Advanced Trauma Life Support (ATLS) and Damage Control Surgery (DCS)

Department of thoracic and cardiovascular surgery

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Golden hour

First peak

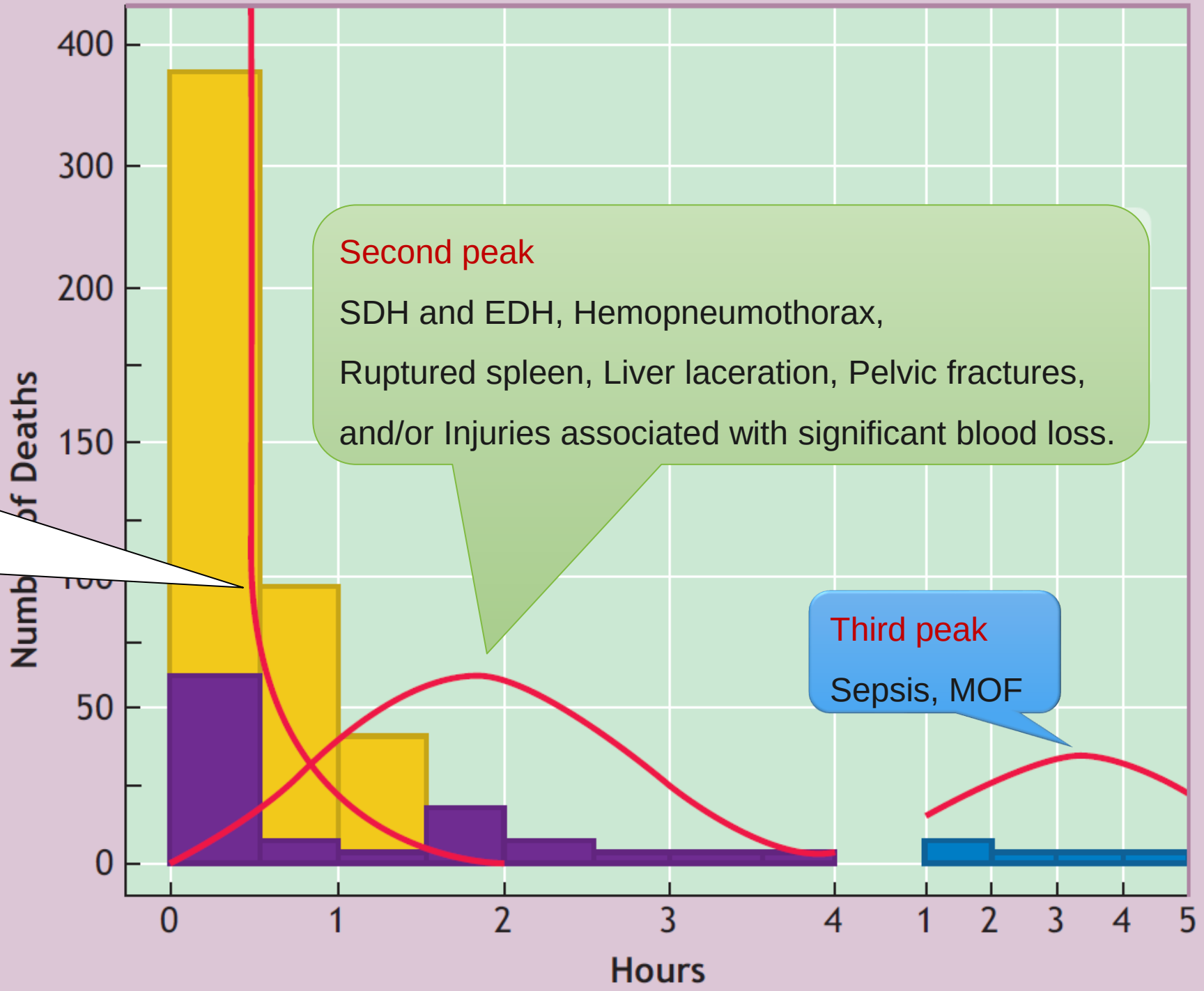
Severe brain,

High spinal cord injury,

Rupture of the heart, aorta,

large blood vessels

TRIMODAL DEATH DISTRIBUTION

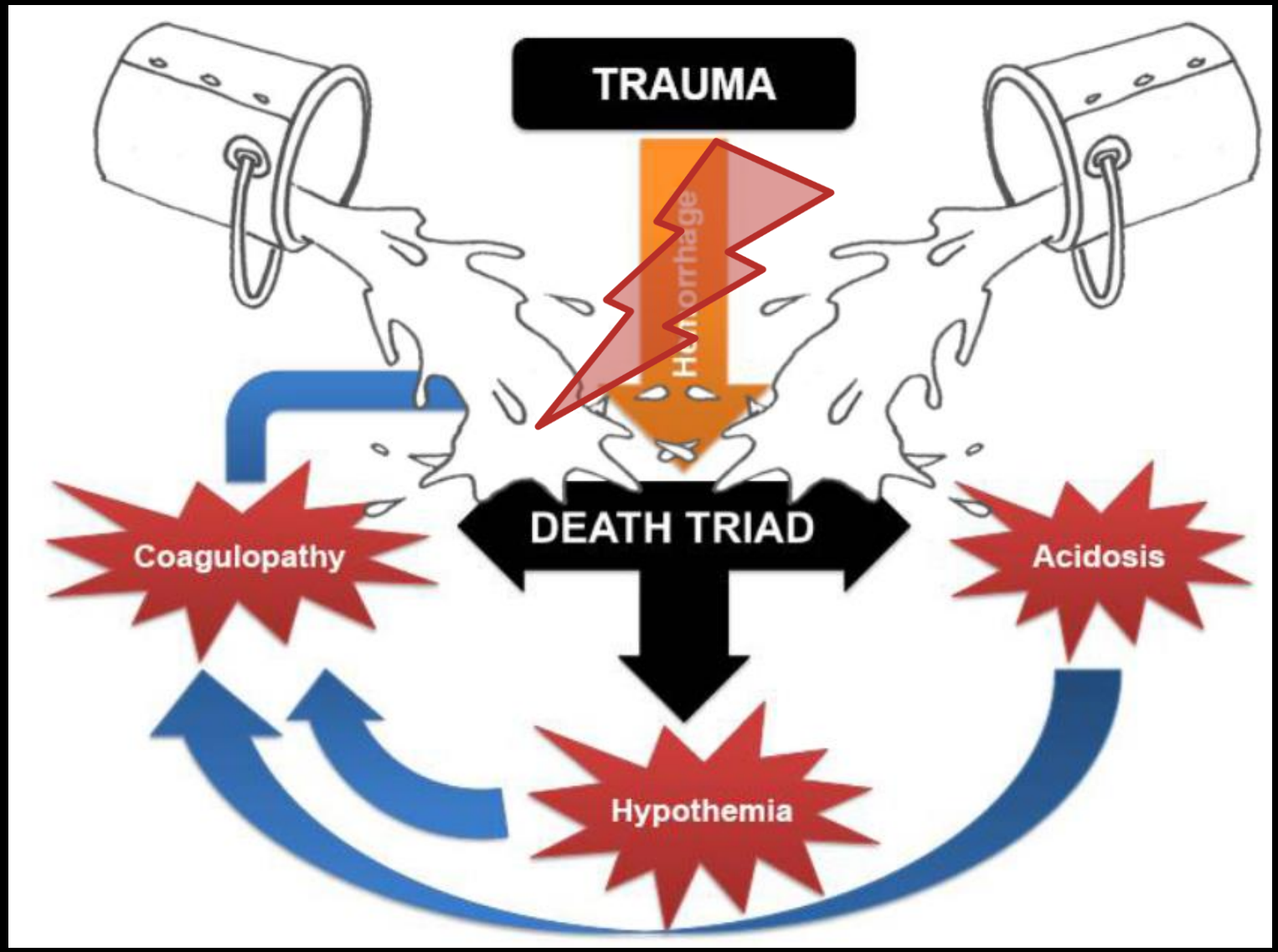


Deadly Trauma Triad

- Hypothermia
- Coagulopathy
- Acidosis

❖ Prevent the lethal triad

➔Damage Control Surgery

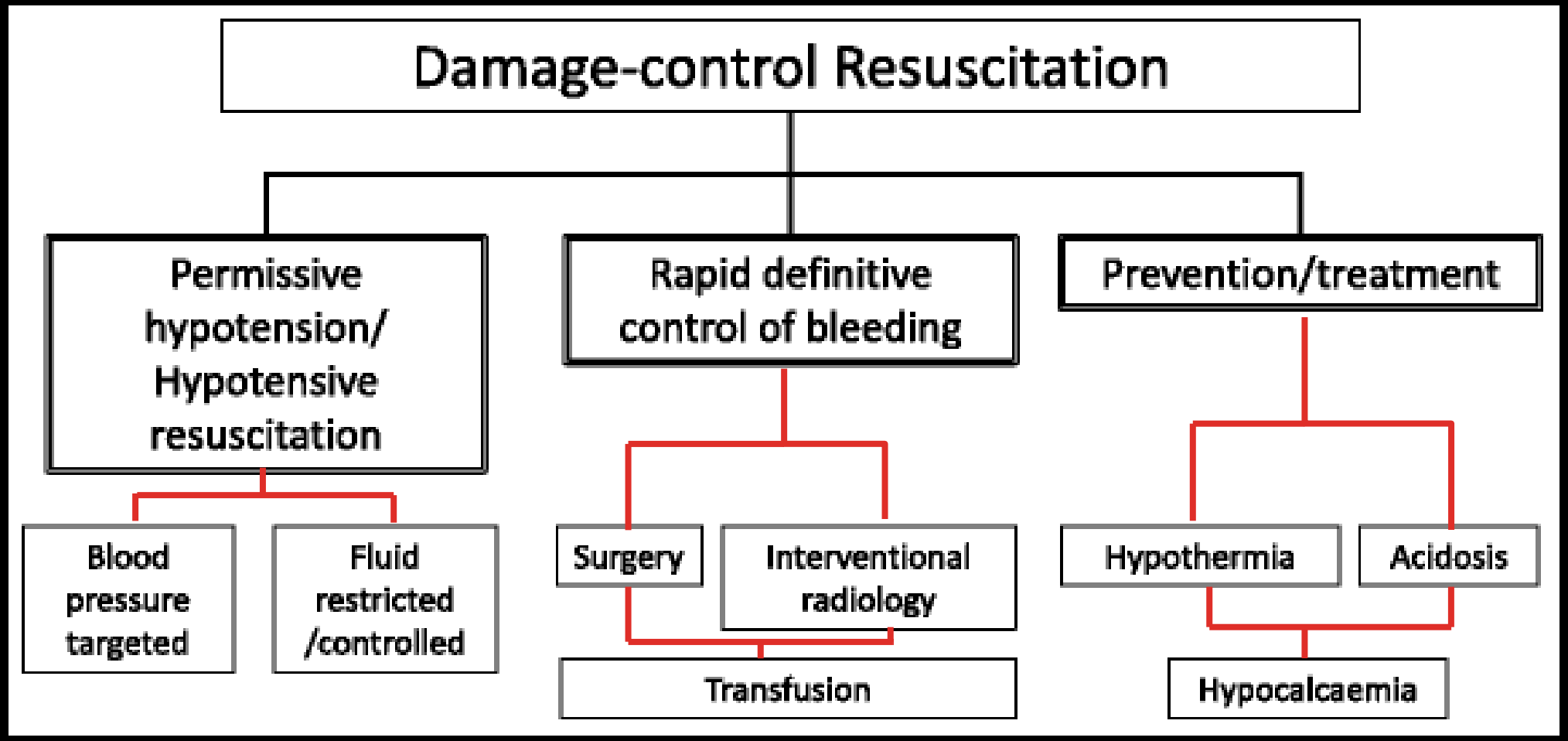


STOP THE BLEEDING

- **S creen** for patients at risk of bleeding / coagulopathy
  - Discover all major bleeding sources fast, screen for coagulopathy, assess trauma load
- **T reat** bleeding/ coagulopathy as soon as possible
  - Operate relevant bleeding sources, treat coagulopathy
- **O bserve** response to interventions
  - Did it work?, Reevaluate continuously
- **P revent** secondary bleeding/ coagulopathy
  - Damage control approach, rewarming, resuscitation, no delay

DAMAGE CONTROL RESUSCITATION (DCR)

*Kudo D, et al. Journal of Intensive Care*2017**5**:11



FIRST, BEFORE DCR

- Advance planning for the arrival of trauma patients
- Patients are assessed, and their treatment priorities are established, based on their injuries, vital signs, and the injury mechanisms.
- Primary survey with simultaneous resuscitation of vital functions
- More detailed secondary survey

ATLS

- The initiation of definitive care
- Damage control surgery on thoracic injury

BLS

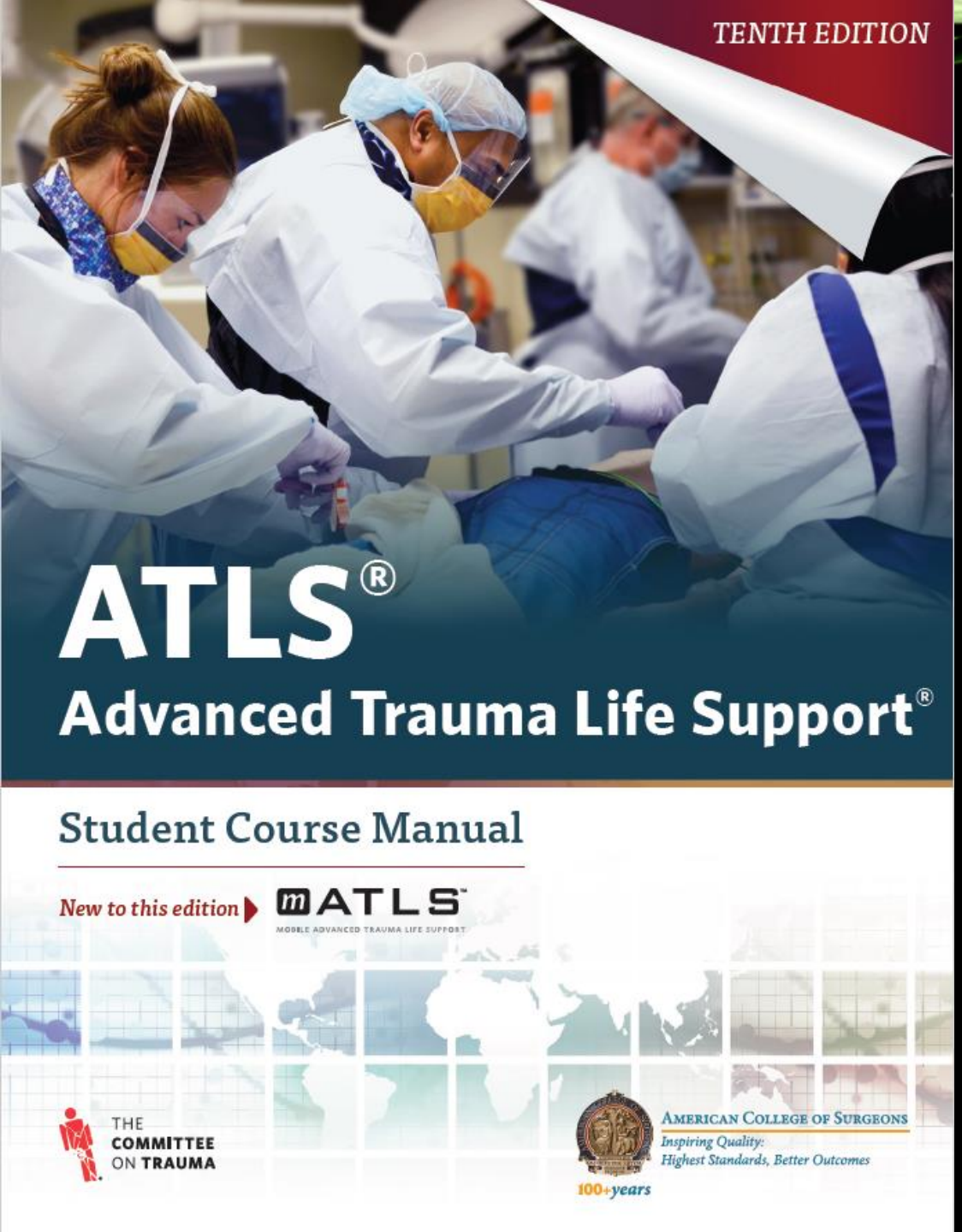
Basic Life Support

ACLS

Advanced Cardiovascular Life Support

ATLS

ADVANCED TRAUMA LIFE SUPPORT



ATLS

- First, In 1978
- 1980, American College of Surgeons

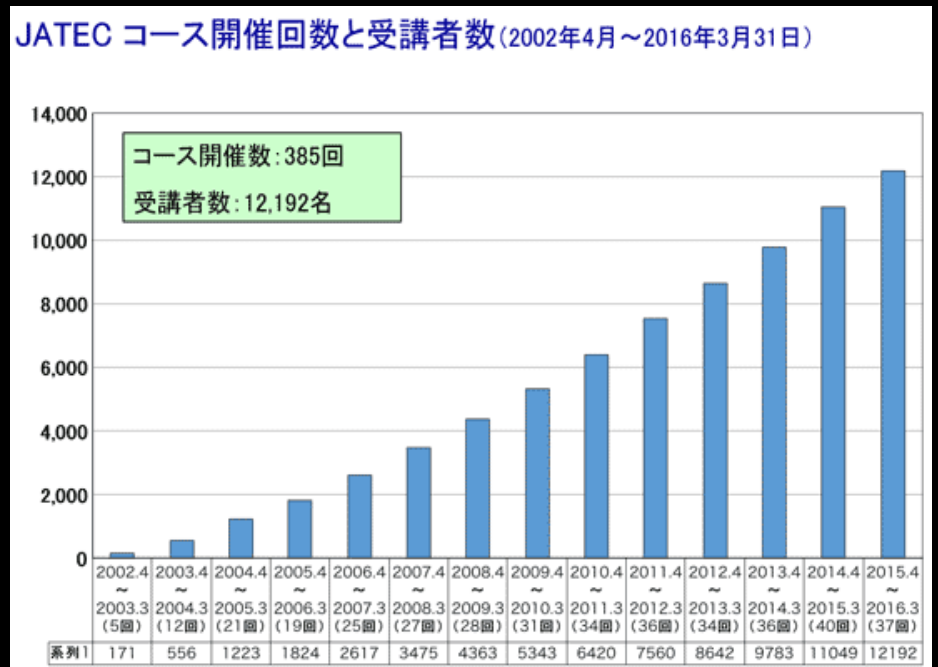
➔ ATLS has been accepted, 78 countries

- Standard protocol for injured patient
- In England:

➔ Advanced for multidisciplinary approach

JATEC

- 일본 구급의학회 및 외상학회
- First course, in 2002, Now, over 14000 doctors
- Residents: associated with trauma care



IN SOUTH KOREA

- BLS, ACLS ➔ 병원 인증평가
- KTAT (Korean Trauma Assessment and Treatment)

  ➔ 대한응급의학회, 대한외상학회 + 대한외상소생협회
- First, 2011, Total 27 times (2019)
- Obligation for only trauma surgeon, not residents
- Previously, emergency medicine resident
- Management for trauma patient ➔ Primary and secondary survey

FIRST, BEFORE DCR

- Advance planning for the arrival of trauma patients
- Patients are assessed, and their treatment priorities are established, based on their injuries, vital signs, and the injury mechanisms.
- Primary survey with simultaneous resuscitation of vital functions
- More detailed secondary survey

ATLS

- The initiation of definitive care
- Damage control surgery on thoracic injury

DCS

DAMAGE CONTROL SURGERY

ATLS - Primary survey

WHEN TREATING INJURED PATIENTS

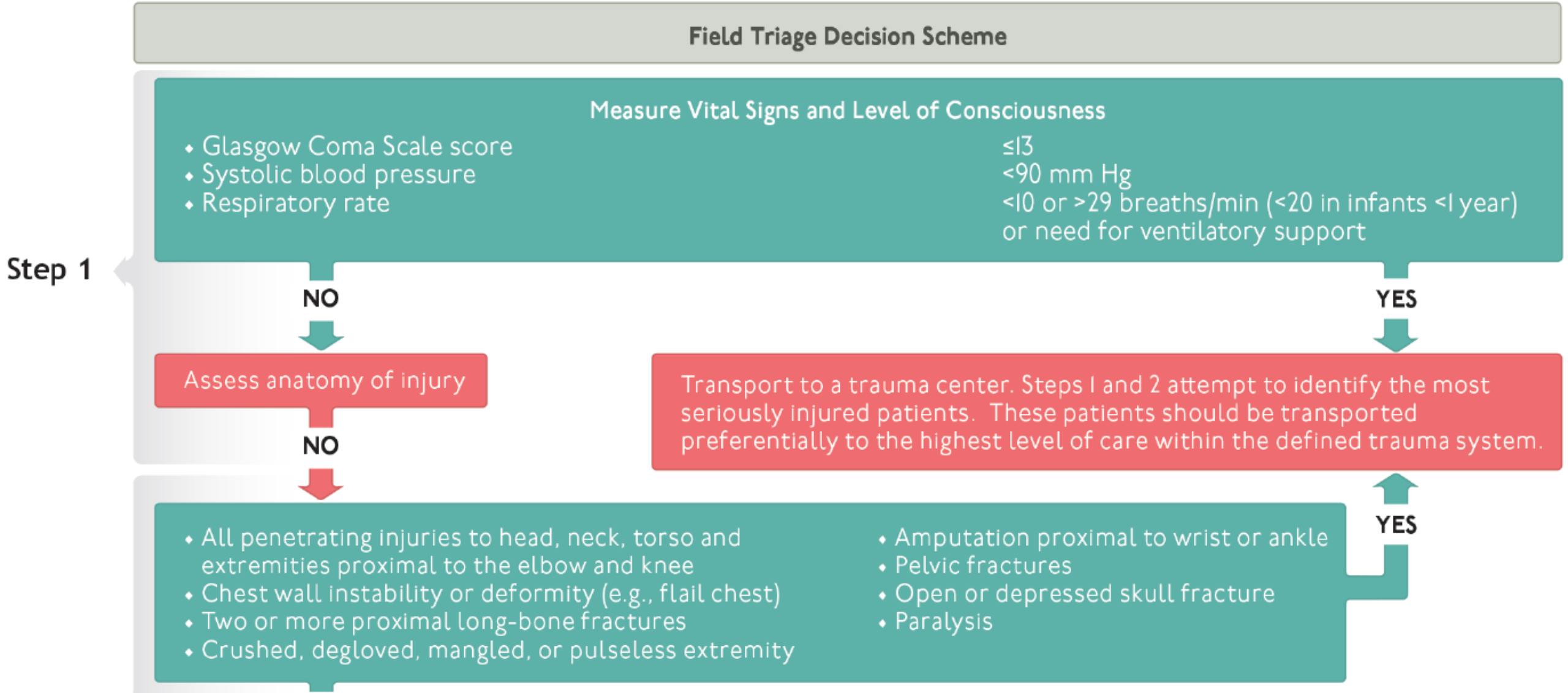
- Preparation
- Triage
- **Primary survey (ABCDEs) with immediate resuscitation** of patients with life-threatening injuries
- Adjuncts to the primary survey and resuscitation
- Consideration of the need for patient transfer
- **Secondary survey (head-to-toe evaluation and patient history)**
- Adjuncts to the secondary survey
- Continued post-resuscitation monitoring and reevaluation
- Definitive care

PREPARATION

■ **FIGURE 1-1 Prehospital Phase.** During the prehospital phase, personnel emphasize airway maintenance, control of external bleeding and shock, immobilization of the patient, and immediate transport to the closest appropriate facility, preferably a verified trauma center.

■ **FIGURE 1-3** Trauma team members are trained to use standard precautions, including face mask, eye protection, water-impervious gown, and gloves, when coming into contact with body fluids.

TRIAGE


Field Triage Decision Scheme
Step 1
Measure Vital Signs and Level of Consciousness
Glasgow Coma Scale score ≤13
Systolic blood pressure <90 mm Hg
Respiratory rate <10 or >29 breaths/min (<20 in infants <1 year) or need for ventilatory support
NO
YES
Assess anatomy of injury
NO
Transport to a trauma center. Steps 1 and 2 attempt to identify the most seriously injured patients. These patients should be transported preferentially to the highest level of care within the defined trauma system.
YES
All penetrating injuries to head, neck, torso and extremities proximal to the elbow and knee
Chest wall instability or deformity (e.g., flail chest)
Two or more proximal long-bone fractures
Crushed, degloved, mangled, or pulseless extremity
Amputation proximal to wrist or ankle
Pelvic fractures
Open or depressed skull fracture
Paralysis

- Chest wall instability or deformity (e.g., flail chest)
- Two or more proximal long-bone fractures
- Crushed, degloved, mangled, or pulseless extremity

- Open or depressed skull fracture
- Paralysis

Step 2

NO

Assess mechanism of injury and evidence of high-energy impact

Transport to a trauma center; depending upon the defined trauma system, does not need to be the highest level trauma center.

YES

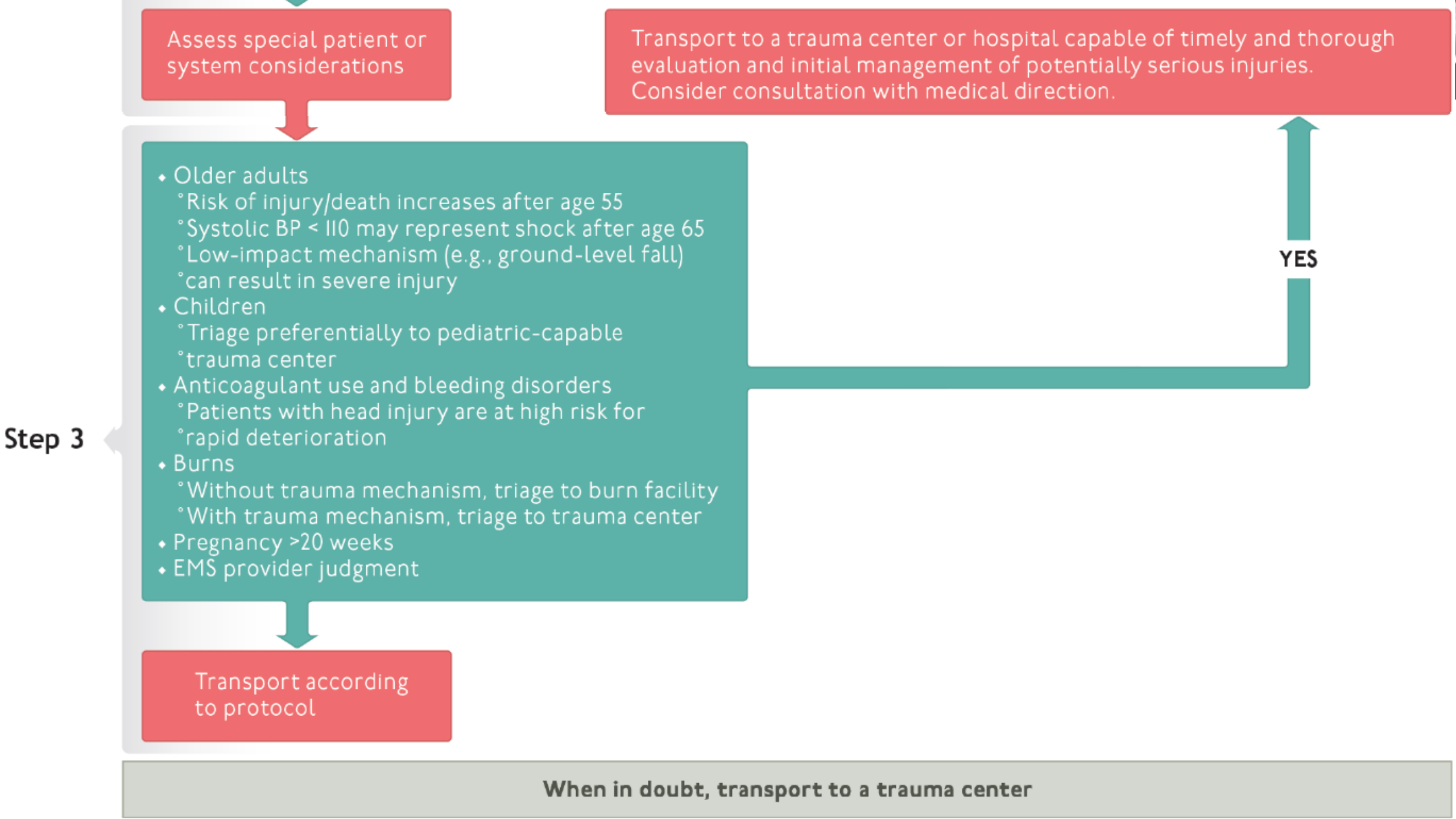
Step 3

- Falls
  - Adults > 20 feet or 6 meters (2 stories)
  - Children > 10 feet or 3 meters (2-3 x height of child)
- High-risk motor vehicle crash
  - Intrusion, including roof: > 12 inches (30 cm) occupant side;
  - > 18 inches (45 cm) any side
  - Ejection (partial or complete) from vehicle
  - Death in same passenger compartment
  - Vehicle telemetry data consistent with high risk of injury
- Auto vs. pedestrian/bicyclist thrown, run over, or with significant (> 20 mph; 32 kph) impact
- Motorcycle crash >20 mph

NO

Assess special patient or system considerations

Transport to a trauma center or hospital capable of timely and thorough evaluation and initial management of potentially serious injuries. Consider consultation with medical direction.


Assess special patient or system considerations
Transport to a trauma center or hospital capable of timely and thorough evaluation and initial management of potentially serious injuries. Consider consultation with medical direction.
YES
• Older adults
° Risk of injury/death increases after age 55
° Systolic BP < 110 may represent shock after age 65
° Low-impact mechanism (e.g., ground-level fall)
° can result in severe injury
• Children
° Triage preferentially to pediatric-capable
° trauma center
• Anticoagulant use and bleeding disorders
° Patients with head injury are at high risk for
° rapid deterioration
• Burns
° Without trauma mechanism, triage to burn facility
° With trauma mechanism, triage to trauma center
• Pregnancy >20 weeks
• EMS provider judgment
Step 3
Transport according to protocol
When in doubt, transport to a trauma center

INITIAL ASSESSMENT AND MANAGEMENT

Immediately life threatening injuries

Potentially life threatening injuries

THE PRIMARY AND SECONDARY SURVEYS ARE REPEATED FREQUENTLY TO IDENTIFY ANY CHANGE IN THE PATIENT'S STATUS THAT INDICATES THE NEED FOR ADDITIONAL INTERVENTION.

PRINCIPLE

THE PATIENT'S VITAL FUNCTIONS MUST BE ASSESSED QUICKLY AND EFFICIENTLY.

MANAGEMENT CONSISTS OF A RAPID PRIMARY SURVEY WITH SIMULTANEOUS RESUSCITATION OF VITAL FUNCTIONS, A MORE DETAILED SECONDARY SURVEY, AND THE INITIATION OF DEFINITIVE CARE

QUESTION 1, ON TRAUMA BAY

- 50/M, Driver TA
- On Scene: SOL (+), Upon arrival: SOL (-)
- CPR time: (7) minutes
- **Next step ??? What should you do for patient on trauma bay?**

- Signs of Life

- Respiratory or Motor effort
- Electrical activity
- Pupillary activity

JUST 10 SECONDS (ABCD)

Clinicians can quickly assess A, B, C, and D in a trauma patient by identifying themselves, asking the patient for his or her name, and asking what happened.

- **A** irway maintenance with restriction of cervical spine motion
- **B** reathing and ventilation
- **C** irculation with hemorrhage control
- **D** isability(assessment of neurologic status)
- **E** xposure/Environmental control

AIRWAY AND CERVICAL IMMOBILIZATION

- Airway maintenance

  - suctioning to clear acc

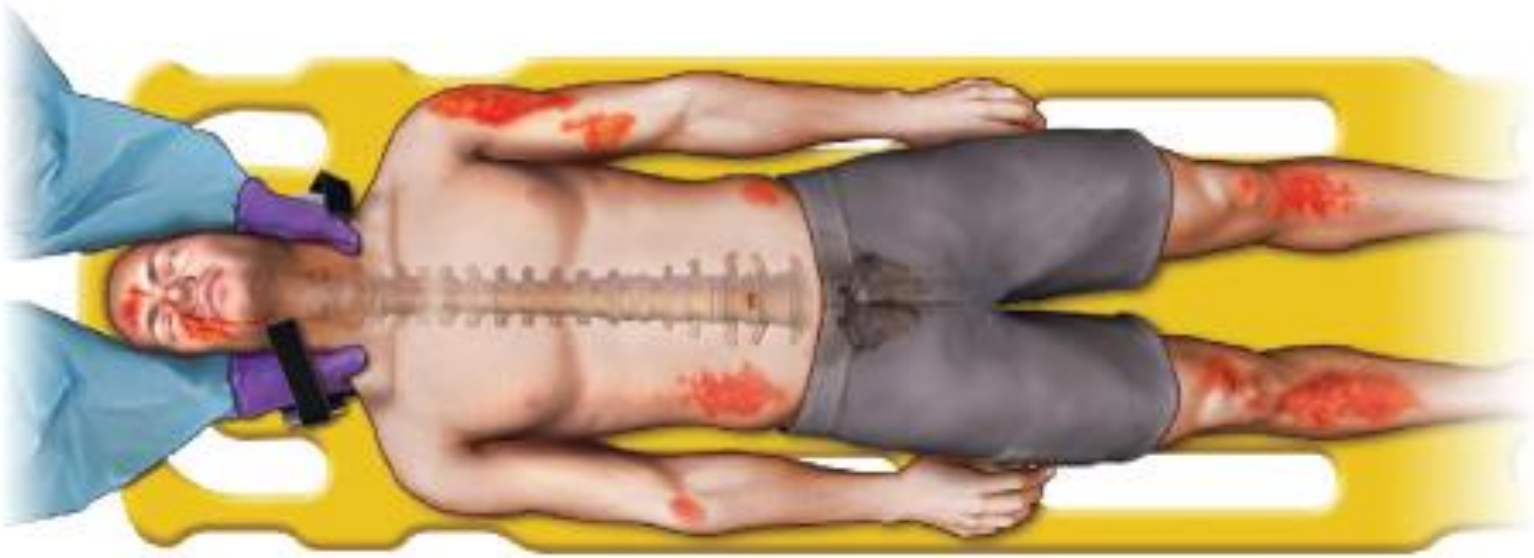
  - **GCS ≤ 8** : placement o

  ➔ Establish a definitive

- While assessing and ma

  ➔ take great care to **pr**

  - if intubation cannot be



■ FIGURE 1-4 Cervical spine motion restriction technique. When the cervical collar is removed, a member of the trauma team manually stabilizes the patient's head and neck.

AIRWAY AND CERVICAL IMMOBILIZATION

- Airway maintenance

  - suctioning to clear accumulated blood or secretions

  - **GCS ≤ 8** : placement of a definitive airway

  ➔ Establish a definitive airway if there is any doubt

- While assessing and managing a patient's airway,

  ➔ take great care to **prevent excessive movement of the cervical spine**

  - if intubation cannot be accomplished➔ Establish an **airway surgically**

TEMPORARILY RELEASING THE CERVICAL COLLAR

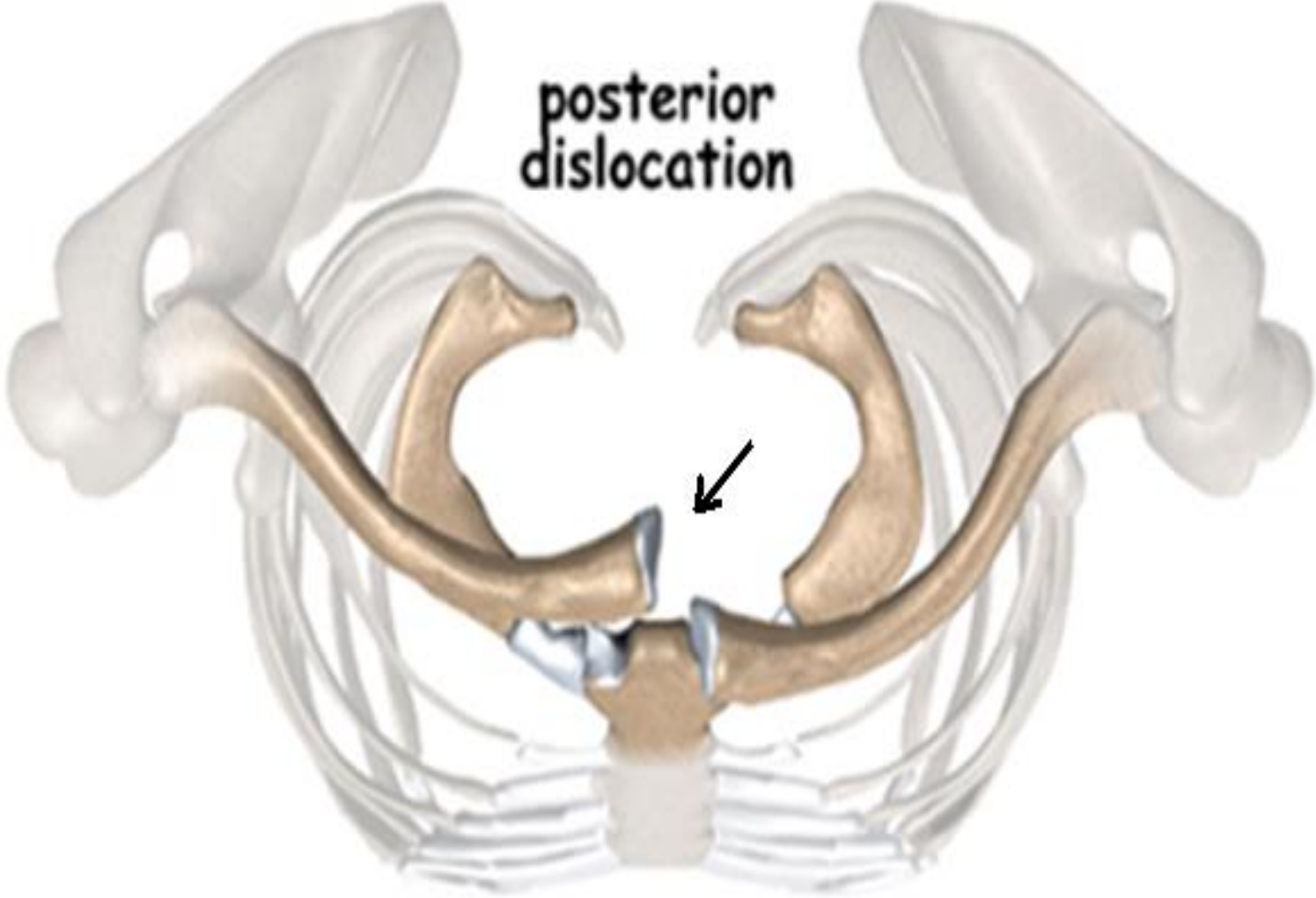
BREATHING AND VENTILATION

- Auscultation/ Visual inspection/ Palpation/ Percussion
- To adequately assess jugular venous distention, position of the trachea, and chest wall excursion, expose the patient's neck and chest.
- **Detect injuries**: Tension pneumothorax/ Massive hemothorax/ Open pneumothorax/ Trachea injury/ Flail chest c severe lung contusion/ Tamponade
- **A simple pneumothorax** can be converted to a **tension pneumothorax** when a patient is intubated and positive pressure ventilation is provided before decompressing the pneumothorax with a chest tube.

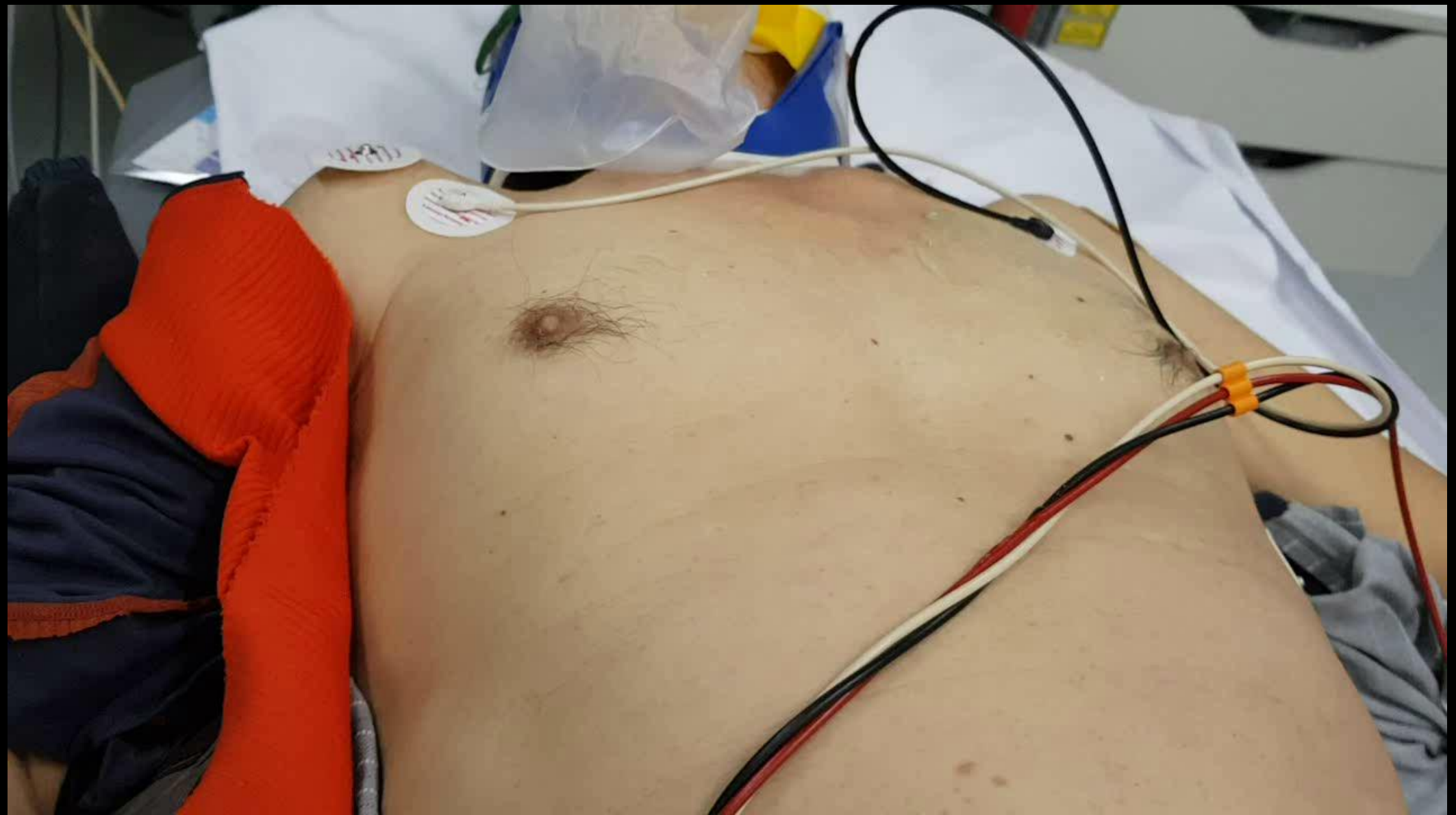
OPEN PNEUMOTHORAX

STRIDOR, MARKED CHANGE OF VOICE

- Driver TA



LT. FLAIL CHEST C PARADOXICAL MOVEMENT



CIRCULATION WITH HEMORRHAGIC CONTROL

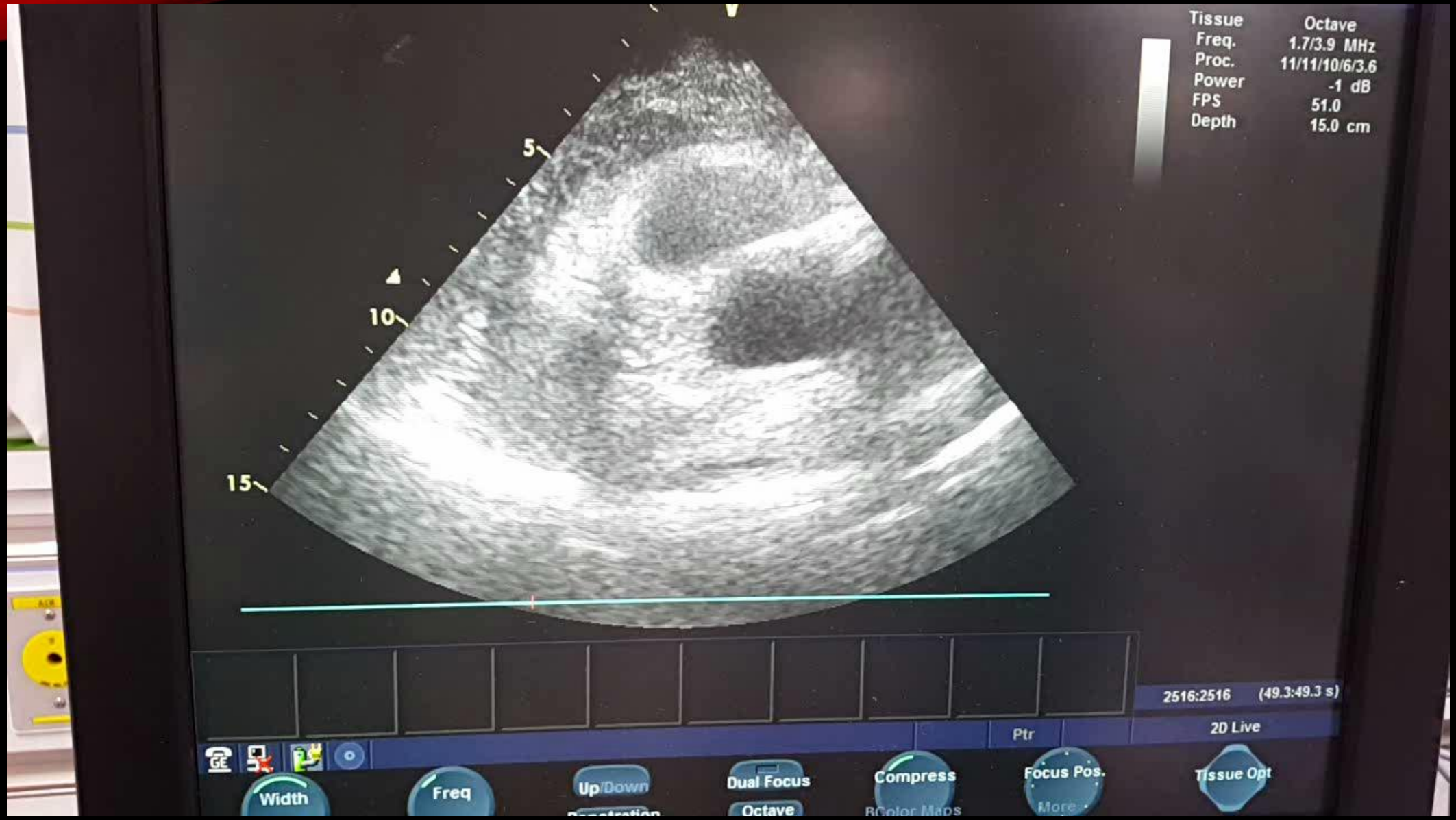
- Once **tension pneumothorax has been excluded** as a cause of shock,

➔ consider that hypotension is due to **blood loss** until proven otherwise

- **Blood Volume and Cardiac Output**: Level of consciousness, skin, pulse etc
- **Bleeding**: Direct manual pressure, Tourniquets for extremity for selected patient, Application of a pelvic stabilizing device, **large-bore peripheral venous catheters**, tranexamic acid(within 3 hours of ibnjury), **definitive control of hemorrhage** etc.
- All IV solutions should be **warmed**, a bolus of 1 L of an isotonic solution

➔ unresponsive to initial crystalloid therapy, **a blood transfusion**

CARDIAC TAMPONADE



DISABILITY (NEUROLOGIC EVALUATION)

- Patient's level of consciousness and pupillary size and reaction
- GCS
- **Drug or alcohol intoxication** can accompany **traumatic brain injury**
- **Prevention of secondary brain injury** by maintaining adequate oxygenation and perfusion
- Patients with evidence of brain injury

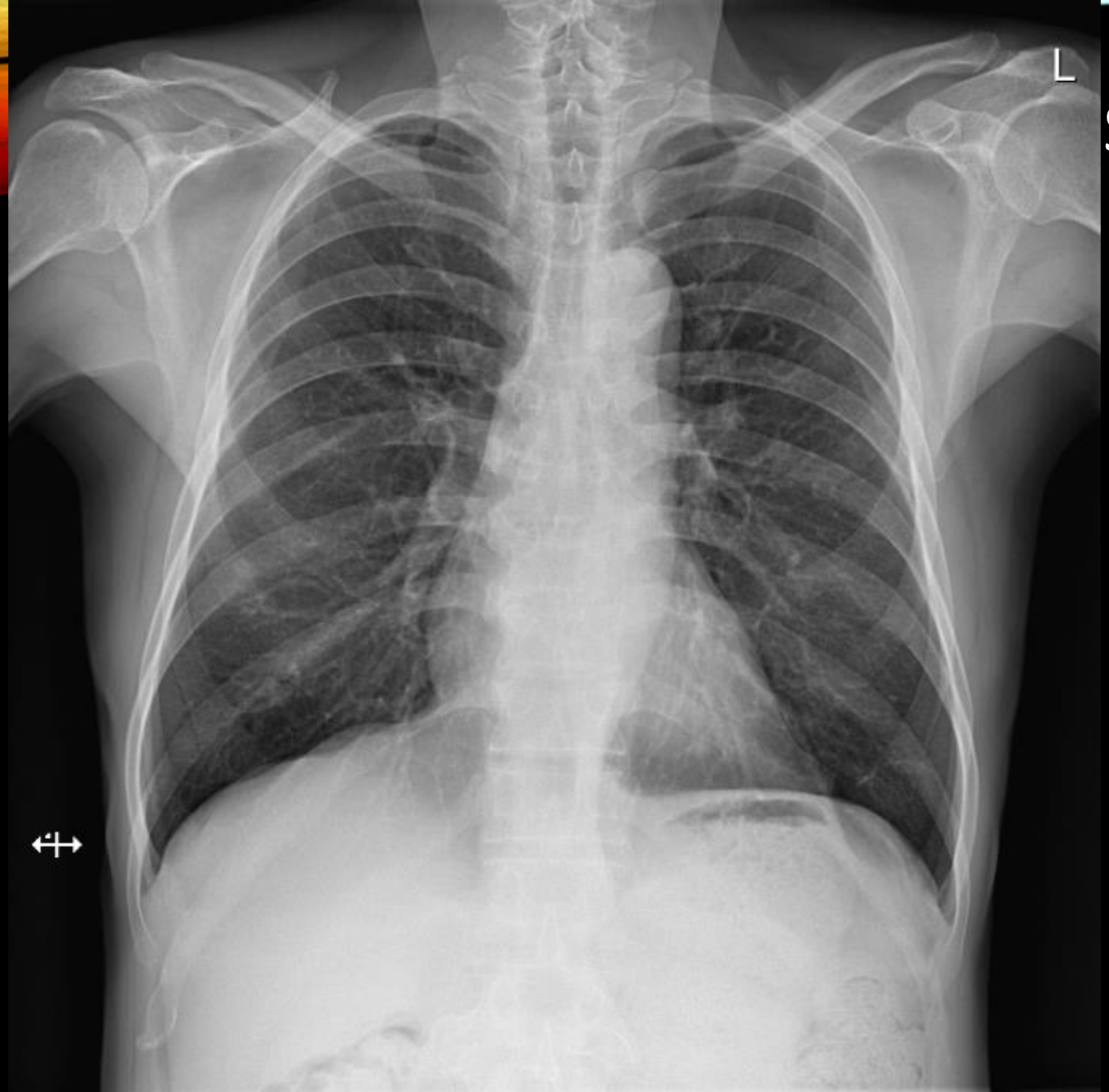
➔ Neurosurgeon contact, not available -> transfer

EXPOSURE AND ENVIRONMENTAL CONTROL

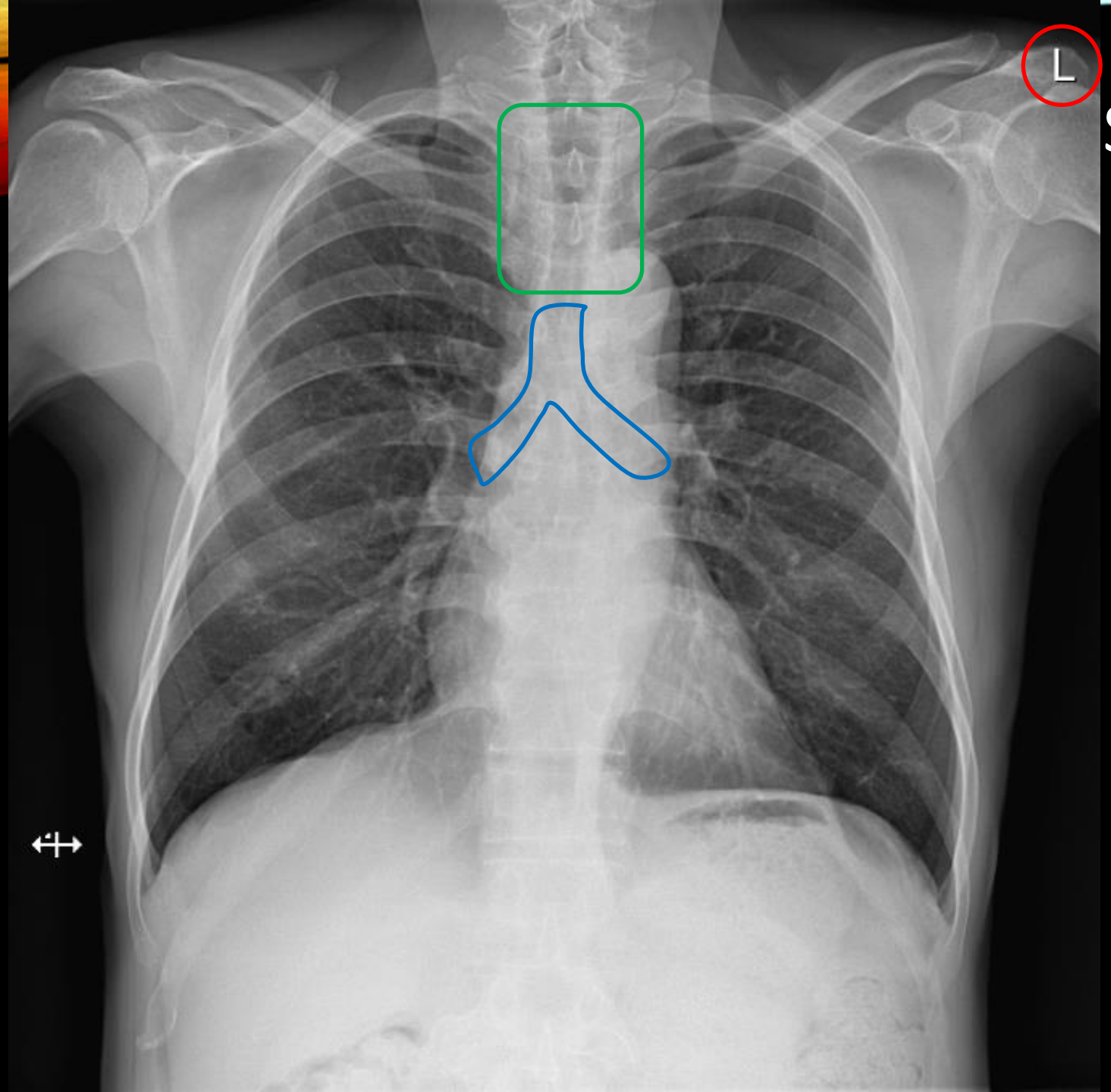
- **Completely undress** the patient, usually by cutting off
- After completing the assessment, cover the patient with **warm blankets**
- **Hypothermia** is a potentially lethal complication in injured patients
- A high-flow fluid warmer to heat crystalloid fluids to **39°C** is recommended.
- **A microwave** can be used to warm crystalloid fluids, but it should never be used to warm blood products.

DURING THE PRIMARY SURVEY

- ECG monitoring
- Pulse oximetry
- Ventilatory Rate, Capnography, and Arterial Blood Gases
- Urinary and gastric catheters
- Trauma series (**X-ray; Chest AP, Pelvis AP**, **C-spine lateral**)
- FAST (focused assessment with sonography for trauma). Extended FAST
- Surgical consultation/ Patient transfer (not to delay transfer)



Systemic approach



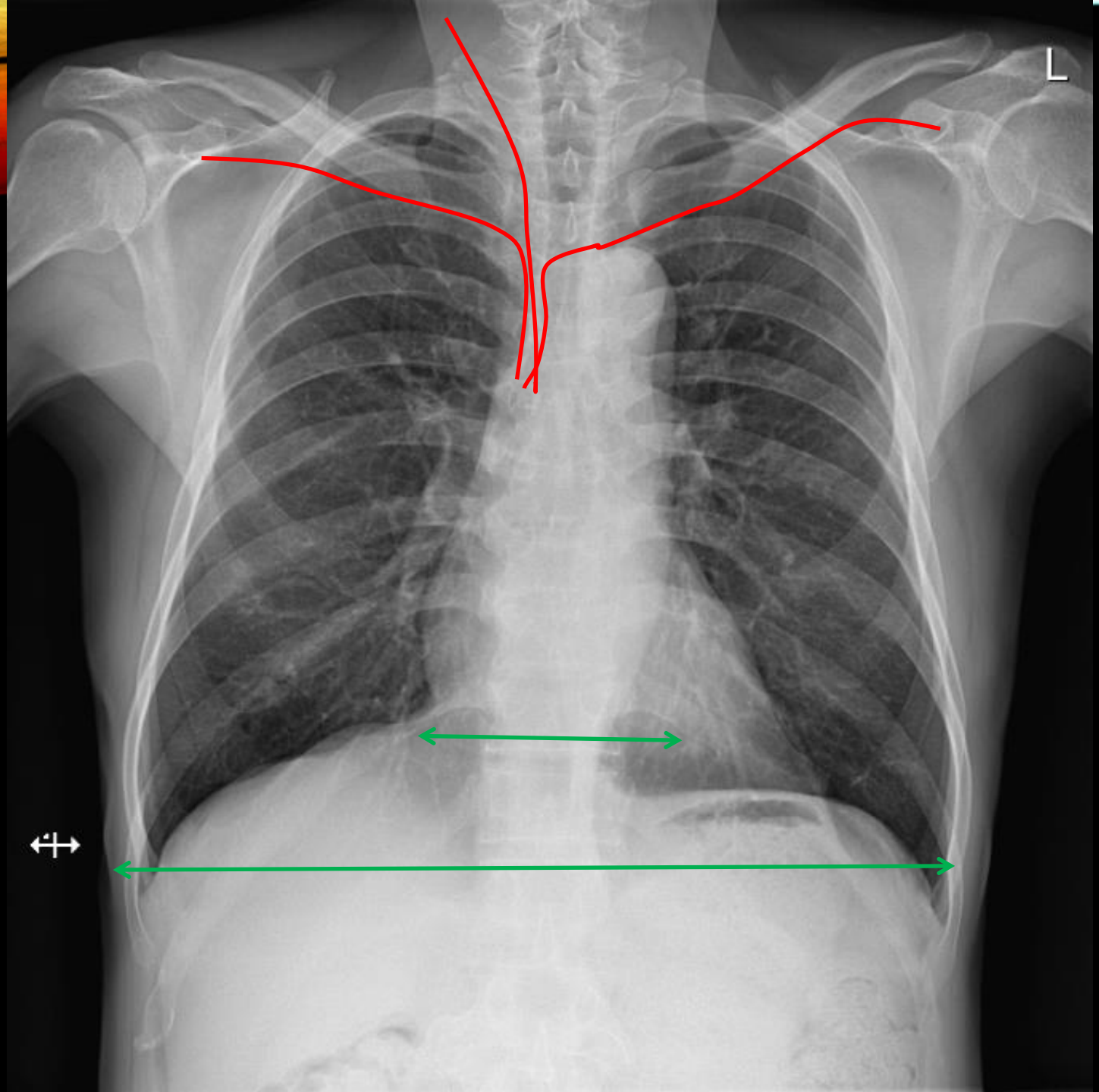
Systemic approach

Pt. name/Marker

Clavicle equidistant from spinous processes of thoracic spine

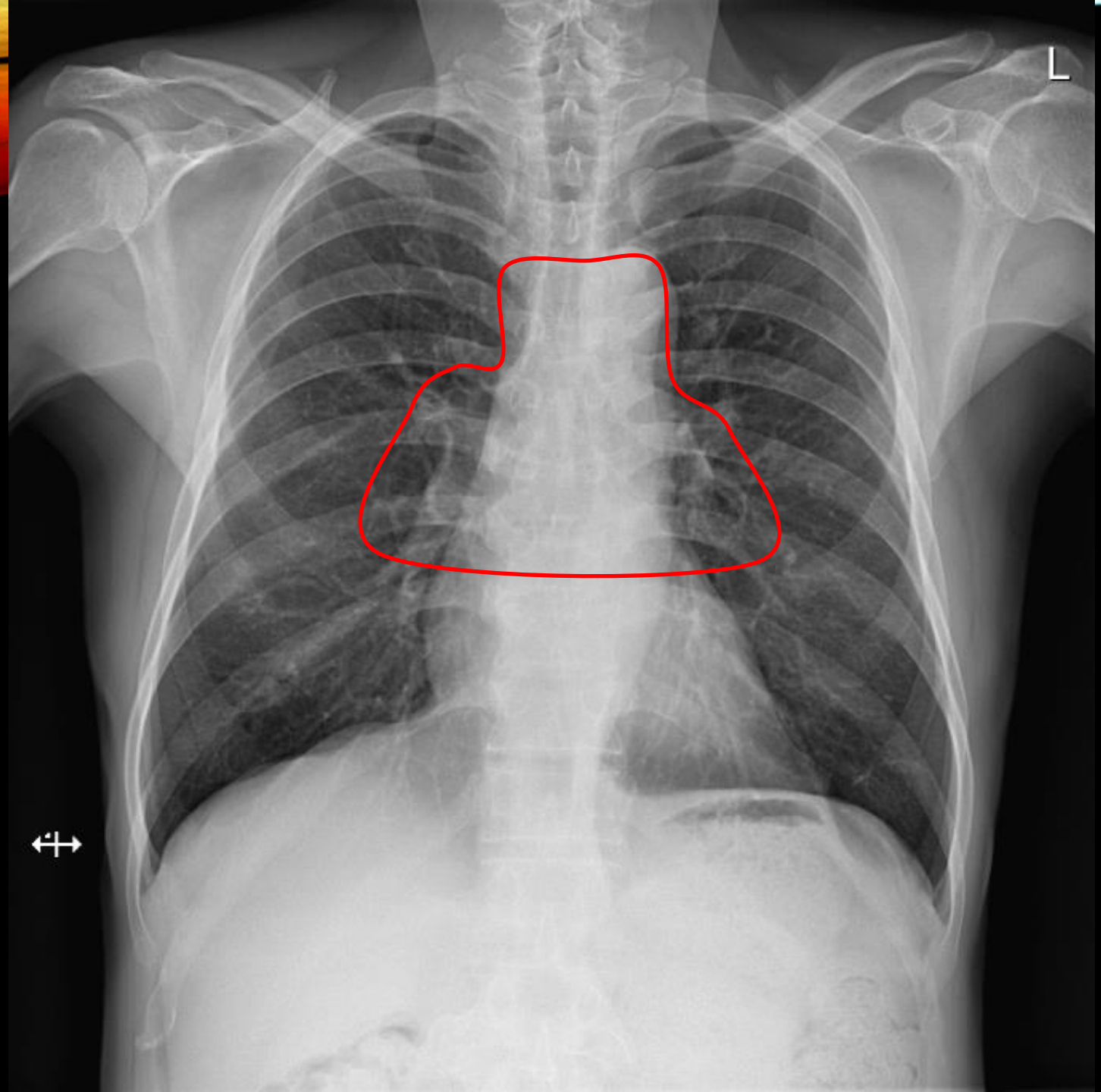
Tip of endotracheal tube (2cm above carina)

Systemic approach



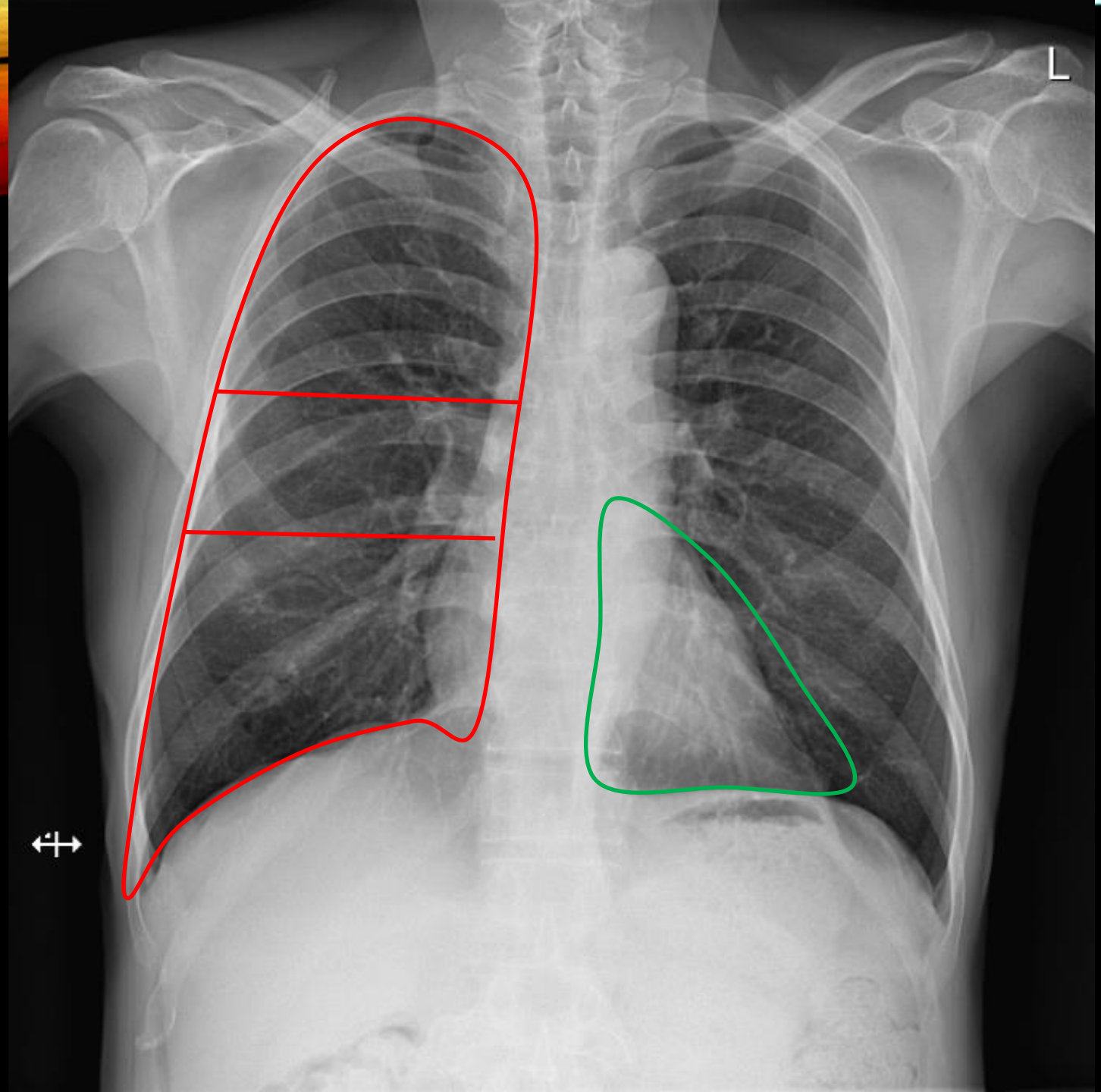
Tip of central venous catheter at superior vena cava

Cardiac size (cardiomegaly: > ½ thoracic cavity)



Systemic approach

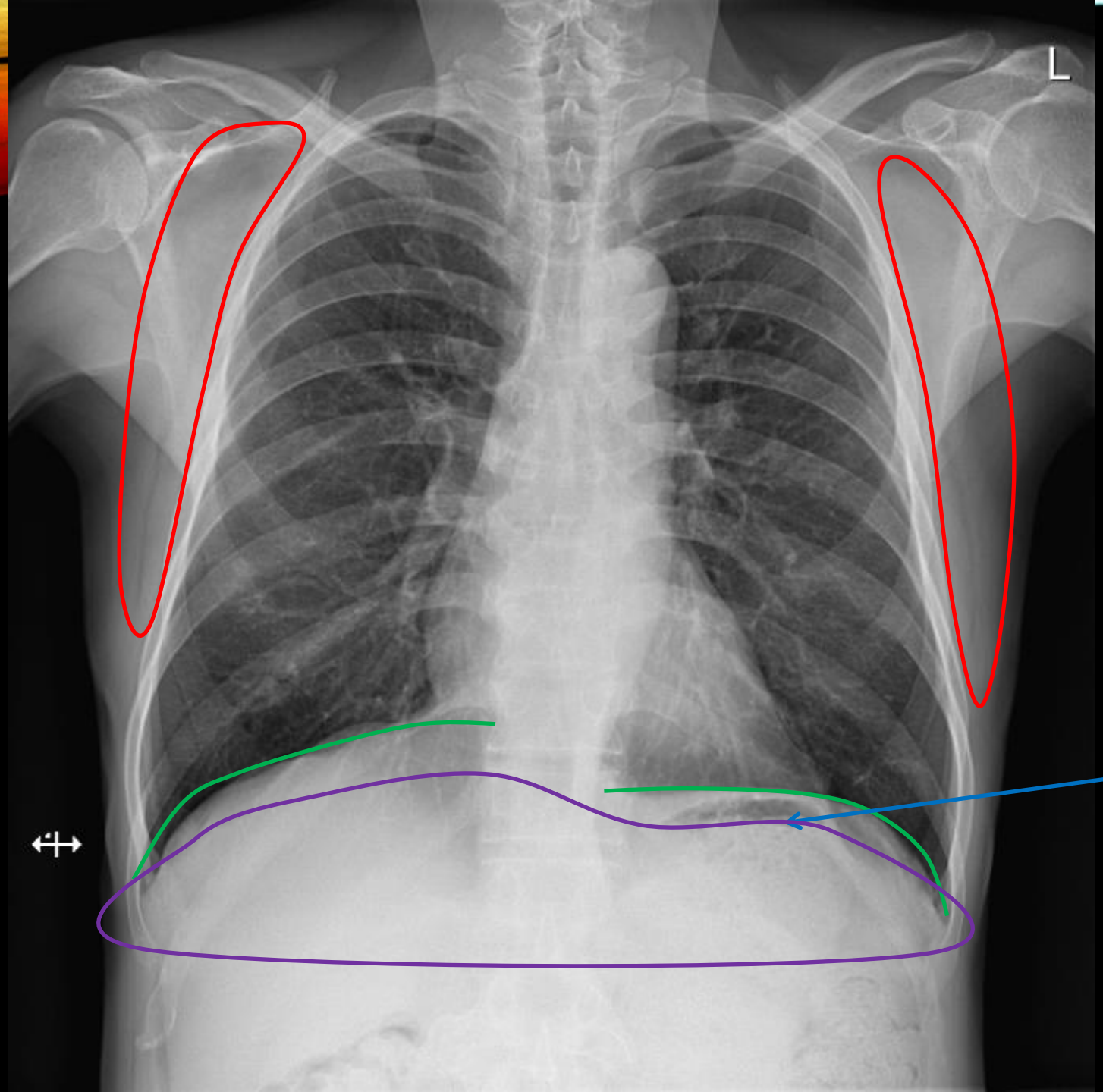
- Mediastinum widening
- Hilar vascular structures
- Trachea location



Systemic approach

Compare upper, middle and lower zone

Look behind the heart



Systemic approach

Look at bone (each rib, clavicle, scapula, humerus, spine)

Subcutaneous emphysema

Both diaphragm: sharp, continuous

Stomach gas bubble

Under diaphragm: pneumoperitoneum

DURING THE PRIMARY SURVEY

- ECG monitoring
- Pulse oximetry
- Ventilatory Rate, Capnography, and Arterial Blood Gases
- Urinary and gastric catheters
- Trauma series (**X-ray; Chest AP, Pelvis AP**, **C-spine lateral**)
- FAST (focused assessment with sonography for trauma). Extended FAST
- Surgical consultation/ Patient transfer (not to delay transfer)

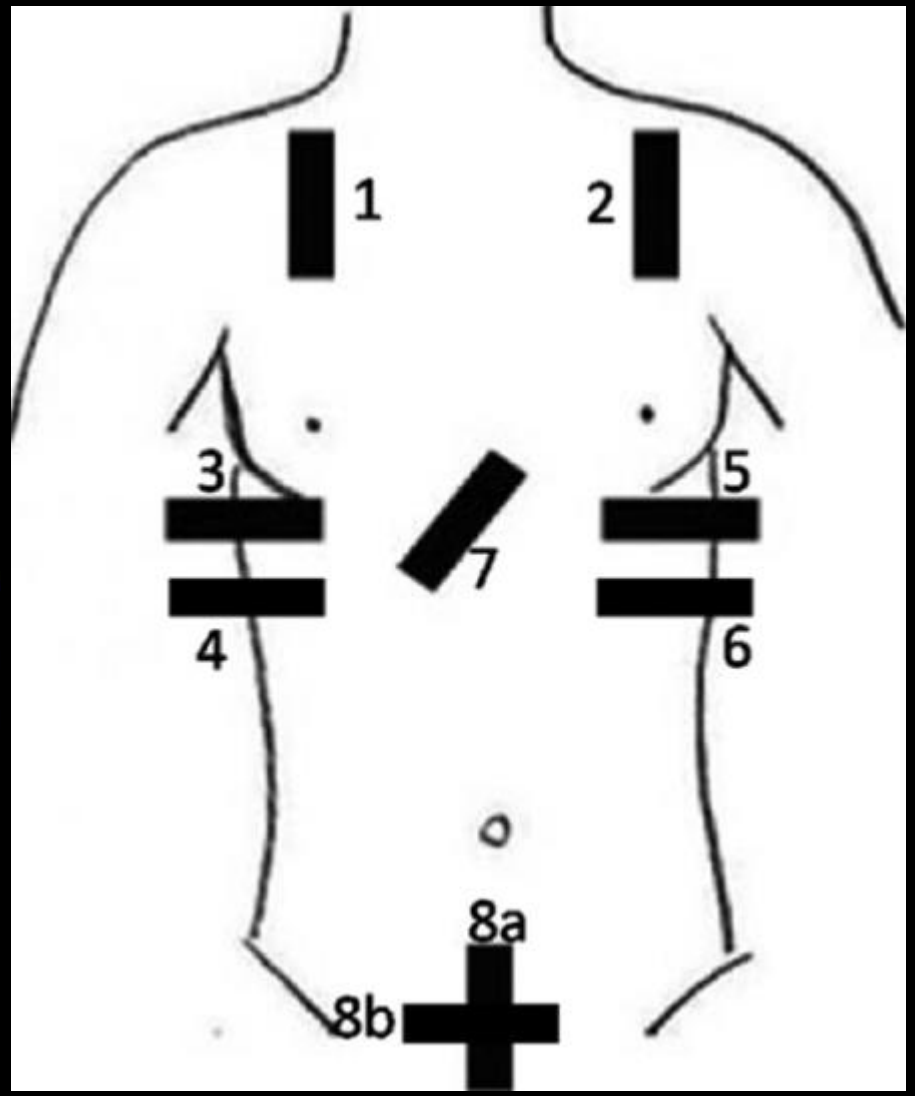
FAST (FOCUSED ASSESSMENT WITH SONOGRAPHY FOR TRAUMA)

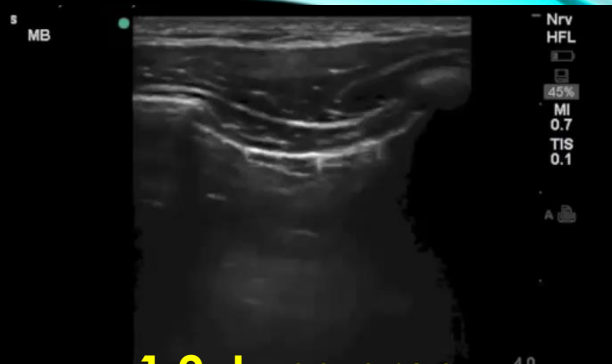
- A rapid bedside ultrasound examination
- Screening test for blood around
  - Heart (Pericardial effusion)
  - Abdominal organs (Hemoperitoneum)
    : Morison’s pouch, splenorenal recess, pelvic cavity
- Extended FAST (E-FAST)
  - Examination of both lungs (pneumothorax, hemothorax)

E-FAST

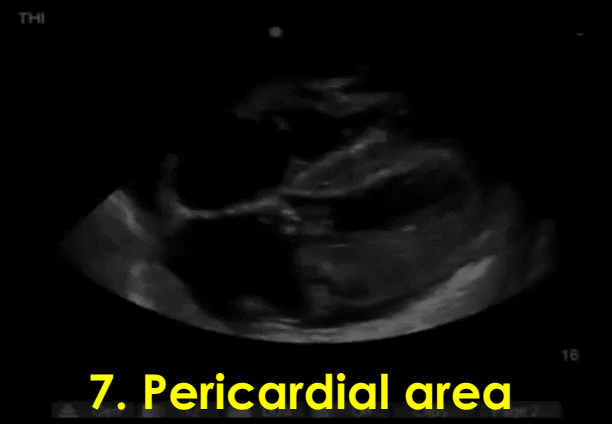
4. Perihepatic area

8. Pelvis area

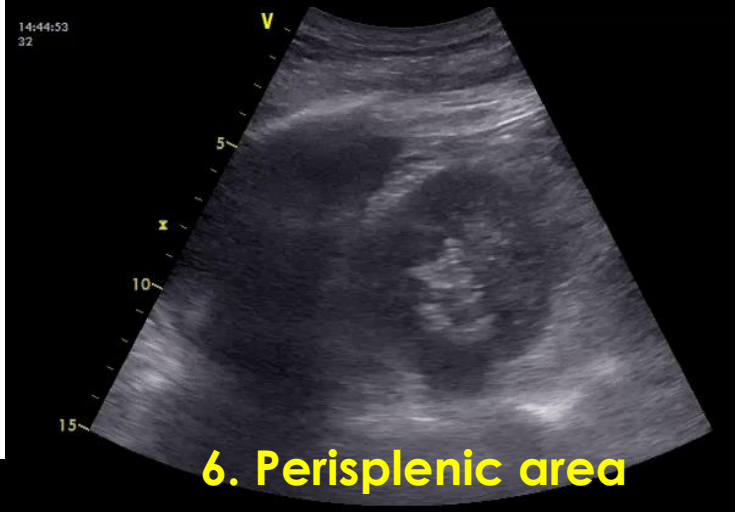




1.2. Lung area



7. Pericardial area



6. Perisplenic area

QUESTION 1, ON TRAUMA BAY

- 50/M, Driver TA
- On Scene: SOL (+), Upon arrival: SOL (-)
- CPR time: (7) minutes
- **Next step ??? What should you do for patient on trauma bay?**

- Signs of Life
  - Respiratory or Motor effort
  - Electrical activity
  - Pupillary activity

During the primary survey, life-threatening conditions are identified and treated in a prioritized sequence

QUESTION 1, ON TRAUMA BAY

- 50/M, Driver TA
- On Scene: SOL (+), Upon arrival: SOL (-)
- CPR time: (7) minutes
- FAST: Hemopericardium (+)

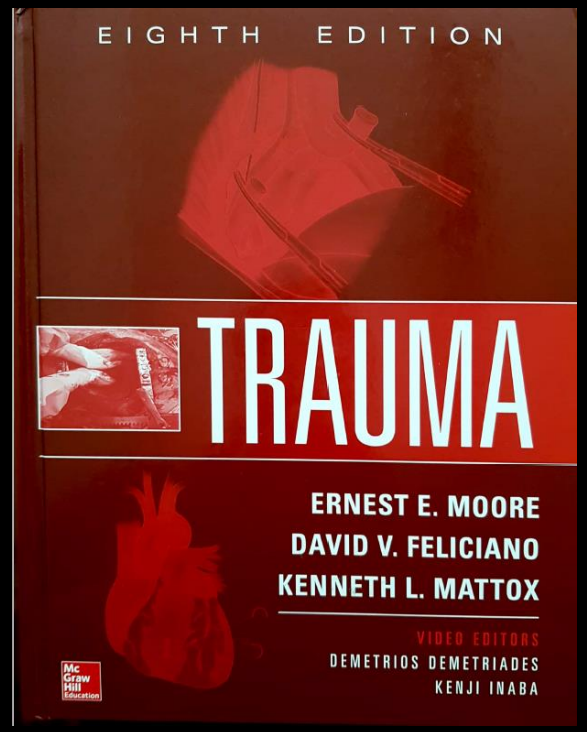
  Hemoperitoneum (-)
- V/S: **Not checkable**
- **Next step ??? What should you do for patient on trauma bay**

- Signs of Life

- Respiratory or Motor effort
- Electrical activity
- Pupillary activity

RESUSCITATIVE THORACOTOMY

- Indication



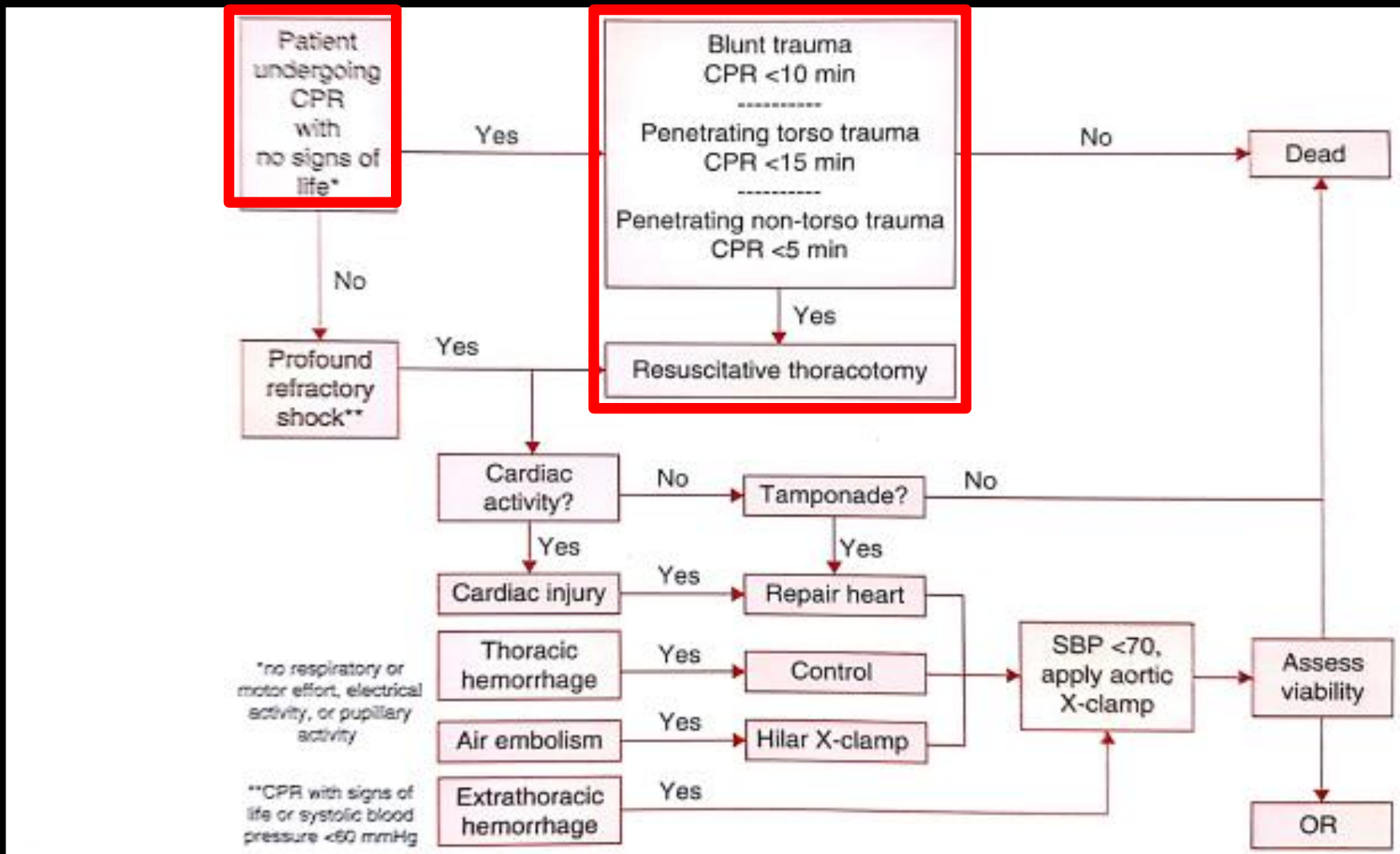
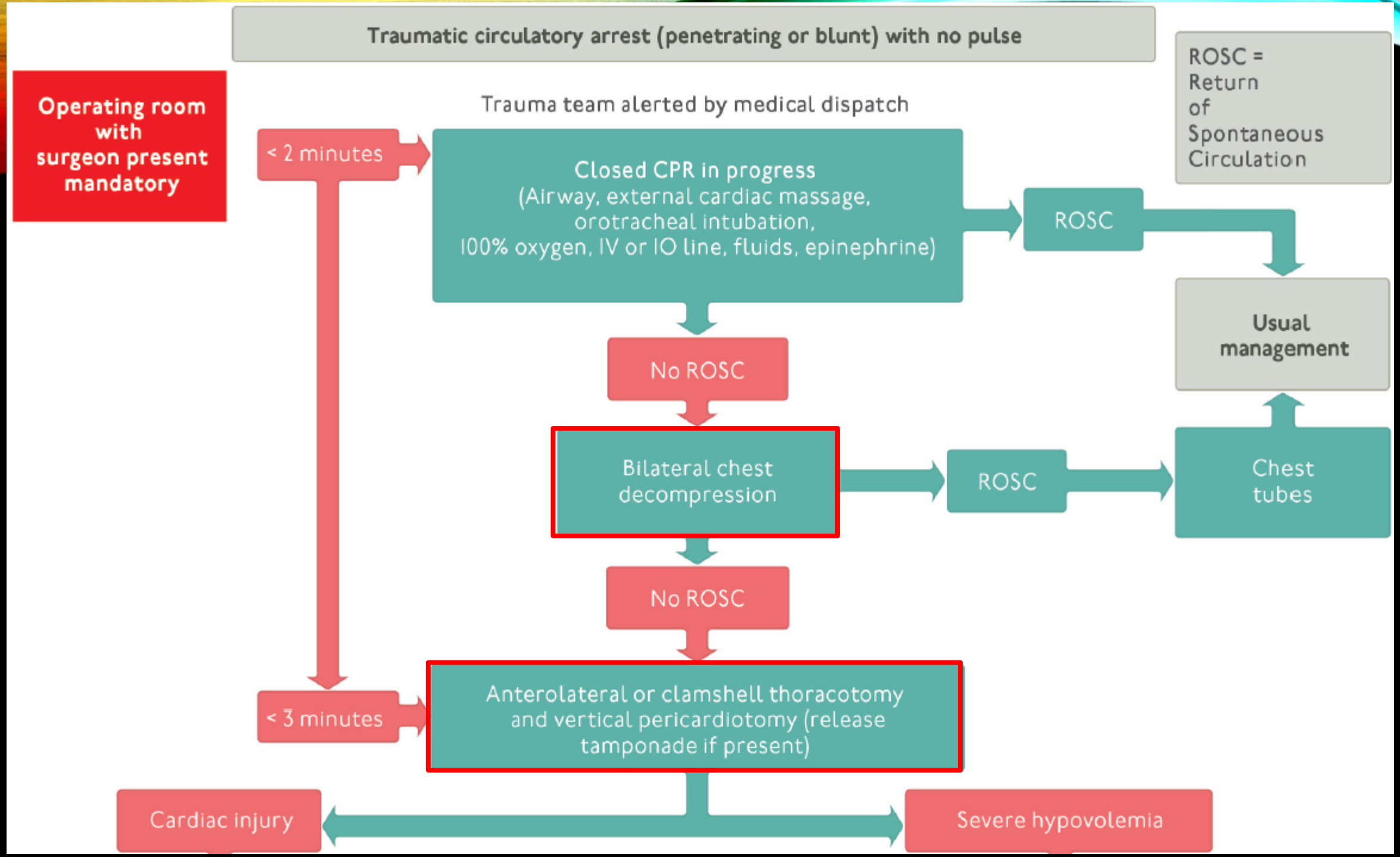
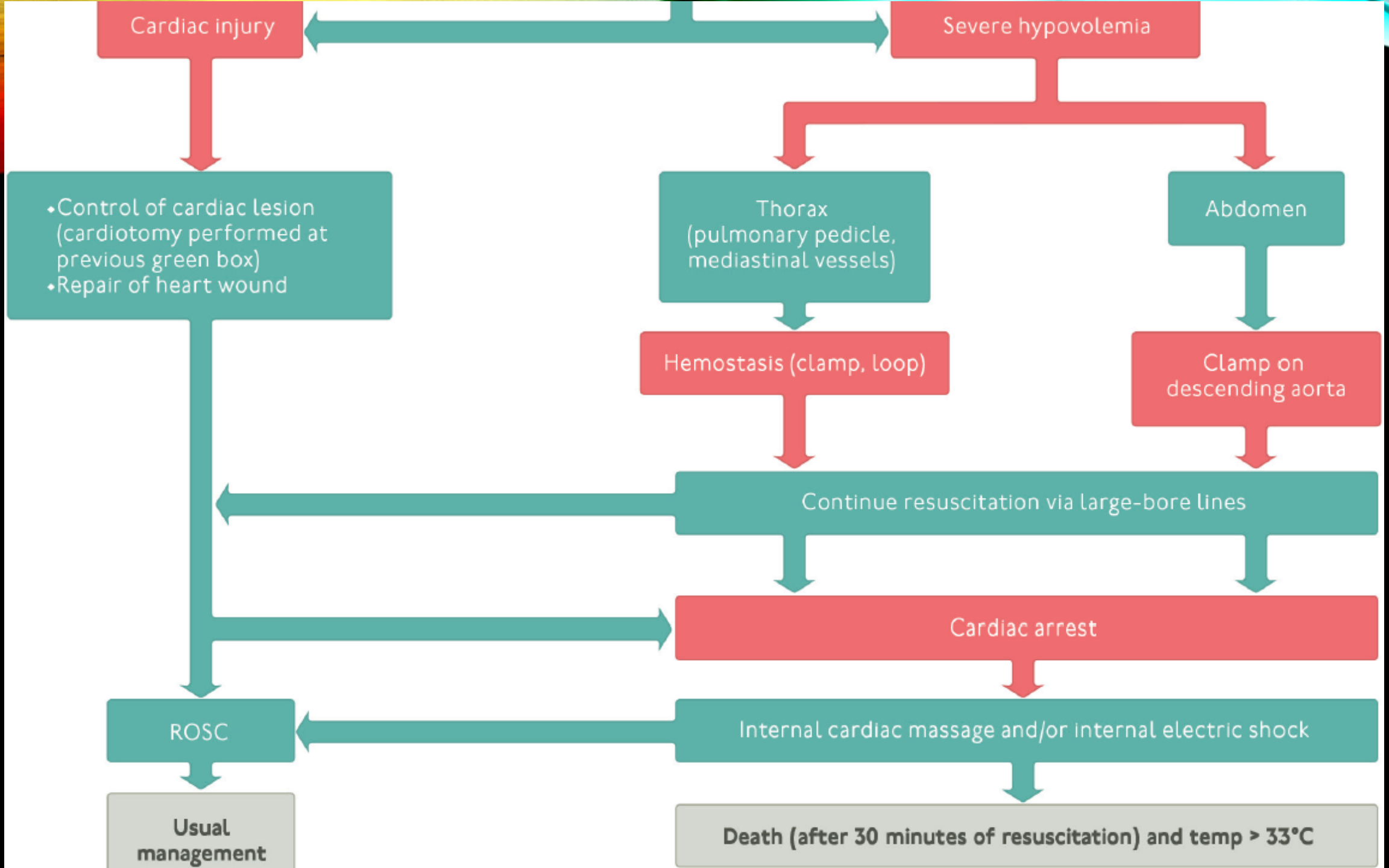


FIGURE 14-1 Algorithm directing the use of EDT in the multiply injured trauma patient.


Traumatic circulatory arrest (penetrating or blunt) with no pulse
ROSC = Return of Spontaneous Circulation
Operating room with surgeon present mandatory
Trauma team alerted by medical dispatch
< 2 minutes
Closed CPR in progress
(Airway, external cardiac massage, orotracheal intubation, 100% oxygen, IV or IO line, fluids, epinephrine)
ROSC
Usual management
No ROSC
Bilateral chest decompression
ROSC
Chest tubes
No ROSC
< 3 minutes
Anterolateral or clamshell thoracotomy and vertical pericardiotomy (release tamponade if present)
Cardiac injury
Severe hypovolemia


Cardiac injury
Severe hypovolemia
•Control of cardiac lesion (cardiotomy performed at previous green box)
•Repair of heart wound
Thorax (pulmonary pedicle, mediastinal vessels)
Abdomen
Hemostasis (clamp, loop)
Clamp on descending aorta
Continue resuscitation via large-bore lines
Cardiac arrest
ROSC
Internal cardiac massage and/or internal electric shock
Usual management
Death (after 30 minutes of resuscitation) and temp > 33°C

BILATERAL CHEST DECOMPRESSION

- **In TRAUMA patient**, What is the critical point during CPR?
- **WHAT**

  IS THE MOST IMPORTANT PROCEDURE **DURING CHEST COMPRESSION**

BILATERAL CHEST DECOMPRESSION

- **In TRAUMA patient**, What i
- **CHEST DECOMPRESSION**

  IS THE MOST IMPORTAN

- **Field thoracostomy**

Resuscitation (2007) 75, 276–285

Outcome in 757 severely injured patients with traumatic cardiorespiratory arrest☆

Stefan Huber-Wagner[a,*], Rolf Lefering[b], Mike Qvick[a], Michael V. Kay[a]
Thomas Paffrath[b], Wolf Mutschler[a], Karl-Georg Kanz[a],

Working Group on Polytrauma of the German Trauma Society (DGU)[1]

Conclusions: Prehospital chest tube insertion was found to be a strong predictor for survival. On-scene chest decompression of TCRA patients is recommended in case of the decision to start with ECC. Based on our data, resuscitation after severe trauma seems to be more justified than the current guidelines state.

LONDON'S AIR AMBULANCE

Traumatic Cardiac Arrest: Who Are the Survivors?

David Lockey, FRCA, FIMC, RCS(Ed)
Kate Crewdson, MB, BS, BSc
Gareth Davies, FFAEM, FRCP

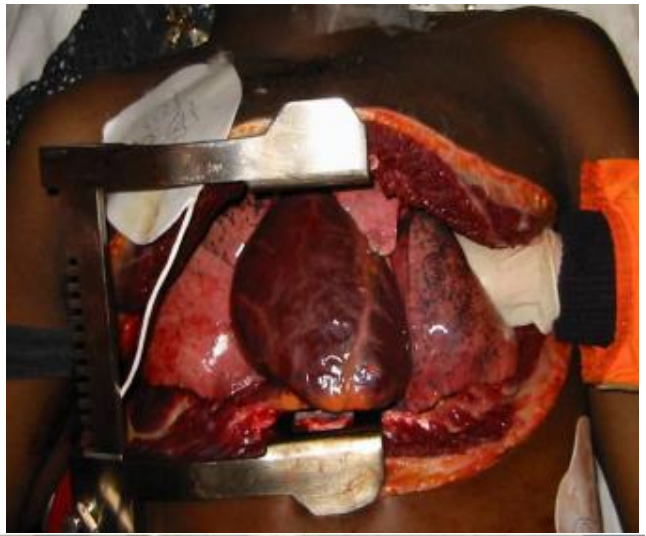
From the London Helicopter Emergency Medical Service, Royal London Hospital, London, United Kingdom.

Study objective: Survival from traumatic cardiac arrest is poor, and some consider resuscitation of this patient group futile. This study identified survival rates and characteristics of the survivors in a physician-led out-of-hospital trauma service. The results are discussed in relation to recent resuscitation guidelines.

Methods: A 10-year retrospective database review was conducted to identify trauma patients receiving out-of-hospital cardiopulmonary resuscitation. The primary outcome measure was survival to hospital discharge.

Results: Nine hundred nine patients had out-of-hospital cardiopulmonary resuscitation. Sixty-eight (7.5% [95% confidence interval 5.8% to 9.2%]) patients survived to hospital discharge. Six patients had isolated head injuries and 6 had cervical spine trauma. Eight underwent on-scene thoracotomy for penetrating chest trauma. Six patients recovered after decompression of tension pneumothorax. Thirty patients sustained asphyxial or hypoxic insults. Eleven patients appeared to have had "medical" cardiac arrests that occurred before and was usually the cause of their trauma. One patient survived hypovolemic cardiac arrest. Thirteen survivors breached recently published guidelines.

Conclusion: The survival rates described are poor but comparable with (or better than) published survival rates for out-of-hospital cardiac arrest of any cause. Patients who arrest after hypoxic insults and those who undergo out-of-hospital thoracotomy after penetrating trauma have a higher chance of survival. Patients with hypovolemia as the primary cause of arrest rarely survive. Adherence to recently published guidelines may result in withholding resuscitation in a small number of patients who have a chance of survival. [Ann Emerg Med. 2006;48:240-244.]



Resuscitative Thoracotomy

Trauma Center
ankook University Hospit
Sung Wook, Chang

ATLS - Secondary survey

SECONDARY SURVEY

- Head-to-toe evaluation
- Complete history
- Physical examination
- Each region of the body
- The potential for missing
  an injury or failing

TABLE 1-1 MECHANISMS OF INJURY AND SUSPECTED INJURY PATTERNS

MECHANISM OF INJURY	SUSPECTED INJURY PATTERNS	MECHANISM OF INJURY	SUSPECTED INJURY PATTERNS
BLUNT INJURY			
Frontal impact, automobile collision • Bent steering wheel • Knee imprint, dashboard • Bull's-eye fracture, windscreen	• Cervical spine fracture • Anterior flail chest • Myocardial contusion • Pneumothorax • Traumatic aortic disruption • Fractured spleen or liver • Posterior fracture/dislocation of hip and/or knee • Head injury • Facial fractures	**Rear impact, automobile collision**	• Cervical spine injury • Head injury • Soft tissue injury to neck
		Ejection from vehicle	• Ejection from the vehicle precludes meaningful prediction of injury patterns, but places patient at greater risk for virtually all injury mechanisms.
Side impact, automobile collision	• Contralateral neck sprain • Head injury • Cervical spine fracture • Lateral flail chest • Pneumothorax • Traumatic aortic disruption • Diaphragmatic rupture • Fractured spleen/liver and/or kidney, depending on side of impact • Fractured pelvis or acetabulum	**Motor vehicle impact with pedestrian**	• Head injury • Traumatic aortic disruption • Abdominal visceral injuries • Fractured lower extremities/pelvis
		Fall from height	• Head injury • Axial spine injury • Abdominal visceral injuries • Fractured pelvis or acetabulum • Bilateral lower extremity fractures (including calcaneal fractures)

HISTORY

- **History of the mechanism of injury (MOI)**

TABLE 1-1 MECHANISMS OF INJURY AND SUSPECTED INJURY PATTERNS

MECHANISM OF INJURY	SUSPECTED INJURY PATTERNS
PENETRATING INJURY	
Stab wounds	
• Anterior chest	• Cardiac tamponade if within "box" • Hemothorax • Pneumothorax • Hemopneumothorax
• Left thoraco-abdominal	• Left diaphragm injury/spleen injury/hemopneumothorax
• Abdomen	• Abdominal visceral injury possible if peritoneal penetration
Gunshot wounds (GSW)	
• Truncal	• High likelihood of injury • Trajectory from GSW/retained projectiles help predict injury
• Extremity	• Neurovascular injury • Fractures • Compartment syndrome

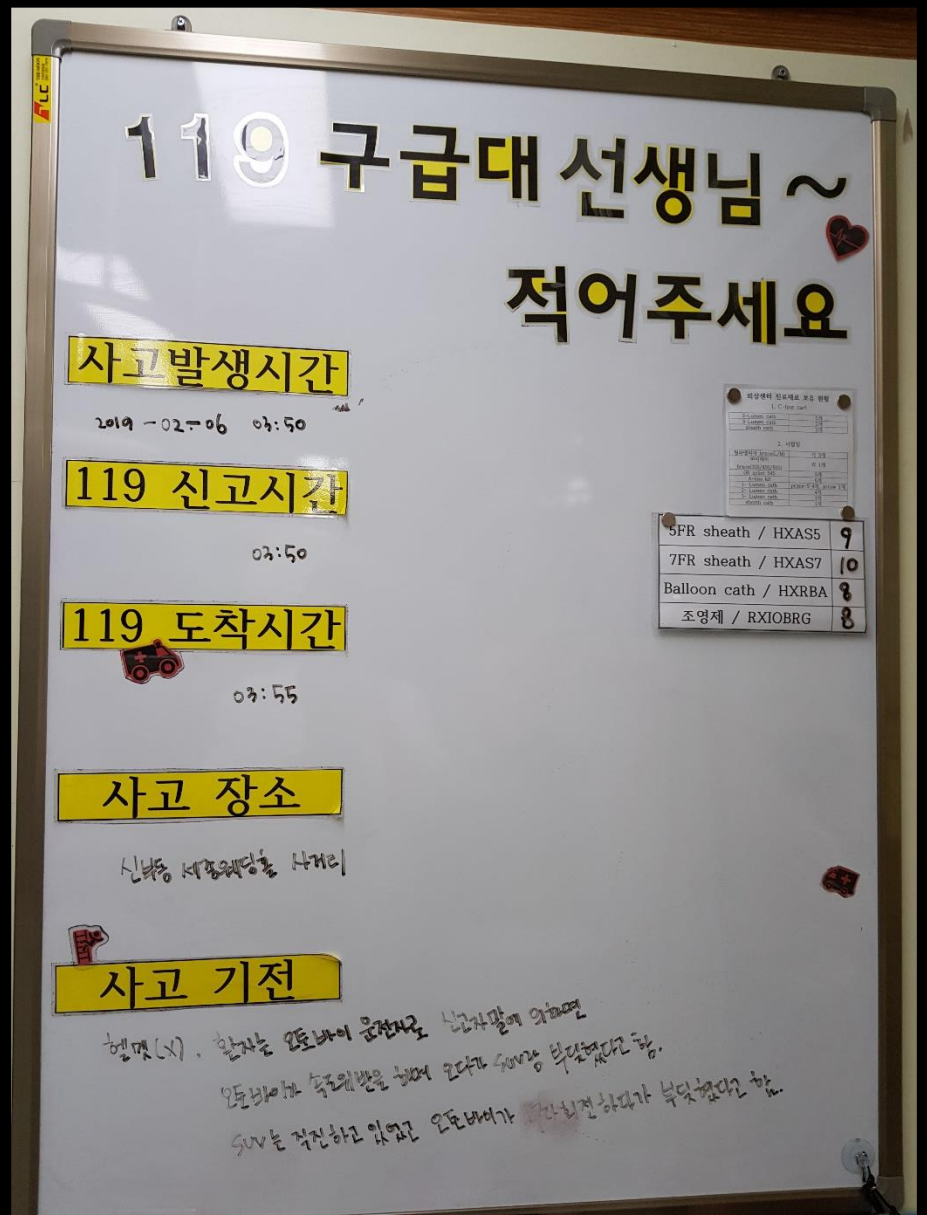
MECHANISM OF INJURY	SUSPECTED INJURY PATTERNS
THERMAL INJURY	
Thermal burns	• Circumferential eschar on extremity or chest • Occult trauma (mechanism of burn/means of escape)
Electrical burns	• Cardiac arrhythmias • Myonecrosis/compartment syndrome
Inhalational burns	• Carbon monoxide poisoning • Upper airway swelling • Pulmonary edema

HISTORY

- **History of the mechanism of injury (MOI)**

AMPLE HISTORY

- **Include a history of the mechanism of injury**
- **A** llergies
- **M** edications currently used
- **P** ast illnesses/Pregnancy
- **L** ast meal
- **E** vents/Environment related to the injury



HEAD

- Visual acuity, Ocular entrapment
- Pupillary size
- Hemorrhage of the conjunctiva and/or fundi
- Penetrating injury
- Contact lenses (remove before edema occurs), Dislocation of the lens
- Maxillofacial structures

CERVICAL SPINE AND NECK

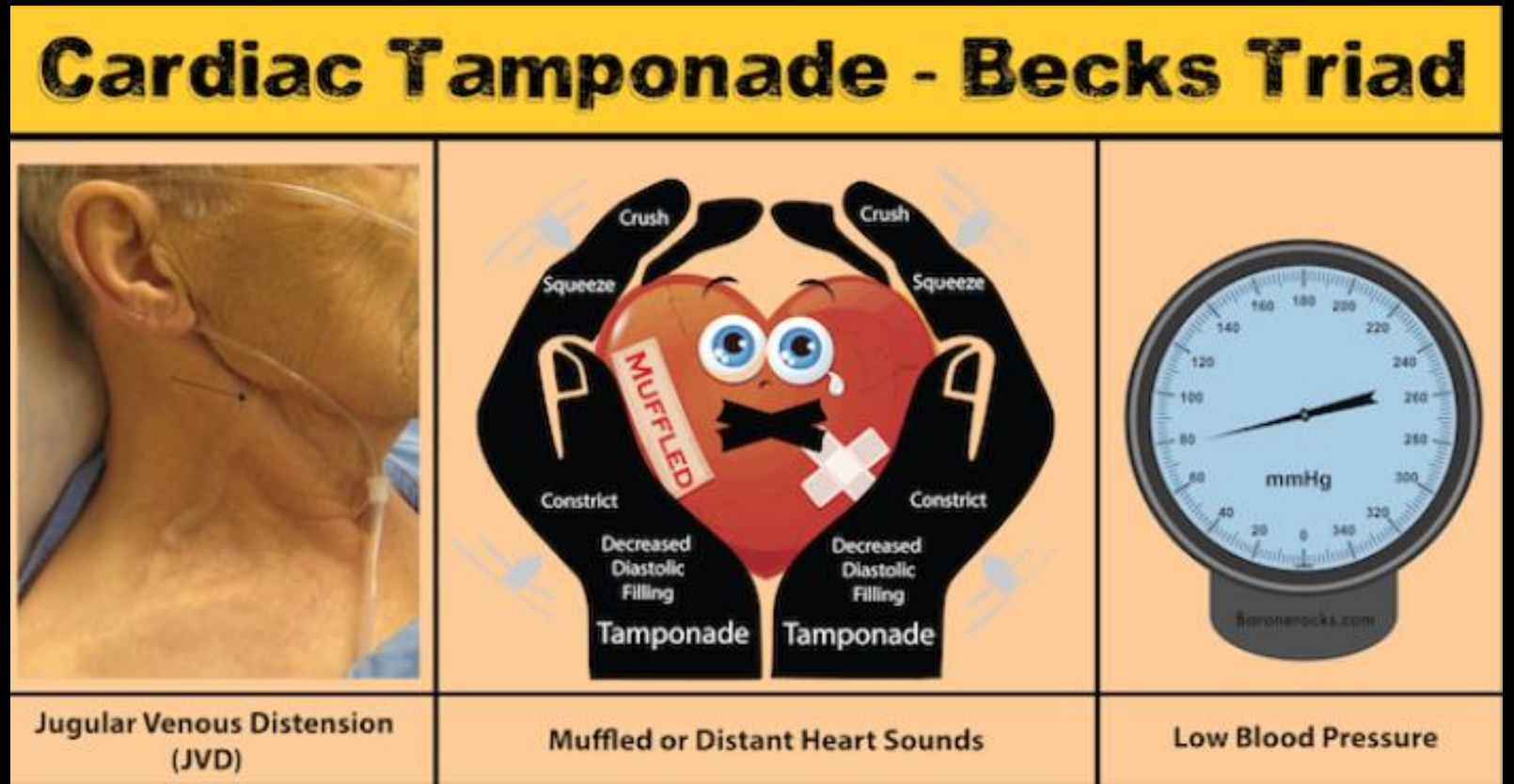
- Patients with **maxillofacial or head trauma** should be presumed to have a **cervical spine injury**, and **cervical spine motion must be restricted.**
- The absence of neurologic deficit **does not exclude** injury to the cervical spine
- Active arterial bleeding, an expanding hematoma, arterial bruit, or airway compromise usually requires operative evaluation.
- Protective helmet ➔ protection of a potentially unstable cervical spine
- Unexplained **paralysis** of an upper extremity ➔ a cervical nerve root injury

CHEST

- Inspection, palpation, auscultation and percussion of the chest
- **Cardiac tamponade vs. Tension pneumothorax** vs. Massive hemothorax

- Hypovolemia

➔ No neck vein distention



CHEST

- Inspection, palpation, auscultation and percussion of the chest
- Cardiac tamponade vs. **Tension pneumothorax vs. Massive hemothorax**

TABLE 4-1 DIFFERENTIATING TENSION PNEUMOTHORAX AND MASSIVE HEMOTHORAX

CONDITION	PHYSICAL SIGNS				
	BREATH SOUNDS	PERCUSSION	TRACHEAL POSITION	NECK VEINS	CHEST MOVEMENT
Tension pneumothorax	Decreased or absent	Hyperresonant	Deviated away	Distended	Expanded immobile
Massive hemothorax	Decreased	Dull	Midline	Collapsed	Mobile

ABDOMEN, PELVIS, PERINEUM, RECTUM, AND VAGINA

- Early involvement of a surgeon is essential
- Pelvic fractures: ecchymosis over the iliac wings, pubis, labia, or scrotum.
- Pain on palpation of the pelvic ring is an important finding.
- Perineum and pelvis ➔ Urethral injury
- A rectal examination

  ➔ integrity of the rectal wall, and quality of sphincter tone
- Vaginal examination in patients with a risk of vaginal injury.

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- Vaginal examination in patients with a risk

PITFALL	PREVENTION
Pelvic fractures can produce large blood loss.	• Placement of a pelvic binder or sheet can limit blood loss from pelvic fractures. • Do not repeatedly or vigorously manipulate the pelvis in patients with fractures, as clots can become dislodged and increase blood loss.

MUSKULOSKELETAL AND NEUROLOGICAL SYSTEM

PITFALL	PREVENTION
Compartment syndrome can develop.	• Maintain a high level of suspicion and recognize injuries with a high risk of development of compartment syndrome (e.g., long bone fractures, crush injuries, prolonged ischemia, and circumferential thermal injuries).

ADJUNCTS TO THE SECONDARY SURVEY

- Additional x-ray examinations of the spine and extremities
- CT scans of the head, chest, abdomen, and spine
- Contrast urography and angiography
- Transesophageal ultrasound
- Bronchoscopy
- Esophagoscopy
- Other diagnostic procedures

REEVALUATION

TRAUMA PATIENTS **MUST BE REEVALUATED CONSTANTLY** TO ENSURE THAT NEW FINDINGS ARE NOT OVERLOOKED AND TO DISCOVER ANY DETERIORATION IN PREVIOUSLY NOTED FINDINGS

AS **INITIAL LIFE-THREATENING INJURIES ARE MANAGED**, BUT **OTHER LIFE-THREATENING PROBLEMS MAY….**

QUESTION 2, ON TRAUMA BAY

- 50/M, **After Penetrating injury**, Torso
- On Scene: SOL (+), Upon arrival: SOL (**-**)
- CPR time: (12) minutes
- FAST: Hemopericardium (+)

  Hemoperitoneum (-)
- V/S: **Not checkable**
- **Next step ??? What should you do for patient on trauma bay?**

- Signs of Life

- Respiratory or Motor effort
- Electrical activity
- Pupillary activity

QUESTION 3, ON TRAUMA BAY

- 50/M, **After Penetrating injury**, Torso
- On Scene: SOL (+), Upon arrival: SOL (+)
- CPR time: -
- FAST: Hemopericardium (+)

  Hemoperitoneum (-)
- V/S: **BP 70/40 mmHg, HR 130/min**
- **Next step ??? What should you do for patient on trauma bay?**

- Signs of Life

- Respiratory or Motor effort
- Electrical activity
- Pupillary activity

QUESTION 4, ON TRAUMA BAY

- 50/M, **After Blunt injury**, Torso
- On Scene: SOL (+), Upon arrival: SOL (+)
- CPR time: -
- FAST: Hemopericardium (+)

  Hemoperitoneum (-)
- V/S: **BP 50/30 mmHg, HR 140/min**
- **Next step ??? What should you do for patient on trauma bay?**

- Signs of Life

- Respiratory or Motor effort
- Electrical activity
- Pupillary activity

QUESTION 5, ON TRAUMA BAY

- 50/M, **After Blunt injury**, Torso
- On Scene: SOL (+), Upon arrival: SOL (+)
- CPR time: -
- FAST: Hemopericardium (+)

  Hemoperitoneum (-)
- V/S: **BP 50/30 mmHg, HR 140/min ➔ BP 70/50 mmHg, HR 120/min**
- **Next step ??? What should you do for patient on trauma bay?**

- Signs of Life

- Respiratory or Motor effort
- Electrical activity
- Pupillary activity

PRC 3 units transfusion

QUESTION 6, ON TRAUMA BAY

- 50/M, **After Blunt injury**, Torso
- On Scene: SOL (+), Upon arrival: SOL (+)
- CPR time: -
- FAST: Hemopericardium (+)

  Hemoperitoneum (-)

- Signs of Life
  - Respiratory or Motor effort
  - Electrical activity
  - Pupillary activity

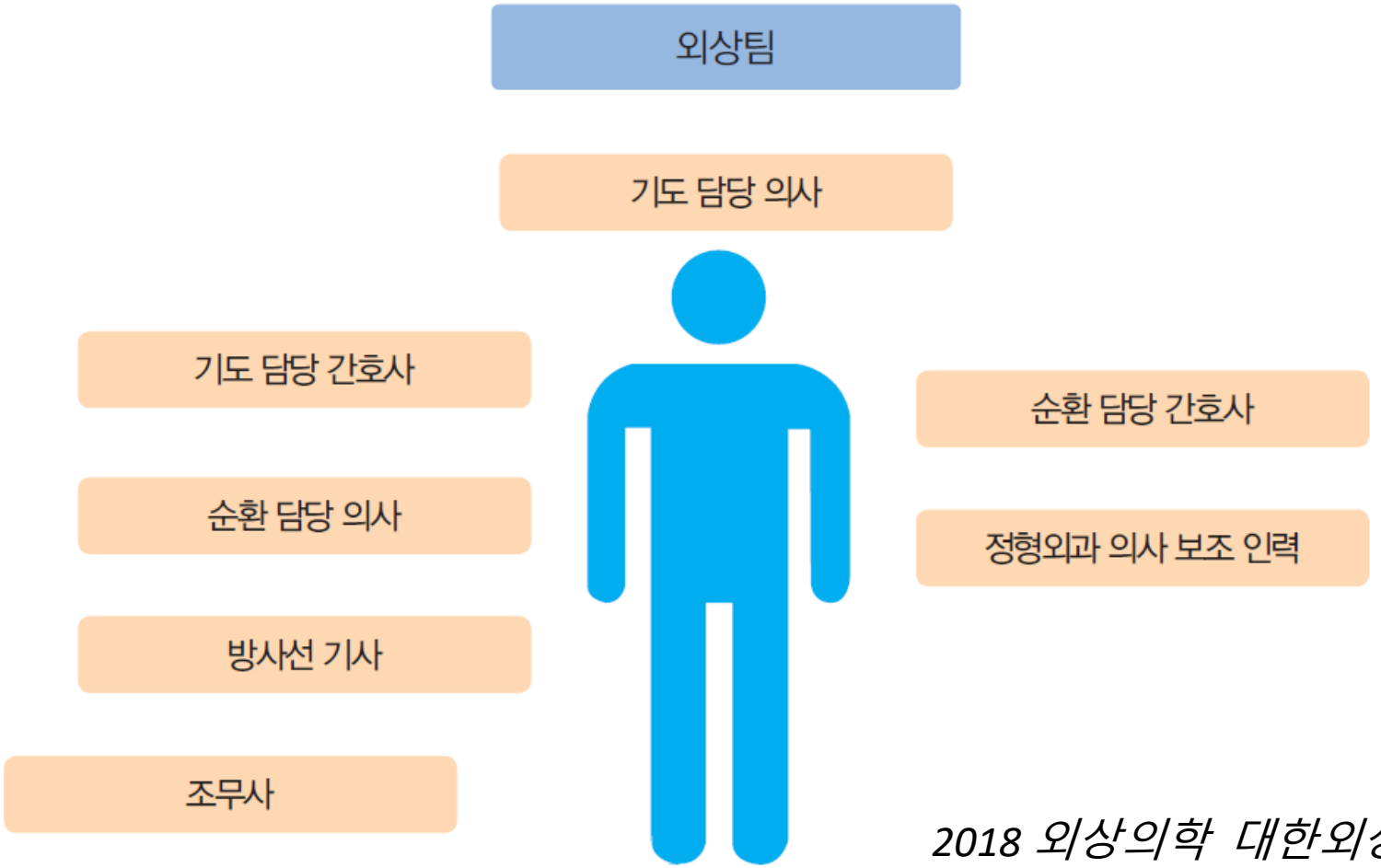
PRC 3 units transfusion

- V/S: **BP 80/50 mmHg, HR 130/min → BP 70/50 mmHg, HR 140/min**
- **Next step ??? What should you do for patient on trauma bay?**

DAMAGE CONTROL RESUSCITATION

- Why ??? Traumatology ???
- Highly preventable death rate on trauma in South Korea?
- It is not my business.
- I am not a trauma surgeon.
- I am not interested in traumatology.
- I am just thoracic surgeon/ cardiac surgeon/ vascular surgeon …..
- In trainee course, I don’t have a chance to meet and treat the injured patient.

TRAUMA TEAMWORK



2018 외상의학 대한외상학회 저

그림 5-1 외상팀의 배치


IN FUTURE
HEALTHCARE
PREVENTION
ASSISTANCE
DOCTORS
ONLINE
DIAGNOSIS
TREATMENT

FURTHER EDUCATION

- Resuscitation on trauma bay
- Team approach
- Immediately vs. potentially life threatening thoracic injuries
- Damage control surgery for thoracic injuries
- Role of CS/TS doctor for patient with profound shock d/t abdominopelvic injuries
- What should I do for severe injured patient ?

THANK YOU FOR YOUR ATTENTION

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DANKOOK UNIVERSITY HOSPITAL

TRAUMA CENTER

Our Mission Your Life