

ADULT

TRAUMA

EMERGENCIES

Last Revised: August 2016

GLASGOW COMA SCALE

Indicator	Response	Score
Eye Opening	Spontaneous	4
	To voice	3
	To pain	2
	None	1
Verbal Response	Oriented	5
	Confused	4
	Inappropriate words	3
	Incomprehensible	2
	None	1
Motor Response	Obeys command	6
	Localizes pain	5
	Withdraws to pain	4
	Flexion to pain	3
	Extension to pain	2
	No response	1

Total GCS: _____

INITIAL TRAUMA CARE

NOTE: **Appropriate body substance isolation precautions must be used.**

FR/BLS TREATMENT:

1. Assure scene is safe.
 2. Control C-spine.
 3. Perform a trauma (ITLS) primary patient assessment.
 4. Control any major external bleeding. Consider the need for a tourniquet. Refer to HEMORRHAGE CONTROL Protocol.
 5. Administer OXYGEN by appropriate method when indicated and attempt to maintain oxygen saturation at 94-99%.
 6. If patient has inadequate ventilation or respiratory effort refer to the UNIVERSAL AIRWAY ALGORITHM.
 7. Apply spinal motion restriction (immobilization) as indicated. Refer to SPINAL MOTION RESTRICTION Protocol.
 8. If patient meets category A or B criteria from the Region 6 Trauma Triage Algorithm:
 - a. Transport rapidly** and call for intercept per INTERCEPT CRITERIA. Appropriate patient destination should be determined by the Region 6 Trauma Triage Algorithm.
 - b. Perform a secondary (detailed) survey if patient is packaged and ambulance has not arrived or during transport.
 - c. Scene time should be limited to 10 minutes or less unless entrapment exists.
 9. If category A or B criteria from the Region 6 Trauma Triage Algorithm is not present:
 - a. Continue with the secondary survey and provide supportive care.
 - b. Transport** and consider intercept per INTERCEPT CRITERIA.
 10. Reassess frequently; every 5 minutes for unstable patients and every 15 minutes for stable patients.
 11. Contact Medical Control.
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ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT**.
 2. Perform trauma (ITLS) primary patient assessment.
 3. Consider the need for advanced airway; refer to the UNIVERSAL AIRWAY ALGORITHM.
 4. Obtain vascular access if needed. Do not delay transport to obtain vascular access.
 5. Apply cardiac monitor if needed.
 6. Assess for treatable causes of shock and treat according to the appropriate protocol.
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**** Only if transporting agency.**

Direct Trauma Transport Triage Criteria

Purpose: To define patients who need rapid transport to a trauma or specialty center.

Policy: Any patient meeting the criteria below should strongly recommend transport directly to the facility most capable of meeting their needs as defined by the criteria groupings or algorithm. If prolonged scene time or transport is anticipated, refer to “Use of Aeromedical Transport Vehicles” policy. Contact the Resource Hospital for direction as soon as possible if questions exist regarding a specific patient or situation.

Patients meeting criteria A or B: Initiate rapid transport with scene time no greater than 10 minutes.

Airway compromise or management by a Basic level EMS provider without ALS intercept should be transported to the nearest facility.

Criteria A:

Presence of any of the following should strongly recommend direct transport to a Level I trauma or specialty center capable of immediate surgery / targeted invasive intervention:

- a. Sustained hypotension (Adult ≤ 90 mmHg; Peds ≤ 80 mmHg) with mechanism or exam findings suggesting ongoing blood loss
- b. GCS (Glasgow Coma Scale) 10 or less
- c. GSW to the abdomen, back, chest or neck with suspicion of significant injury
- d. Stab wound to the abdomen, back, chest or neck with suspicion of significant injury
- e. Uncontrolled bleeding
- f. Pulseless extremity
- g. Unstable pelvis fracture (hemodynamically or anatomically unstable)
- h. Paralysis (spinal cord injury)
- i. Burns, 2nd or 3rd degree $>24\%$ TBSA or involving face / airway not meeting other Category A criteria (Direct to Burn Center)
- j. Amputation proximal to wrist or ankle not meeting other Category A criteria (direct to Re-Implant Center)
- k. Cardiac Tamponade / Tension Pneumothorax

Criteria B:

Presence of any of the following should strongly recommend transport to a hospital capable of urgent surgery:

- l. Respiratory Rate <10 or >29
- m. GCS (Glasgow Coma Scale) 11 – 12 and loss of consciousness > 5 minutes
- n. Full arrest not meeting Region 6 Field Death Declaration Criteria
- o. Stabbing or Gunshot wound to abdomen, back, chest or neck (stable)
- p. Flail chest / Chest wall instability
- q. Head injury with seizure activity, unilaterally dilated pupil, or open / depressed skull fracture
- r. Two or more proximal long bone fractures
- s. MVC (motor vehicle crash) with ejection

- t. Death of occupant in same passenger compartment
- u. Falls ≥ 20 ft (Children: >10 ft or 2- 3 x height of the child)
- v. Separation of rider from motorcycle
- w. Pedestrian / bicyclist struck by vehicle and thrown or run over
- x. Vehicle rollover with unbelted passengers

Treatment:

1. BLS and ILS units should activate a tiered response or aeromedical transport to gain ALS level skills for the patient if they anticipate prolonged scene or transport time.
2. BLS units without mutual aid / rapid tiered response option should transport the patient to the nearest local hospital.
3. Consider aeromedical transport if quicker and of clinical benefit.
4. Pre-determined landing zones should be utilized whenever feasible for patient handoff to aeromedical teams. The landing zones should be available to all aeromedical transport agencies.

Region 6 Trauma Triage Algorithm

When in doubt, take patient to an appropriate Trauma Center.

Measure signs and level of consciousness and assess for major injury.

For Patients Meeting Category A or B Criteria: Initiate Rapid Transport with Maximum of 10 Minute Scene Time

Airway Compromise or Management by a Basic Level EMS Provider without Mutual Aid Should be Transported to the Nearest Facility

Category A:

- GCS Less than or equal to 10
- Systolic BP less than 90 (Adult), 80 (Peds) with mechanism or exam findings suggesting ongoing blood loss
- Paralysis (spine)
- Uncontrolled Bleeding
- Penetrating injuries to abdomen, back, chest or neck and suspicion of significant injury
- Burns >24% surface area, or involving face/airway not meeting other Category A criteria (Direct to Burn Center)
- Salvageable amputation proximal to wrist or ankle not meeting other Category A criteria (Direct To Reimplant Center)
- Unstable Pelvic Fracture
- Pulseless Extremity
- Cardiac Tamponade or Tension Pneumothorax

YES

STRONGLY RECOMMEND:
Transport to Level I Trauma Center or
Specialty Center per Protocol

Alert Trauma Team; Consider Helicopter
Transport if Quicker and of Clinical Benefit.

NO:

Assess for other injuries.

Category B:

- LOC greater than 5 minutes and GCS 11-12
- Respiratory rate less than 10 or greater than 29
- Head injury with seizure activity, unilaterally dilated pupil or open/depressed skull fracture
- Full arrest not meeting Field Death Criteria
- Penetrating injuries with capability to work up/correct

High Risk Vehicular Crash:

- *Rollover with unbelted passengers
- *Ejection from crash
- *Death in same passenger compartment
- *Auto v. pedestrian/bicyclist thrown or run over
- *Motorcycle crash with separation of rider and bike.
- Falls greater than 20 ft or 2-3 times patient's height if child
- Flail Chest/Chest wall instability
- Two or more proximal long bone fractures

YES

STRONGLY RECOMMEND:
Transport to center capable of providing
definitive care (surgery if needed); alert
trauma team; consider helicopter transport
if quicker and of clinical benefit.

NO

Transport According to Trauma
Protocols

AMPUTATION

NOTE: Do not delay transport of patient to retrieve an entrapped or lost part.
Do not complete partial amputations.

FR/BLS TREATMENT:

1. **INITIAL TRAUMA CARE.**
 2. Treat for shock if indicated.
 3. Tissue Preservation:
 - a. Rinse part gently with normal saline if gross contamination (**DO NOT SCRUB**)
 - b. Wrap part in moist sterile gauze (part should never be immersed in water).
 - c. Place wrapped part in water tight bag and seal.
 - d. Label bag with name, date and time.
 - e. Place sealed bag into container filled with water and ice and transport with patient. (**DO NOT PLACE DIRECTLY ON ICE**)
 4. Call for intercept per INTERCEPT CRITERIA.
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ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT.**
 2. Consider **MORPHINE SULFATE** or **FENTANYL** as needed for pain control:
 - a. **MORPHINE SULFATE** 5 mg slow IVP or 10 mg IM. May repeat IVP dose x 1 after 15 minutes if needed.
 - b. **FENTANYL:**
 - IV – 1 mcg/kg slow IVP (maximum initial dose 100 mcg); may repeat x 1 after 15 minutes at 0.5 mcg/kg (maximum second dose 50 mcg).
 - IM – 2 mcg/kg (maximum dose 100 mcg).
 - IN – 1 mcg/kg via atomizer*(maximum initial dose 50 mcg); may repeat x 1 after 5 minutes at 0.5 mcg/kg (maximum second dose 25 mcg).
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***Intranasal medications must be administered through an atomizer; Maximum volume per nostril = 1 ml.**

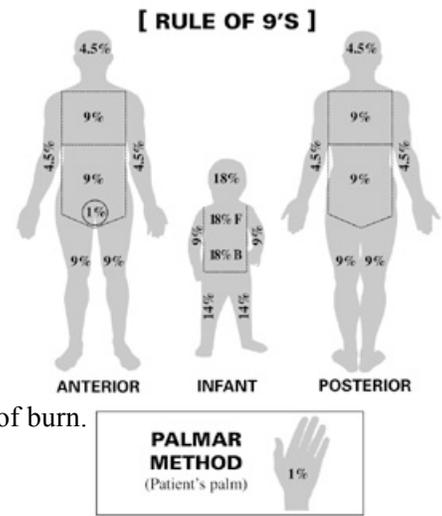
BURNS

CRITERIA: Any may be present:

1. Inhalation injury.
2. Electrical injury.
3. Significant partial or full thickness burns.
4. Chemical injury.

FR/BLS TREATMENT:

1. Assure scene and rescuer safety; remove patient from source of burn.
2. **INITIAL TRAUMA CARE.**
3. Obtain burn history:
 - a. Type of burn / causative agent / time of burn.
 - b. Location of burn / Injury environment
 - c. Estimate degree and percent of surface area burned (Use palm of patients hand to represent 1% of body surface area.)
4. Assess and treat burn according to burn type:
 - a. Superficial thermal burns: Cool with sterile water or saline then cover with moist sterile dressings.
 - b. Partial and full thickness thermal burns: Cover burns with DRY sterile dressings.
 - c. Chemical burns: Flush with water or saline (brush off dry chemical first).
 - d. Electrical burns: Note any secondary fractures or exit wounds caused by the current.
5. Call for intercept per INTERCEPT CRITERIA.



ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT.**
2. Consider the need for an advanced airway if signs of inhalation injury are present.
3. Administer 20 ml/kg NS or LR fluid bolus to maintain SBP 90-100.
4. Consider MORPHINE SULFATE or FENTANYL as needed for pain control:
 - a. MORPHINE SULFATE 5 mg slow IVP or 10 mg IM. May repeat IVP dose x 1 after 15 minutes if needed.
 - b. FENTANYL:
IV – 1 mcg/kg slow IVP (maximum initial dose 100 mcg); may repeat x 1 after 15 minutes at 0.5 mcg/kg (maximum second dose 50 mcg).
IM – 2 mcg/kg (maximum dose 100 mcg).
IN – 1 mcg/kg via atomizer*(maximum initial dose 50 mcg); may repeat x 1 after 5 minutes at 0.5 mcg/kg (maximum second dose 25 mcg).
5. Treat any dysrhythmia per appropriate protocol.

***Intranasal medications must be administered through an atomizer; Maximum volume per nostril = 1 ml.**

CHEST INJURIES

CRITERIA: Any may be present

1. Penetrating or sucking chest wounds.
2. Unstable chest wall segment.
3. Signs of blunt trauma to chest.
4. Paradoxical movement.
5. Tachypnea or respiratory distress with suspected chest injury.

FR/BLS TREATMENT:

1. **INITIAL TRAUMA CARE.**
 2. Treat any obvious chest injuries, as indicated:
 - a. Apply occlusive dressing to sucking chest wounds, leaving one corner open.
 - b. Support any unstable chest wall segments with bulky dressings or hand.
 - c. Control bleeding.
 4. Call for intercept per INTERCEPT CRITERIA.
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ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT.**
 2. NS KVO or saline lock.
 3. Consider the need for a needle decompression:
 - a. Signs of shock
 - b. Decreased or absent breath sounds on affected side.
 - c. Tracheal deviation. (late sign)
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CRUSH INJURIES

CRITERIA:

1. Patient with one or more extremities trapped by an object, capable of causing a crush injury, for more than 1 hour
2. Evidence of distal ischemia (*6 P's*):
 - a. Pain, Pallor, Pulselessness, Paralysis, Paresthesia, Poikilothermia (cool to touch)

FR/BLS TREATMENT:

1. **INITIAL TRAUMA CARE**
 2. Place approved tourniquet on the affected extremity (-ies) just proximal, but as close as possible to the crushed area.
 3. If possible, call for ALS intercept per INTERCEPT CRITERIA.
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ILS TREATMENT:

1. Continue **FR/BLS TREATMENT**
 2. Establish 2 large bore IVs (not in the injured extremity).
 3. Treat pain based on "PAINFUL, SWOLLEN, DEFORMED EXTREMITY" Protocol.
 4. Administer 1 Liter **NORMAL SALINE** bolus.
 - a. Use with caution in patient with history of CHF. STOP fluids if signs of pulmonary edema (increasing shortness of breath or rales/crackles on lung exam)
 5. If possible, call for ALS intercept per INTERCEPT CRITERIA.
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ALS TREATMENT:

1. Continue **ILS TREATMENT**.
 2. Initiate cardiac monitoring and assess for hyperkalemia (Wide QRS, Peaked T waved or flattened/absent P waves)
 3. Administer **SODIUM BICARBONATE**:
 - a. Mix 50 mEq in 1000mL of 0.9% Normal Saline. Administer the entire 1000 mL bolus PRIOR to release of crushed extremity.
 - b. STOP fluids if signs of pulmonary edema (increasing shortness of breath or rales/crackles on lung exam).
 4. Lift object **SLOWLY** off of the patient.
 5. Transport to appropriate Trauma Facility.
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6. Contact Medical Control if you feel additional **SODIUM BICARBONATE** is needed.

HEAD OR SPINE TRAUMA

CRITERIA: Any may be present:

1. Unresponsive or GCS \leq 13.
2. Posturing.
3. Unequal pupils.
4. Loss of motor and/ or sensory function.
5. Mechanism that indicates significant potential for injury.

EXCLUSION:

1. SBP < 90 – See SHOCK FROM TRAUMA protocol.

FR/BLS TREATMENT:

1. **INITIAL TRAUMA CARE.**
 2. Assessment factors to consider:
 - a. Restlessness can be a sign of hypoxia.
 - b. Assume cervical injury in all patients with significant head injury.
 - c. Observe patient closely for changes in LOC.
 - d. Avoid the use of nasal airways with suspected facial fractures.
 - e. Do not treat hypertension in the head-injured patient.
 3. Call for intercept per INTERCEPT CRITERIA.
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ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT.**
 2. If unconscious or semi-conscious, intubate according to the UNIVERSAL AIRWAY ALGORITHM; if signs of elevated intracranial pressure (posturing, unilateral pupil dilation, GCS \leq 8 with hypertension/bradycardia), initiate controlled ventilations at 14-20 breaths/min with 100% oxygen, keeping end-tidal CO₂ at 30-35%, if able to monitor.
 3. **HYPERTONIC SALINE** (3% solution) at 5ml/kg IV over 30 minutes if signs of elevated intracranial pressure present, if available.
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HEMORRHAGE CONTROL

CRITERIA:

1. Traumatic external hemorrhage

FR/BLS/ILS/ALS TREATMENT:

1. **INITIAL TRAUMA CARE**
 2. Control bleeding by applying **DIRECT PRESSURE** to the bleeding site.
 - a. If bleeding soaks through the dressing, apply additional dressings and do not remove dressings from the injured site to ensure that direct pressure is continued
 - b. Cover the dressed site with a pressure bandage.
 3. If severe bleeding persists from an extremity despite applying direct pressure and is amenable to tourniquet use, apply a **TOURNIQUET** to affected extremity.
 - a. Apply commercially made tourniquet approximately 2-3 cm proximal to the wound/injury.
 - i. Recommended commercially made tourniquets include the combat Application Tourniquet (CAT) and the Special Operations Forces Tourniquet (SOFT-T)
 - b. Tighten tourniquet until bleeding stops and/or distal pulse is absent.
 - c. Document time of application and location of tourniquet and ensure that receiving facility is aware of time of placement.
 - d. Do NOT apply tourniquet over a joint. If wound is over a joint or just distal to a joint, apply the tourniquet just proximal to the joint.
 - e. Do NOT apply tourniquet over a fracture.
 - f. Do NOT release tourniquet until the patient reaches definitive care.
 - g. Do NOT obscure a tourniquet with clothing or bandages.
 4. If severe bleeding persists from the trunk, neck, head or other location where a tourniquet cannot be used, **HEMOSTATIC GAUZE** dressings, in addition to wound packing, should be used.
 5. Manage pain per the “PAINFUL, SWOLLEN, DEFORMED EXTREMITY” Protocol.
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PAINFUL, SWOLLEN, DEFORMED EXTREMITY

CRITERIA: Any may be present:

1. Obvious open fracture.
2. Deformity.
3. Swelling.
4. Point tenderness.
5. History of injury consistent with a fracture.

FR/BLS TREATMENT:

1. **INITIAL TRAUMA CARE.**
 2. Evaluate PMS (pulse, movement, sensation) distal to the injury.
 3. Immobilize fracture, covering open injuries with sterile dressing.
 4. Re-assess PMS distal to the injury.
 5. Call for intercept per INTERCEPT CRITERIA.
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ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT.**
 2. Consider MORPHINE SULFATE **or** FENTANYL as needed for pain control:
 - a. MORPHINE SULFATE 5 mg slow IVP or 10 mg IM. May repeat IVP dose x 1 after 15 minutes if needed.
 - d. FENTANYL:
IV – 1 mcg/kg slow IVP (maximum initial dose 100 mcg); may repeat x 1 after 15 minutes at 0.5 mcg/kg (maximum second dose 50 mcg).
IM – 2 mcg/kg (maximum dose 100 mcg).
IN – 1 mcg/kg via atomizer*(maximum initial dose 50 mcg); may repeat x 1 after 5 minutes at 0.5 mcg/kg (maximum second dose 25 mcg).
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***Intranasal medications must be administered through an atomizer; Maximum volume per nostril = 1 ml.**

SHOCK FROM TRAUMA

CRITERIA: Any may be present:

1. Systemic hypotension
2. Altered LOC
3. Inadequate perfusion (pale, cool & mottled)
4. Massive blood loss
5. Crush Syndrome
6. Suspected pelvis or long bone fractures

FR/BLS TREATMENT:

1. **INITIAL TRAUMA CARE.**
 2. If suspected pelvic fracture consider pelvic wrap.
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ILS TREATMENT:

1. Continue **FR/BLS TREATMENT.**
 2. Administer 20 ml/kg NS or LR fluid bolus to maintain SBP 90-100 or MAP >65.
 - a. STOP fluids if signs of pulmonary edema (increasing shortness of breath or rales/crackles on lung exam)
 3. Consider the potential cause for shock:
 - a. Tension Pneumothorax - Needle decompression
 - b. Hemorrhage - Control bleeding, IV fluids. Refer to HEMORRHAGE CONTROL Protocol.
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ALS TREATMENT:

1. Continue **ILS TREATMENT.**
 2. Consider the potential cause for shock:
 - a. Tension Pneumothorax - Needle decompression
 - b. Hemorrhage - Control bleeding, IV fluids. Refer to HEMORRHAGE CONTROL Protocol.
 - c. Pericardial tamponade
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3. If neurogenic shock is suspected and patient is not responsive to fluid bolus, Medical Control may consider DOPAMINE at 5 mcg/kg/min titrated to SBP of 90-100 or MAP > 65.

TRAUMATIC ARREST

CRITERIA:

1. Pulseless and apneic trauma patient not meeting the **Trauma Field Death Declaration** criteria (refer to the TRAUMA FIELD DEATH DECLARATION Protocol).

FR/BLS TREATMENT:

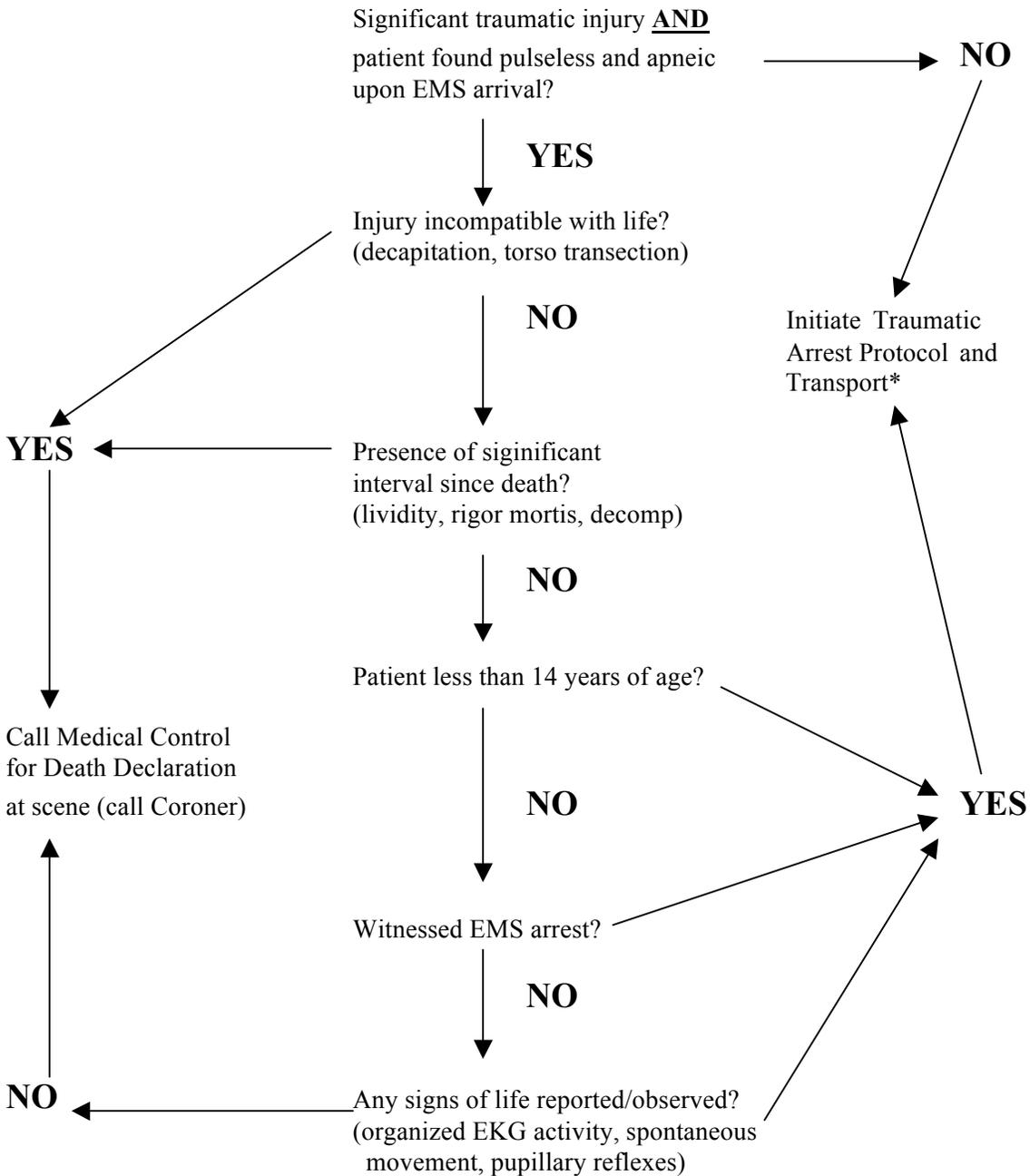
1. Begin CPR. Reference CARDIOPULMONARY ARREST Protocol.
 2. **INITIAL TRAUMA CARE.**
 3. Attempt to maintain inline stabilization throughout assessment and treatment.
 4. Rapid extrication should be utilized if patient is entrapped.
 5. Apply AED.
 6. Load and Go within **10 minutes** of extrication if ambulance has arrived.
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ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT.**
 2. Administer EPINEPHRINE 1:10,000 1mg IVP every 3-5 minutes as long as patient remains pulseless.
 3. Treat subsequent dysrhythmias per appropriate protocol.
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TRAUMA FIELD DEATH DECLARATION

TREATMENT: ALL LEVELS



*EMS witnessed cardiopulmonary arrest and 15 minutes of unsuccessful resuscitation and CPR per protocol may be pronounced dead in the field as per Medical Control.

Tranexamic Acid (TXA)

Administration for Hemorrhagic Shock

NOTE: TXA may only be considered if patient is being transported to a LEVEL 1 TRUAMA CENTER that supports administration of TXA. Consider air medical transport if indicated and applicable per Direct Trauma Transport protocol.

Criteria:

1. Age \geq 18 years
2. Blunt or penetrating trauma
3. Time of injury less than 3 hours (180 minutes). Prefer $<$ 60 minutes from initial traumatic insult.
4. All 4 of the following signs and symptoms of severe internal or external hemorrhage **MUST** be present:
 - a. SBP \leq 90 mmHg
 - b. Pulse Rate \geq 110 bpm
 - c. Tachypnea \geq 24 breaths per minute
 - d. Evidence of peripheral vasoconstriction including cool, pale skin and delayed capillary refill of $>$ 2 seconds.
5. Consider consulting medical control for those patients who may benefit from this medication, including impending hemodynamic instability.

Exclusion:

1. Time from initial traumatic insult $>$ 180 minutes or unknown time of injury.
2. Allergy to TXA.

ALS TREATMENT:

1. Perform Initial Trauma Assessment.
 2. Refer to **Shock from Trauma** and **Hemorrhage Control** protocols.
 3. Obtain at least 1 dedicated IV line for TXA, and a second large bore IV site (or IO) for continuous IV fluid administration.
 4. TXA Administration: **1 gram/10mL in 50mL NS over 10 minutes IV** via 10 drop tubing (1 drop per second) if patient remains hemodynamically unstable and it is suspected that the patient will continue to require aggressive crystalloid administration in the next 24 hours. **According to the manufacturer, TXA should be given via a dedicated IV line.**
 5. During initial report to the receiving facility, and at transition of care, report the time of injury and time of TXA loading dose.
 6. Maintenance infusion of TXA will be given at the discretion of the Trauma Center or flight crew (if applicable).
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August 2016