Pre-hospital Trauma Life Support

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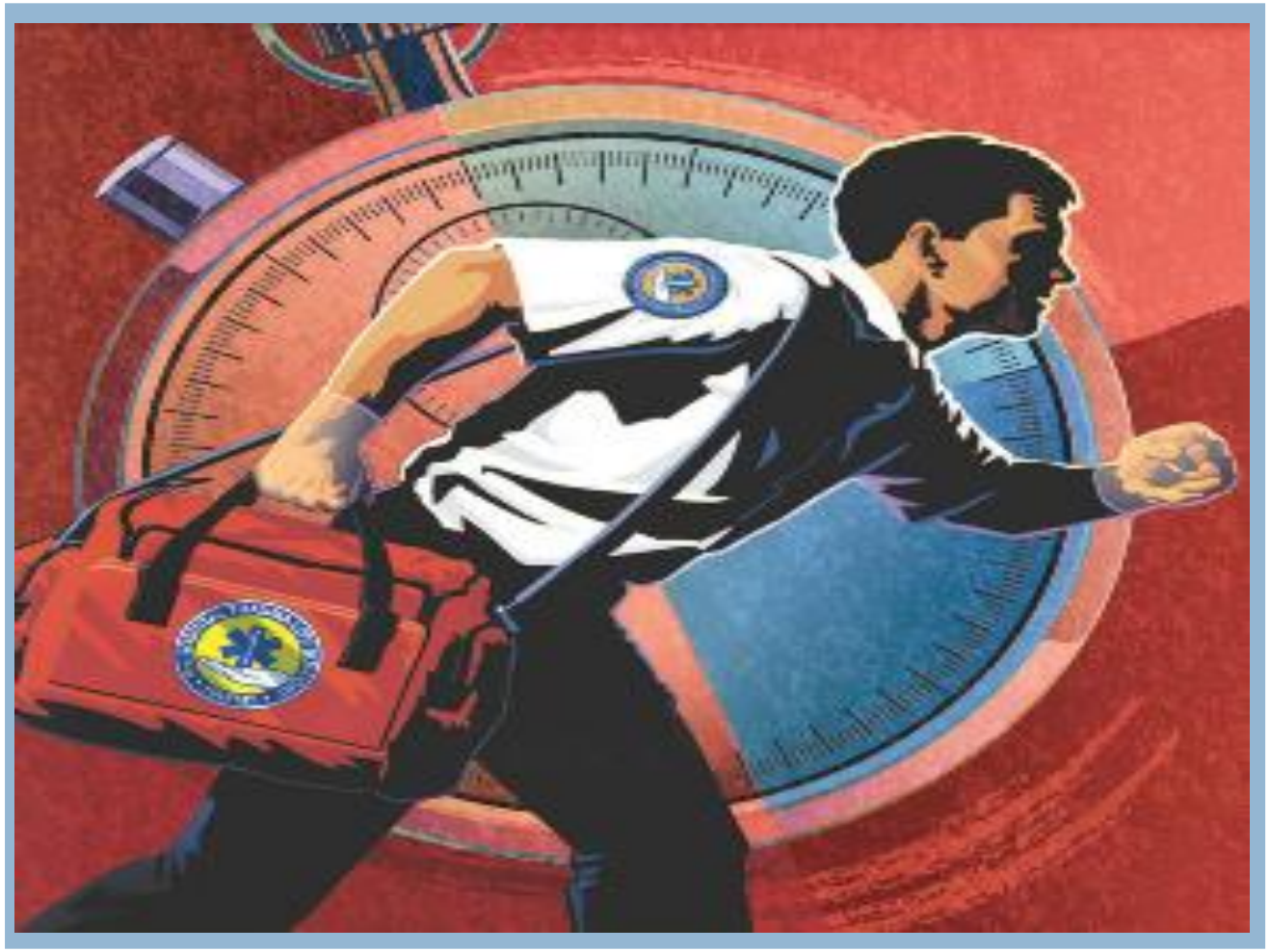


Golden principles of Prehospital Trauma Care

Golden Hour

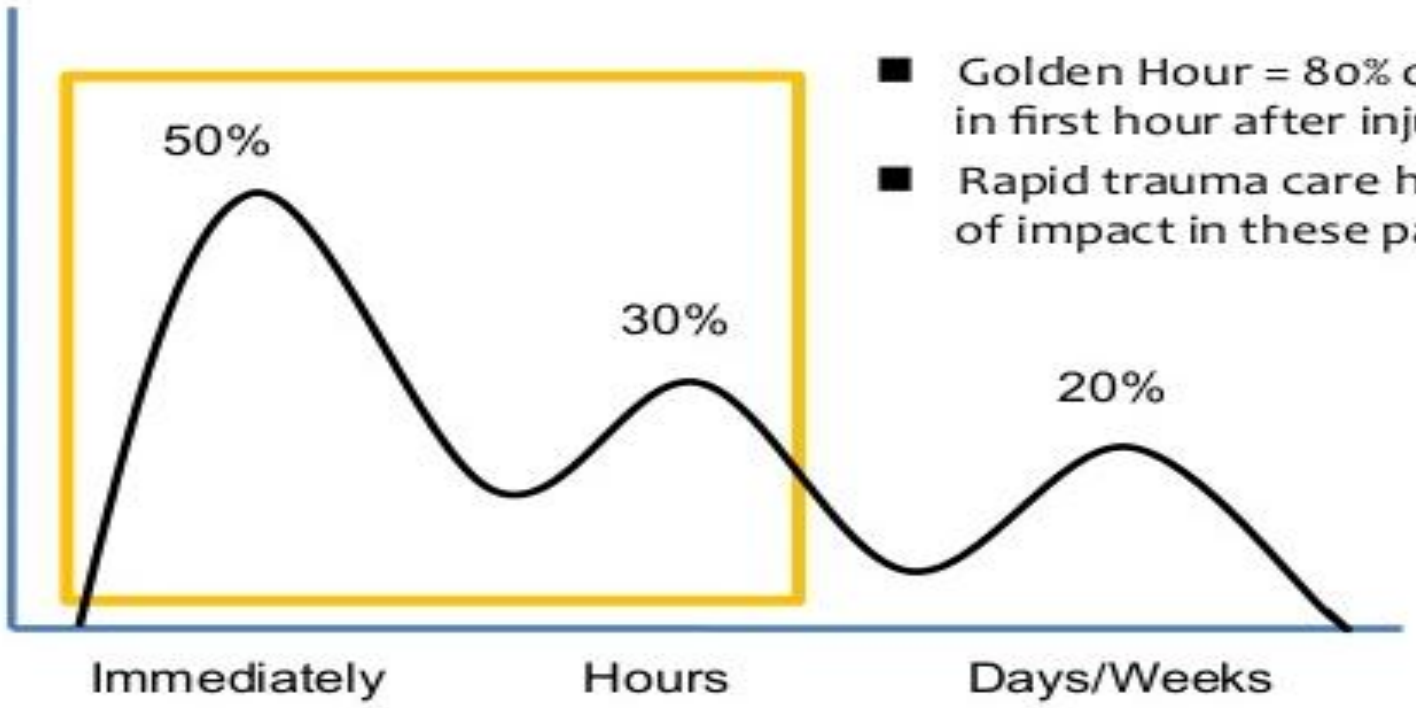
- “ There is a ‘golden hour’ if you are critically injured, you have less than 60 minutes to survive. You might not die right then, it may be three days or two weeks later. But something has happened in your body that is irreparable.”

- Golden hour >> Golden period

Why Trauma Patients Die

- Massive acute blood loss – 36%
- Severe injury to vital organs such as the brain – 30%
- Airway obstruction and acute ventilatory failure – 25%

Trimodal Distribution of Trauma Deaths



- Golden Hour = 80% of trauma deaths in first hour after injury
- Rapid trauma care has greatest level of impact in these patients

1. Ensure the Safety of the Prehospital care providers and the patient

- Scene safety >> highest priority on arrival on calls for medical assistance
- Patients and all medical providers
- Can be anticipated before at the scene – dispatch

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- Motor vehicle crash
  - Traffic, hazardous material, fires, fuel spill, downed power line

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- An incident involving a victim with a gunshot wound
  - The perpetrator may still be in the area
- Violent crime scene
  - Need law enforcement person
  - Only those with proper training should attempt to enter these scence

1. Ensure the Safety of the Prehospital care providers and the patient

- Standard precautions
  - Blood and body fluids >> transmitted infection; HIV, HBV
- Hazardous situations
- Rapid extrication

2. Assess the scene situation to determine the need for additional resource

- Quick assessment to determine the need for additional or specialized resources
  - Emergency Medical System
  - Fire suppression equipment
  - Special rescue teams
  - Power company personnel
  - Medical helicopters
  - Physicians

3. recognize the kinematics that produced the injuries

- Understanding the principles of kinematics >> better patients assessment
- Should not delay the initiation of patient assessment and care
- Patients and bystanders

Mechanism of Injury Criteria for Triage to Trauma center

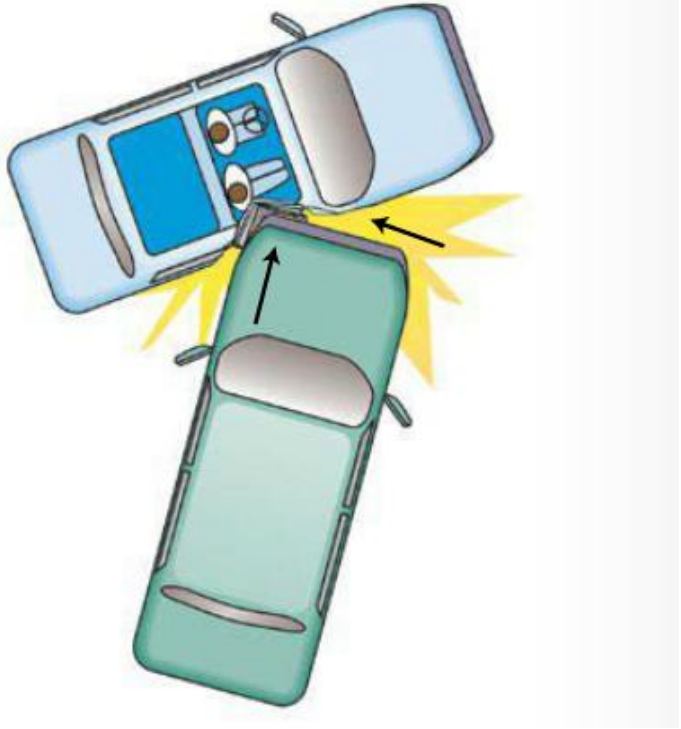
- Falls
  - Adult > 20 feet (6.1 meters)(1 story = 10 feet)
  - Children > 10 feet (3 m), or 2 or 3 times the child's height

- Motorcycle crash > 20 mph

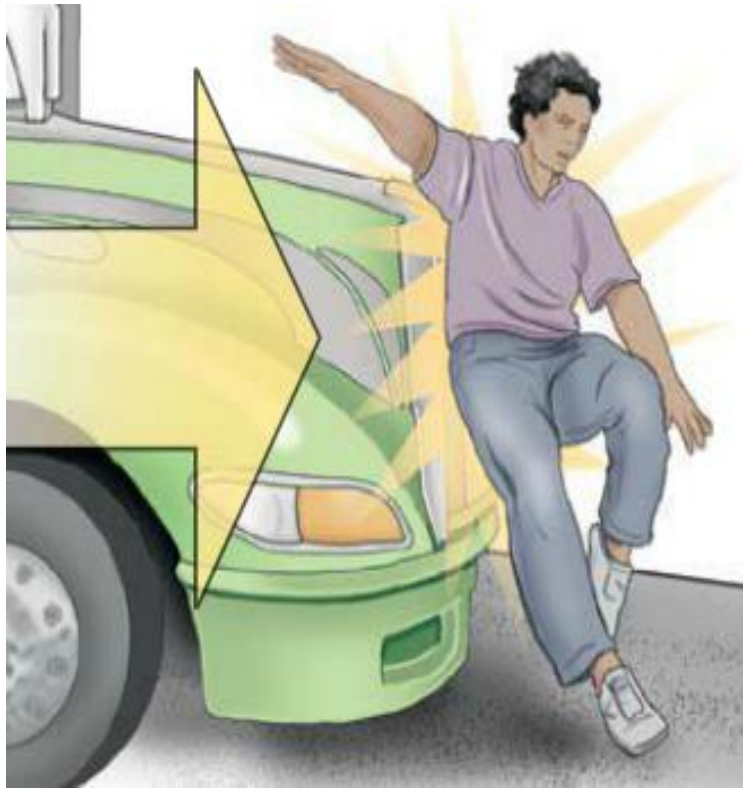
Mechanism of Injury Criteria for Triage to Trauma center

- High-risk auto crash
  - Intrusion, including roof
    - occupant site > 12 inches (0.3 m)
    - Any site > 18 inches (0.5 m)
  - Ejection : partial or complete
  - Death of the same passenger compartment
  - Vehicle telemetry data consistent with a high risk of injury
  - Vehicle versus pedestrian or bicyclist who is thrown, run over, or significant impacted

Mechanism of Injury Criteria for Triage to Trauma center



Intrusion of the side panel into the passenger compartment



Pedestrian hit by vehicle

4. Use the primary assessment to identify life-threatening conditions

- Adopted from ATLS
- Rapidly assess the life-threatening conditions
- Airway – Breathing – Circulation – Disability – Exposure/Environment

Critical or Potentially Critical Trauma patient

- Airway
  - Inadequate/obstruction
- Breathings
  - RR : too fast/ slow
  - Hypoxia : 02 sat < 95%
  - Dyspnea
  - Open pneumothorax
  - Flail chest
  - Suspected tension pneumothorax

Critical or Potentially Critical Trauma patient

- Circulation
  - Significant external hemorrhage
  - Suspected internal hemorrhage
  - Shock
- Disabillity
  - GCS < 13
  - Seizure activity
  - Sensory and motor deficit

Critical or Potentially Critical Trauma patient

- Penetrating trauma to head, neck, or torso, or proximal to the elbow and knee in the extremities
- Amputation or near-amputation proximal to the fingers or toes
- Any trauma in the presence of following
  - History of serious medical conditions
  - Age > 55 years
  - Children
  - Hypothermia
  - Burns
  - Pregnancy > 20 wks
  - Prehospital care provider judgment of high-risk conditions

5. Provide appropriate airway management while maintaining cervical spine stabilization as indicated

- Highest priority
- Essential skills of airway management
  - Suctioning
  - Open airway >> trauma jaw trust, trauma chin lift
  - Orophryngeal/ nasopharyngeal airway
- Supraglottic device
- ET tube intubation
- Cricothyroidotomy
- Manual-in-line

5. Provide appropriate airway management while maintaining cervical spine stabilization as indicated

- Endotracheal tube insertion >> controversy in prehospital setting
  - Unrecognized malpositioning
  - Insufficient performance of the procedure to maintain proficiency
  - No result in lower morbidity or mortality rate
  - Hyperventilation was common

Indications for endotracheal tube intubation

- GCS ≤ 8
  - Require for high concentrations of oxygen
  - Decrease RR
  - An expanding hematoma in the neck
  - Airway or pulmonary burn
  - Altered mental status that affects positing of the tongue

6. Support ventilation and delivery oxygen to maintain SpO2 > 95%

- Normal RR 12-20 tpm
- Trauma pts who need O2 supplement
  - Tachypnea/bradypnea
  - Obvious or suspected life-threatening condition
- Management
  - nonrebrething mask
  - Bag-mask device connect to the supplement of oxygen FiO2 > 0.85
  - Pulse oxymetry, ETCO2

7. Control any significant external hemorrhage

- Maintain a sufficient number of circulating RBCs
- No blood available in prehospital setting

- Management
  - Direct pressure
  - Tourniquet
  - Hemostatic agents

Attempted resuscitation will never be successful
In the presence of ongoing external bleeding

8. Provide basic shock therapy

- appropriately splinting musculoskeletal injuries
  - **Long spinal board**
    - splint virtually all fractures in an anatomical position
    - decrease internal hemorrhage

- Restore and maintaining normal body temperature

- The triad of death
  - Hypothermia
  - Acidosis
  - Coagulopathy

9. Maintain manual spine stabilization until the patient is immobilized

- Manual stabilization of cervical spine until
  - Immobilized on an appropriate device
  - Deem no to meet indications for spinal immobilization
- Involves head to pelvis
- Should not interfere ability to open mouth

9. Maintain manual spine stabilization until the patient is immobilized

- Indications for blunt injury
  - GCS < 15
  - Neck pain
  - a neurologic complaint
  - Spinal tenderness
  - An anatomical deformity
  - Motor or sensory deficit
  - Alcohol/drug intoxication
  - Significant distracting injury
  - Inability to communicate
- Indications for Penetrating injury
  - Spine-related neurologic complaint
  - Motor or sensory deficit

10. Initiate transport to the closest appropriate facility as soon as possible

- 2 things that cannot be provided in the prehospital setting
  - Blood
  - Control of internal hemorrhage

- Spend as little time on scene as possible

‘Limited scene intervention’

Not

‘Scoop-and-Run’

10. Initiate transport to the closest appropriate facility as soon as possible

- **Limited scene intervention**
  - Focusing on rapid assessment to identify life-threatening conditions
  - Performed interventions

- **'Platinum 10 minutes'**
  - Ideally within 10 minutes

- The closest hospital may not the appropriate receiving facility for many trauma pt.
  - Transport directly to trauma center in within a reasonable distance

11. Initiate warmed intravenous fluid replacement En Route to the receive facility

- Warmed intravenous crystalloid – 39 Ċ (102 F)
  - Prevent hypothermia
- 2 large bore IV catheter
- Aim to keep
  - MAP 60-65 mmHg, SBP 80-90 mmHg
  - In traumatic brain injury >> keep SBP ≥ 90 mmHg

12. Secondary assessment

- When life-threatening problem have been satisfactorily manage
- Only if time permits

- History : SAMPLE
  - Symptoms
  - Allergy
  - Medications
  - Past history/pregnancy
  - Last meal
  - Events
- Physical Examination >> head to toe

13. Provide adequate pain relief

- It is appropriate to provide analgesics to relieve pain
- Contraindication >> hypotension
- Mask the symptoms
- Impair the ability of trauma team to adequately assess

14. Providing thorough and accurate communication regarding the patient and the circumstances of the injury to the receiving facility

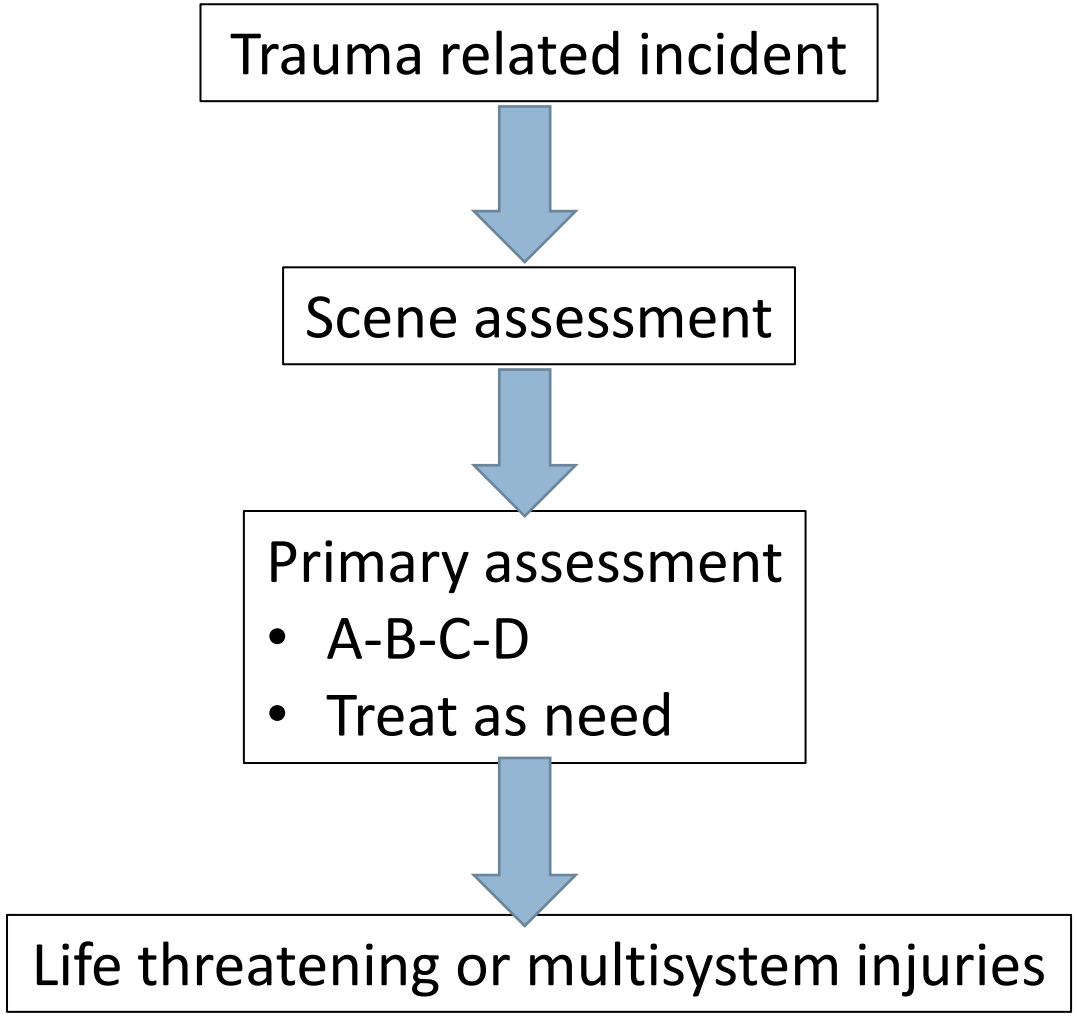
- 3 components
  - Pre-arrival warning
  - Verbal report upon arrival
  - Patient Care Report (CPR)

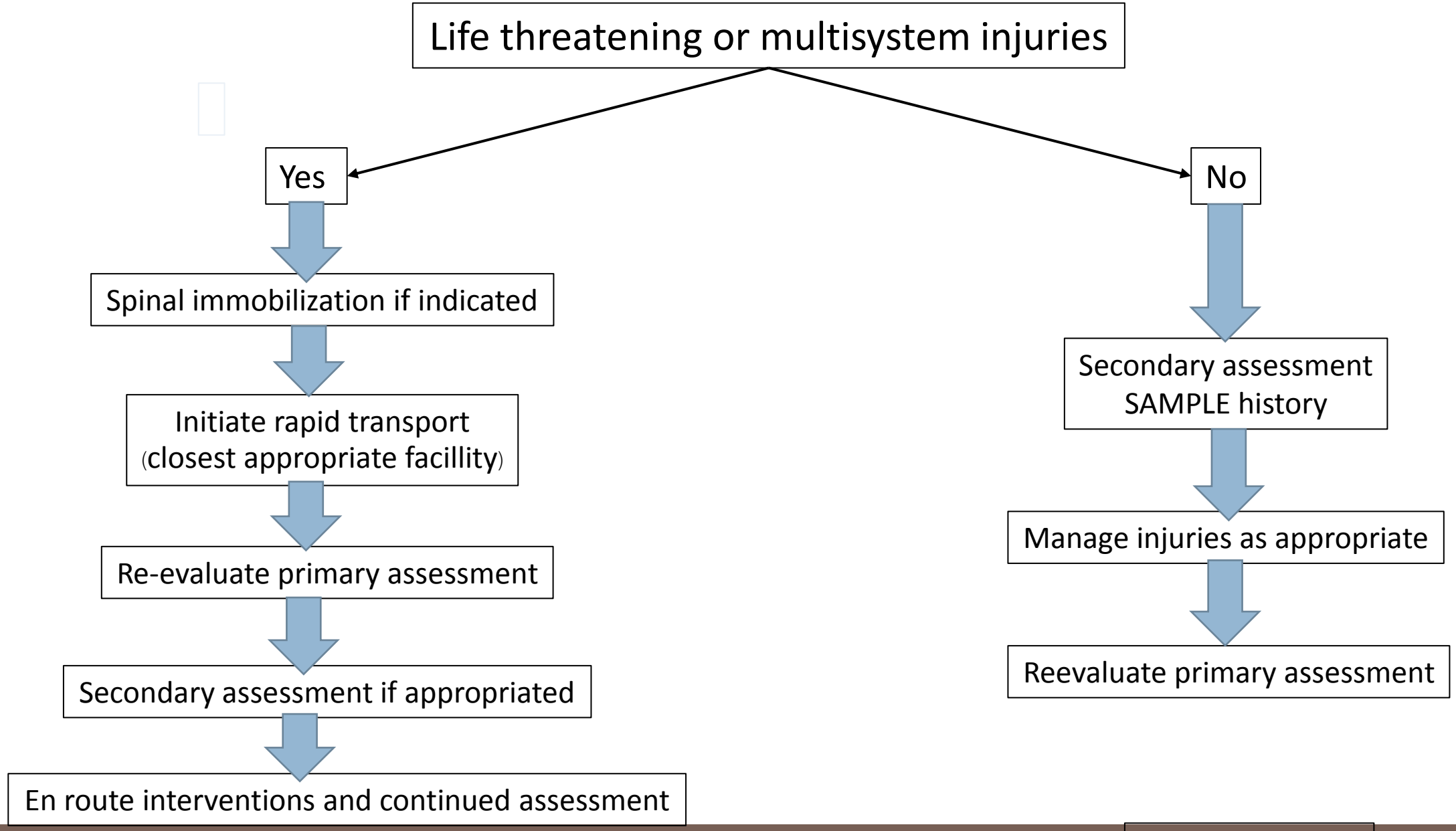
- The patient' s presenting conditions
- Kinematics of the injury
- Assessment findings
- Intervention performed
- The patient's response to those interventions

15. Above all, do no further harm

- What can prehospital care providers do for critically-injured trauma patient ? Benefit to patient ?
  - If uncertain >> withheld the intervention and transport pt. to the closest appropriated facility

- Financial harm
  - New drugs/interventions VS existing treatments


Trauma related incident
Scene assessment
Primary assessment
• A-B-C-D
• Treat as need
Life threatening or multisystem injuries


Life threatening or multisystem injuries
Yes
No
Spinal immobilization if indicated
Initiate rapid transport
(closest appropriate facillity)
Re-evaluate primary assessment
Secondary assessment if appropriated
En route interventions and continued assessment
Secondary assessment
SAMPLE history
Manage injuries as appropriate
Reevaluate primary assessment
Initiate transport

The Fundamental Principles

- Rapid Assessment
- Key field interventions
- Rapid transport to the closest appropriated facility

Reference

- PHTLS : Prehospital Trauma Life Support, 8th edition

Thank you for your attentions