

Poor Prognostic Indicators

Critical Decision Making for the EMT



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The material presented here is for educational/informational purposes. It should not be considered medical advise.
EMS providers are reminded to follow regional/local protocols when treating their patients.



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Content Outline

- Overview & Goals
- Definitions
- Patient Assessment Review
- Golden Rules
- Case Studies
- Summary
- Questions/Comments

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Overview and Goals

- Develop Critical Thinking
- Utilize assessment skills to identify patients that require rapid intervention and treatment
- Utilization of additional resources
- Making the rapid transport decision
- Choosing the right place to take your patient

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Gary and Stu's tips on EMS Survival #1

The air goes in and out.
The blood goes round and round

Any deviation from that,
is a bad thing



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Critical Thinking (Definition)

The intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by observation, experience, reflection, reasoning, or communication, as a guide to belief and action.

National Council for excellence in Critical Thinking Instruction

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Patient Assessment Review

- Primary Survey = Initial Assessment
- CUPS Determination/Transport Decision
- Secondary Survey = Rapid/Detailed Physical Exam

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Primary Survey (Initial Assessment)

- Check for immediate life threats.
- Airway, Breathing, Circulation, Neurological assessments
- Vital signs should be estimated
 - Actual number is not as important as recognizing rates outside the normal limits
 - 60/70/80 Rule for Blood Pressure

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Who are our patients? Utilizing CUPS Determination

CUPS Status helps us classify our patients into categories that either require rapid intervention and transport or allows for extended scene time and delayed transport
It identifies the Sick Sick from the Sick

CUPS Determination

- | | |
|--|--|
| <p>C-Critical/CPR</p> <ul style="list-style-type: none"> • Cardiac/Respiratory Arrest • Patients being ventilated <p>U-Unstable</p> <ul style="list-style-type: none"> • Severe airway compromise • Multi-system trauma • Hidden hemorrhage • Respiratory distress • Chest Pain • Altered mental status/unresponsive | <p>P-Potentially Unstable</p> <ul style="list-style-type: none"> • Early signs of shock • Hemodynamically stable patients with significant MOI • Major isolated injury • Altered mental status • Most medical emergencies <p>S-Stable</p> <ul style="list-style-type: none"> • Single isolated injuries • Uncomplicated medical emergencies |
|--|--|

CUPS Determination

- | | |
|--|--|
| <p>Critical & Unstable Patients</p> <ul style="list-style-type: none"> • Approx. 10% of our patients • Require Rapid Intervention and Transport • Consider ALS <p><i>These are the patients we can make a difference with.</i></p> | <p>Potentially Unstable & Stable Patients</p> <ul style="list-style-type: none"> • Approx. 90% of our patients • Extended scene time permissible • ALS usually unnecessary |
|--|--|

Load & Go **Stay & Play**

Platinum 10 minutes

The First 10 minutes after initial injury

Ideally C & U patients should be identified, extricated and enroute within the Platinum 10 minutes



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Activities within the Platinum 10

- Identify Critical & Unstable Patients
- Assessment and treatment of life threatening injuries/illness
- Rapid extrication when indicated
- Timely transport to an appropriate facility
- Early alerting of the receiving facility

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Secondary Survey Pitfalls (Detailed Physical Exam)

- Completing Secondary Survey on a patient **before** life threats are managed
- Failing to complete a secondary survey on critical patients **after** life threats are managed
- Failing to complete a secondary survey on a stable patient
- Not obtaining the medical history on a trauma patient when possible

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Scenario #1

You are called to the scene of a donor-cycle crash. You find the rider lying on the ground next to his bike. The scene appears safe.



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Primary (initial) Assessment

- **A**irway: Open and clear
- **B**reathing: RR= 26/min LS: Equal/clear. No apparent chest trauma
- **C**irculation: Radial pulse present, weak & rapid. Skin is cool, clammy & Pale. No obvious external bleeding present
- **D**isability: PERRLA , patient is alert but appears anxious
- **E**xpose: No deformities noted

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Discussion

- What types of conditions do you suspect?
- What is your CUPS status/transportation decision?
- How often would you re-assess vital signs?
- What additional resources would you need?

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Upon Further Exam

- Head, neck & chest unremarkable
- Pupils are sluggish
- Abdominal tenderness found in R.U.Q.
- PR & RR still rapid and shallow
- The patient is taking longer to respond to your questions

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Shock (Hypoperfusion Syndrome)

“A rude unhinging of the machinery of life”



Samuel Gross 1852

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Shock (Hypoperfusion Syndrome)

- The body’s inability to meet it’s oxygen needs (poor tissue perfusion)
- Leads to anaerobic metabolism

Shock is a Life Threatening Condition!!!

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Shock
(Hypoperfusion Syndrome)

Early Signs and Symptoms

- Altered Mental Status
- Tachycardia
- Tachypnea
- Diaphoresis
- Blood Pressure remains Stable

Remember: Our job is to keep the patient from progressing past the early stages

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Shock
(Hypoperfusion Syndrome)

Late Stages

- Pulse, Respirations and Mental Status continue to deteriorate
- Blood Pressure Drops

Remember: if you wait for the blood pressure to drop...You waited too long!!!

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Hidden Bleeding
Things to Remember

- Blood in the abdomen may not always cause pain or tenderness
- Retroperitoneal injuries are usually asymptomatic
- Mechanism of injury
- Level of shock is greater than can be explained by visible injuries
- The patient can "bleed out" without any signs of external bleeding

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Gary & Stu's tips on EMS Survival #2

All Bleeding stops eventually!!!



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Scenario #2

You are called to the gym for a basketball player down. The player is a 24 y/o male complaining of sudden onset of chest pain and shortness of breath. Patient states he has a history of Asthma and that he used his MDI without relief. The scene is safe.

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Primary Assessment

- **A:** Open and clear
- **B:** RR=24 & shallow. Obvious respiratory distress. Patient complains of pain on inspiration. LS: diminished on left side, but clear
- **C:** PR: 110, radial pulses present, skin unremarkable
- **D:** PERRLA. Patient is Alert
- **E:** No deformities noted. Patient denies any contact took place during the game

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Discussion

- What types of conditions do you suspect?
- What is your CUPS status/transport decision?
- How often would you re-assess vital signs?
- What interventions would you use?
- What additional resources would you need?

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Upon Further Exam

- **S:** Pain on inspiration, increased SOB, distended neck veins
- **A:** No known allergies
- **M:** Proventil MDI. Taken without relief
- **P:** Asthma
- **L:** Breakfast, 3 hours ago
- **E:** Just finished playing a varsity basketball game

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Upon Further Exam

- **A:** Clear
- **B:** 28 & labored. No relief with oxygen. LS: quiet on left side. Increased JVD and tracheal shift towards the right.
- **C:** PR: 126 BP: 100/70, skin cool, clammy and pale
- **D:** Patient is becoming confused and sluggish with his responses

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Spontaneous Pneumothorax
(Things to Remember)

Simple Spontaneous Pneumothorax

- Medical by nature (no associated trauma)
- More common in adults 20-40
 - Tall & Thin
 - Males
- May not have any other known pulmonary problems

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Spontaneous Pneumothorax
(Things to Remember)

Complex Spontaneous Pneumothorax

- Medical by nature (no associated trauma)
- More common in adults >40
- Those with lung pathology at risk
 - Asthma
 - COPD
 - Cancer
 - TB

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Spontaneous Pneumothorax
(Things to Remember)

- May occur right after exercise
- Can quickly progress to Tension Pneumothorax
- Need ALS/Rapid transport for needle decompression

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Scenario #3

You are doing a stand-by at a baseball game. You get called to the field for the pitcher who was hit by a line drive on the side of the head. The player is not moving. One of the trainers is holding in-line stabilization. The scene is safe.

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Primary Assessment

- **A:** Open & clear. Gag reflex present
- **B:** RR 22/min, LS: clear
- **C:** PR=100, radial pulse present. No external bleeding noted.
- **D:** PERRLA, patient withdraws to painful stimuli
- **E:** Obvious bruise to side of head

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Discussion

- What type of conditions do you suspect?
- What is your CUPS status/transport decision?
- How often would you re-assess vital signs?
- What interventions would you use?
- What additional resources would you need?

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Upon Further Exam

As you are preparing to immobilize your patient, he begins to stir.

- **A:** Clear
- **B:** RR=22 with high flow O2
- **C:** PR=90, BP=146/90
- **D:** Patient responds to name only
- **E:** No change

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During Transport

The patient loses consciousness

- **A:** No gag reflex
- **B:** RR irregular (Cheyne-Stokes)
- **C:** PR=68, BP= 168/98
- **D:** Unresponsive with posturing. Pupils Fixed and dilated on side of injury.

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Closed Head Injuries (Things to Remember)

- Epidural Hematoma:** Bleeding between the skull and the dura mater
- Represent about 2% of all head injuries
 - Common in blows to side of head
 - Arterial bleeding in nature. Causes rapid change in LOC and vital signs
 - Early S/S are similar to that of a concussion

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Closed Head Injuries
(Things to Remember)

Epidural Hematoma

- Important to monitor and transport all head injuries with loss of consciousness
- Period of Lucidity followed by return of LOC
- Unusual breathing patterns present

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Closed Head Injuries
(Things to Remember)

Subdural Hematoma: Bleeding between the Brain and the Dura mater

- Venous bleeding
- Early LOC
- S/S may be delayed up to 72 hours
- S/S vary based on the location of the bleeding

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Closed Head Injuries
(Things to Remember)

Signs of Increasing Intracranial Pressure

- Cushing's Triad
 - Rising Blood Pressure (widening pulse pressure)
 - Changes in breathing pattern
 - Cheyne-Stokes respirations
 - Central Neurogenic Hyperventilation
 - Ataxic Breathing
 - Pulse Rate Decreases

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Closed Head Injuries
(Things to Remember)

- Change in Pupils
- Varying degrees of LOC
 - Onset
 - Duration

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Closed Head Injuries
(Things to Remember)

- Spinal Precautions Indicated
- Avoid aggressive hyperventilation
- Remember to treat for shock
- May hide other injuries due to the bodies compensatory mechanisms

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Gary and Stu's tips on EMS Survival #3

If it's wet and sticky and it's not yours...
(or your significant others)

Don't touch it without gloves!!!

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Poor Prognostic Indicators



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**Poor Prognostic Indicator
(Definition)**

An ominous sign or symptom that usually is associated with poor patient outcome.



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Narrowing Pulse Pressure

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Pericardial Tamponade

- Blood fills the pericardial sack causing squeezing of the heart
- With each beat more pressure is added
- The heart cannot re-expand to refill for the next beat
- Beck's Triad
 - Hypotension
 - Muffled heart sounds
 - Neck vein distention (JVD)

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Pericardial Tamponade

When systolic and diastolic pressure meet,
no cardiac output is possible

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Gary and Stu's tips on EMS Survival #4

If it's 3:00 am on a Saturday night and you are at the scene of a car crash, and no one around you is drunk....

Keep looking, someone is missing!!!

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Depressed respiratory rate and unresponsive to Pain. Patient has been Drinking



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Alcohol Poisoning

- Alcohol is a CNS depressant
- Patient may be unable to maintain airway
- high risk of aspiration
- Can lead to Blindness, Coma, Death
- Rubbing alcohol can cause these problems even in small doses.

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Mental Status Changes

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Mental Status Changes

Mental status is the cumulation of the function of organs in the body. The brain is very sensitive to disruptions in its environment. Mental status changes should serve as a red flag to the pre-hospital provider.

Pre-Hospital Emergency Care Secrets, 1998

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Causes of Mental Status Changes

- A**- Alcohol
- E**- Epilepsy, endocrine, exocrine (liver)
- I**- Insulin
- Q**- Oxygen, opiates
- U**- Uremia (kidney failure)
- T**- Trauma/Temperature extremes
- I**- Infections (sepsis)
- P**- Poisons/Psychiatric
- S**- Shock/Stroke

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Back Pain, Person >60, No Known Trauma/Prior Hx

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Abdominal Aortic Aneurysm

- “Tearing” pain
- Pain shooting down the leg
- History of hypertension
- Presently hypotensive
- Blood pressure discrepancy between arms
- Poor distal pulses in the legs

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Blunt Traumatic Arrest

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Blunt Traumatic Arrest

Patients found in the field without vital signs following blunt trauma (i.e. rapid deceleration injuries) have < 0.00001% chance of regaining vital signs.

Does your system allow you to pronounce?

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Paradoxical Chest Rise

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Paradoxical Chest Movement

- Flail Chest
- Leads to Respiratory Distress
- Not easily managed in the field
- Often associated with Pneumothorax and Pericardial Tamponade

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Asthma patient with normal respiration rate and diffuse wheezing and dyspnea

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Severe stage of Asthma

- Indicates respiratory failure
- Impending respiratory arrest
- Patient may no longer have the capacity to perform the work of breathing necessary to maintain adequate oxygenation
- Sternal retractions and head bobbing in children
- diminished lung sounds

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The Quiet Child



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The Quiet Child

The child who just sits there listless, "floppy", not interacting with caregiver or EMS. Not responding to your presence (either crying, pulling away or even curious) is usually very sick.

The quiet child is usually the sickest!!

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Gary and Stu's tips on EMS Survival #5

The better the meal or the dream that got interrupted....

1. The longer the call will take
2. The stupider the complaint will be

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More things to Remember

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Vital Sign Abnormalities

- Tachycardias without any apparent explanation
- Traumatic bradycardia
- Orthostatic changes in vital signs in the suspected hypovolemic patient
- Hypertensive/Hypotensive patients
- Diaphoresis, pallor, cyanosis
- Tachypnea, hyperpnea, bradypnea
- Sudden unexplained mental status changes

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Vital Sign Abnormalities

Take the patients age, past medical history and medications into account when deciding what is "normal" for your patients.

All Vital Sign changes from the normal limits require an explanation

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Gary and Stu's tips for EMS Survival #6

If it were not for stupid people...

We would be out of business!!!

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Making the Transport Decision



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Making the Transport Decision

Where you decide to bring your patient (and by what means) depends on several factors:

- Patient condition & complaint
- Patient choice
- Need for specialty referral center (Tertiary care center)
- External factors (weather, patients in custody)
- Local/Regional Resources and protocol.

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Making the Transport Decision

Patients in Extremis should go to the nearest 911 receiving facility

- Respiratory/Cardiac Arrest (actual or impending)
- Patients with unsecured airways

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Specialty Referral Centers

- Trauma Centers
- Burn Centers
- Other



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Trauma Center Candidates

Patients should be transported to Trauma Centers based on:

- Vital Signs & Level of Consciousness
- Anatomy of Injury
- Mechanism of injury
- Special patient or system considerations
- Transport time

Why Trauma Centers?

- Dedicated to trauma care
- Specialized care (staff are trauma experts)
- Specialized facilities (all necessary components are available 24/7, 365)
- Specialty services (all necessary specialties and sub-specialties available 24/7. 365)

Trauma Center Candidates Vital Signs & LOC

- Glasgow Coma Scale \leq 13 **or**
- Systolic Blood Pressure $<$ 90mmHg **or**
- Respiratory rate $<$ 10 or $>$ 29 or need for ventilatory support ($<$ 20 in infant $<$ 1 year)

Trauma Center Candidates
Anatomy of Injury

- Penetrating injury to head, neck, torso or proximal extremities
- Fracture of 2 or more proximal long bones
- Flail chest
- Pelvic fractures
- Open or depressed skull fractures
- Paralysis
- Crush, degloved or mangled extremity
- Amputation proximal to wrist or ankle

From: CDC 2011 Guidelines for Field Triage of Injured Patients

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Trauma Center Candidates
Mechanism of Injury

- Falls
 - Adult > 20 ft (1 story = 10 ft)
 - Child > 10 ft or 2-3 times the child's height
- High-Risk auto crash
 - Intrusion: >12" roof, >18" any site
 - Ejection (partial or complete) from automobile
 - Death in same passenger compartment
 - Vehicle Telemetry data consistent with high risk of injury
- Auto V pedestrian/bicyclist thrown, run over
- Motorcycle crash > 20mph

From: CDC 2011 Guidelines for Field Triage of Injured Patients

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Trauma Center Candidates
Mechanism of injury



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Trauma Center Candidates
Special patient or system considerations

- **Age**
 - Older adults: Risk of injury/death increases after 55
 - SBP < 110 may represent shock after age 55
 - Children: Should be triaged to pediatric trauma centers
- **Bleeding disorders or on anticoagulants**
- **Burns**
 - Without other trauma MOI, triage to Burn Center
 - With trauma MOI, triage to trauma center
- **Time –sensitive extremity trauma**
- **End-stage renal disease requiring dialysis**
- **Pregnancy > 20 weeks**
- **EMS provider judgment**

From: CDC 2011 Guidelines for Field Triage of Injured Patients
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Trauma Center Candidates

**When in doubt
take to a trauma center!!!**

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**Gary and Stu’s tips on EMS
Survival # 7**

Alcohol is good for business!!

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Burn Center Candidates



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Burn Center Candidates

- Partial thickness burns > 10% total BSA
- Burns to face, hands, feet, genitalia, perineum or major joints
- Full thickness burns in any age group
- Electrical burns, including lighting injury
- Chemical burns
- Inhalation burns (after airway is secured)
- Burn patients with pre-existing medical conditions

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Burn Center Candidates

- Patients with burns to face (inhalation buns, etc.) should first have their airway protected (intubated) before transport to burn center
- Patients who have both trauma and burn injuries should go to the trauma center if the trauma injuries are more severe than the burn

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Specialty Referral Centers (Other)

- Stroke Centers: Think F.A.S.T.
- STEMI Centers: Chest pain
- Cardiac Arrest/Hypothermia Centers
- Hyperbaric Centers: CO poisoning, smoke inhalation, DCI
- Replantation Centers: Traumatic amputations
- Sexual Assault SAFE centers
- Venomous bite centers

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Gary and Stu's tips on EMS Survival #8

10 years of experience is a lot different than 1 year of experience repeated 10 times.

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Being a better EMT

- Keeping skills and knowledge current
- Continuing Education
- EMS Journals
- Advanced Courses (BTLS, PHTLS, etc.)
- Going to Conferences

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Summing it up!!!

The EMT is faced with many decisions during the course of treating patients. The use of critical thinking along with good assessment skills will help with the identification of critical/unstable patients and rapid treatment of life threatening injuries.

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Questions/Comments



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