dz. by hx. VS 144/81 74 22 GCS 15.

This next case offers a good opportunity to demonstrate the difficulties of assessing/treating morbidly obese individuals.

A 60s-something female, 300-plus pounds on a 5-foot frame was the restrained driver in an MVA with + LOC. There was heavy front end damage causing her air bag to deploy. On scene she c/o tenderness in both upper quadrants and pelvic cavity and bilateral leg pain. Her initial VS were HR 116 RR 20 BP 170/70 GCS 15. The second set was unchanged. She gave a history of hypertension and diabetes. She was evaluated at the scene by a BLS engine company and transported by BLS to a non-trauma center. Over the next five hours she was treated with pain meds x3. CT abdomen at three hours, revealed retroperitoneal blood and free air, and right hip fracture. She was admitted by the hospitalist and taken to OR by the on-call surgeon there within two hours

During surgery, no perforated viscous was noted, but a large retroperitoneal hematoma was seen around the pancreas and duodenum. No discrete bleeder was ever found, just generalized oozing from tissues. Drains were placed. Her lipase was 788. Her hip was repaired 4 days later. A month later she was discharged to a SNF, non-ambulatory and confused. Her abdominal surgical site was still not healed (large necrotic wound with eschar). Within a week of arrival, she developed respiratory distress. EMS transported her back to the hospital in cardio-respiratory arrest where she was pronounced.

Her cause of death on autopsy was attributed to sequelae of the blunt impact to torso and extremity with femoral neck fracture; her hypertensive heart disease and morbid obesity were contributing causes. They also found her to have a surgical wound infection, acute pancreatitis, chronic hepatitis with incipient cirrhosis, incipient bronchopneumonia, among other conditions.

• Did this patient initially meet trauma alert criteria? At first pass, it is unclear, but mechanism, tachycardia, upper abdominal and

CT Head showed SDH, GCS dropped to 6 in CT. Pt intubated upon return to ED, given FFP and PRBC. The EDP transferred pt to a trauma center but by that time, the patient had no brain activity. After transfer, his poor prognosis was discussed with his family and he was made a DNR. He, too, expired about 24 hours later.

• Did these patients meet trauma alert criteria? Yes, both with altered LOC.

• Elder grey criteria? Yes, both by age and on antiplatelets (ASA, Plavix, Aggrenox) and anticoagulants (Coumadin, occasionally Lovenox).

• Would these patients have done better at a trauma center? I do not know. But I do know trauma centers are, in general, more efficient in obtaining imaging studies, administering blood products and appropriate blood components, and timely OR interventions.

pelvic pain, and concern for at least two major long bone problems puts this patient into Trauma Alert criteria.

• Did the patient meet "Elder Gray-Area" Criteria? A young or old 60s?

• Should the patient have been transferred to a trauma center? Certainly once the ED evaluation revealed the initial extent of injuries, the patient clearly met criteria for transfer to a Trauma Center.

• Should we consider morbid obesity as a factor to consider for transport or transfer to a trauma center? Yes. The literature is inconclusive on this issue, but the anecdotal experience suggests that morbidly obese patients (BMI > 30) face limitations in reliable abdominal exams for peritonitis, suboptimal imaging studies, poorer healing, and limited access to appropriately sized medical equipment ranging from BP cuffs and stretchers to OR retractors.

• Another consideration in this case was the patient's diabetic history. Diabetes was recently added to Elder Gray-Area Criteria. Diabetes is an independent predictor for worse outcomes, certainly in the management of medical problems. This likely translates to the trauma patient, particularly in their healing and recovery phase. However, the literature does not yet support primary transport to a trauma center if diabetes is the sole indicator. If you think about how prevalent diabetes has become in our society, one could easily imagine how this could put an undue burden onto trauma centers.

• Should morbid obesity be added to Elder Gray-Area Criteria? Possibly. Should this maybe be extended to the general population?

• What about pregnant women? Over 24 weeks, yes.



Prehospital Elder Gray-Area Non-Trauma Alert Criteria

Although Hillsborough County first implemented this additional trauma triage evaluation criteria in 2005, ample anecdotal evidence suggests that many hospital care providers are not yet familiar with it.

The trauma literature has shown us that older trauma patients are particularly vulnerable to injury and call for the provider to have a higher index of suspicion during their assessment. The Hillsborough County Trauma Audit Committee (TAC) believes that often times this population might benefit from the additional services available at trauma centers. The TAC developed the Elder Gray-Area Non-Trauma Alert Criteria to assist prehospital in directing appropriate patients towards those facilities who may have need of a higher level of care. Although not mandatory trauma transport criteria, consideration of the Elder Gray-Area Criteria should weigh heavily in EMS' transport destination decisions of the 65+ crowd.

→ **First, check to see if your older trauma patient already meets trauma alert criteria and call an alert as appropriate.**

→ **If not a trauma alert, but the patient is 65 years or older, RECOMMEND transporting that individual to a trauma center if one or more of the following conditions are satisfied:**

Mechanism of Injury

Burns

Motor vehicle collision associated with:

- Rapid deceleration of automobile (>35mph)
- Pedestrian/bicycle/golf cart
- Motorcyclist
- Vehicle occupant with lack of restraints
- Significant passenger space invasion
- Prolonged extrication greater than 20 minutes
- Significant vehicular damage
- Rollover
- Fatality of other occupant

Injuries associated with an above mechanism:

- Evidence of chest or pelvic trauma

Other events associated with high-energy dissipation:

- Fall
- Blast

Traumatic injury and currently taking:

- Anticoagulants and blood thinners
- Diabetic medications
- Cardiac medications such as beta blockers and antiarrhythmics

Traumatic injury and medical history of:

- Cardiac
- CHF
- COPD
- Surgical: recent surgery, transplant recipient
- Paralysis
- Dementia
- Diabetes

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