

# Traumatic Cardiac Arrest: What's New.....20 years on?

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# Consider This.....

- You are on shift in the ED and you get a call to standby to receive a 27 year old male with a single stab wound to the chest. His BP is 88/57, HR 108, Sats 98% and ETA: 5 mins.
- You hear the sirens and as the medics pull up at the ambulance bay, they were already doing CPR. The monitor showed PEA
- What is going through your mind?







**Messy  
Chaotic  
Bloody**









# Traumatic Cardiac Arrest

Poor outcomes, survival rates

Outcomes may vary according to mechanism, age, response time

Younger patients, less medical comorbidities, 18-35 years, almost never a primary pump failure



- **Less common than medical cardiac arrest**
- **Poor neurological outcomes following TCA, means greater disability adjusted life (DALY) years lost**

# Chronicle Journal of Emergency Medicine

## Traumatic Cardiac Arrest: A Review Lateef F\*, Choo Hui Min<sup>1</sup>, Charlotte *Copyright: © 2017 F Lateef*

### Abstract

Traumatic cardiac arrest (TCA) is commonly associated with poor outcomes. Though less common than medical cardiac arrest, TCA accounts for almost half of the cardiac arrest cases in the young. In patients with TCA, survival rates have been reported to be between 0-5%, despite the best efforts and latest guidelines in practice. Emergency physicians are thus pressed in their decisions on resuscitation, due to some of these factors and considerations.

# Observations and Characteristics

- 9 cohort studies
- Total: 6 340 TCA patients
- 25 YEARS OF DATA

- 1. Male: 74.9%
- 2. Mechanism:
  - Blunt: 72.1%: RTA, Falls
  - Penetrating : 17%: Assault, Stabs, Gun Shots
  - Undetermined: 10.9%
- 3. Asian > Blunt Injuries
- 4. Recordable rhythm: 96.7% PEA, Asystole
- 5. Shockable rhythm: 3.1% VF, VT
- 6. ROSC: 12.5% , median time to ROSC: 8 mins
- 7. Survival to hospital Discharge: 2.2%  
( shockable, ROSC, CPR<15 mins)



# Management: TCA

- 1. Prehospital Care Level, Time, Interventions, AED availability
- 2. Use of FAST in emergency care: 4 chamber cardiac evaluation, other causes. 100% sensitivity, 72.7% specificity > cardiac motion and activity on US
- 3. Emergency Department Thoracotomy (EDT)

# Definition: EDT/RESUSCITATIVE THORACOTOMY

- “a thoracotomy performed prehospital, in the emergency department or elsewhere that is an integral part of the initial resuscitation of a patient”

# POTENTIAL THERAPEUTIC MANEUVERs

- Decompressing cardiac tamponade
- Cross clamping of aorta
- Manage exsanguinating cardiac/  
large vessel injuries
- Evacuate air embolism



# INDICATIONS



- **Joint National Assn for EMS Physicians, 2013**
- **American College of Surgeons Committee on Trauma (ASCOT)**
- **European Resuscitation Council 2015**

# Recommendations

- Penetrating torso trauma patients with less than 15 min of CPR.
- Blunt trauma patients with less than 10 min of prehospital CPR;
- Blunt thoracic trauma with hypotension despite vigorous fluid resuscitation
- Rapid exsanguination from chest tube >1500 mls immediately
- C/I: Lack of relevant expertise, equipment, subsequent providers or if >10/15m

# CONTRAINDICATIONS

- Blunt injury without witnessed cardiac activity (pre-hospital)
- Penetrating abdominal trauma without cardiac activity (pre-hospital)
- Non-traumatic cardiac arrest
- Severe head injury
- Severe multisystem injury
- Improperly trained team
- Insufficient equipment

**Decision usually made on a case  
by case basis....**



# Eastern Assn for the Surgery of Trauma 72 Studies

# EAST

Guidelines for Resuscitative Thoracotomy

## Strong Recommendation:

- Pulseless with SOL after penetrating thoracic injury

## Conditional Recommendation:

- Pulseless without SOL after penetrating thoracic injury
- Pulseless with SOL after penetrating extra-thoracic injury
- Pulseless without SOL after penetrating extra-thoracic injury
- Pulseless with SOL after blunt injury

## Recommend Against:

- Pulseless without SOL after blunt injury

# Western Trauma Assn Studies from 1999

# WEST

Guidelines for Resuscitative Thoracotomy

## Blunt Trauma Patients:

- Less than 10 minutes of prehospital CPR

## Penetrating Trauma Patients:

- Less than 15 minutes of prehospital CPR
- Less than 5 minutes of prehospital CPR in patients with penetrating trauma to neck or extremity

## Other:

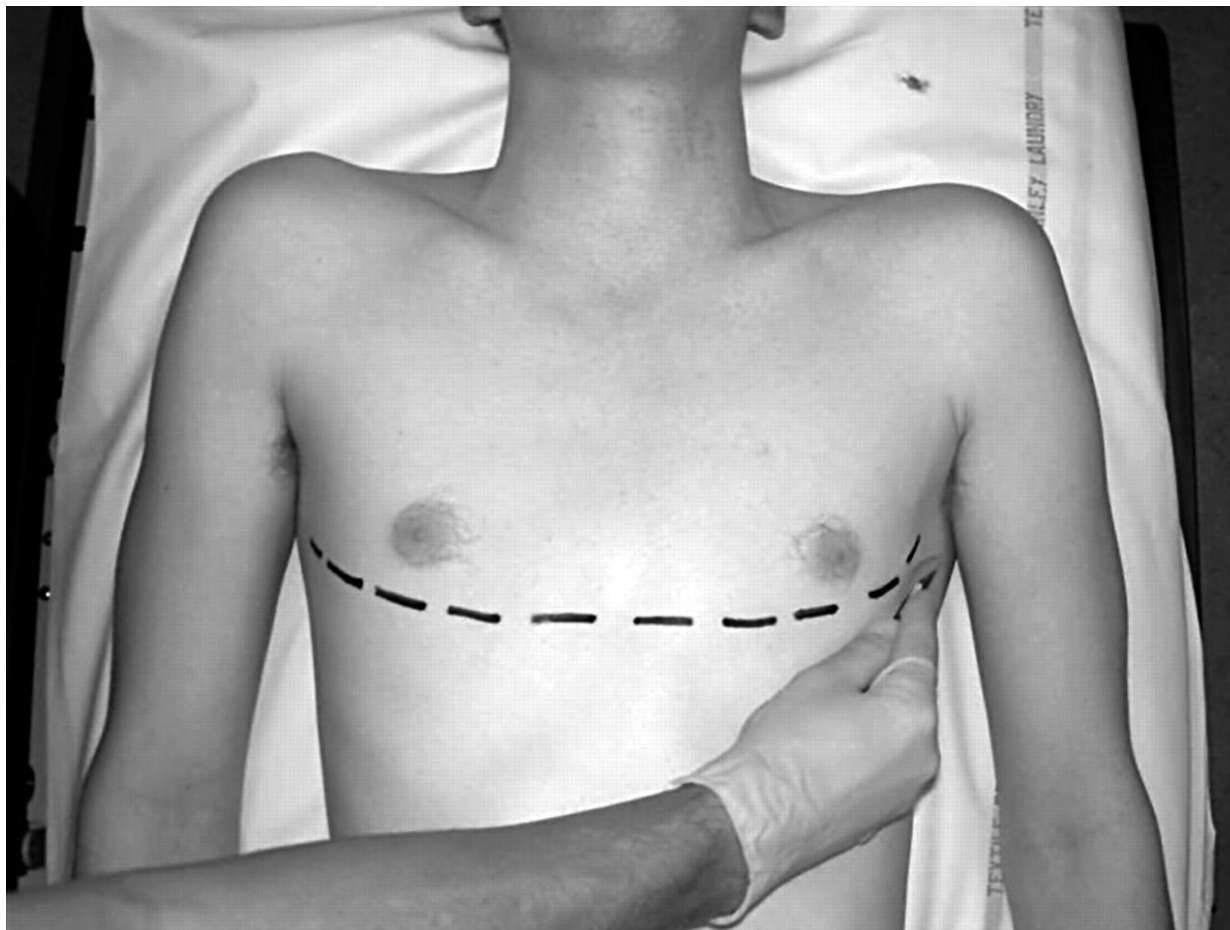
- Patients in profound refractory shock



# GUIDELINES

- EAST..... SOL, Signs of LIFE
- WEST.....Time frame
- Very New Study: JAMA SURGERY
- Looking at the association of prehospital mode of transport and mortality in penetrating trauma patients.
- 103 000 patients, Level 1 TRAUMA CENTRE with stab and gun shot wounds: There was lower likelihood of death in patients transported in private vehicles compared t EMS transport (stat significant)

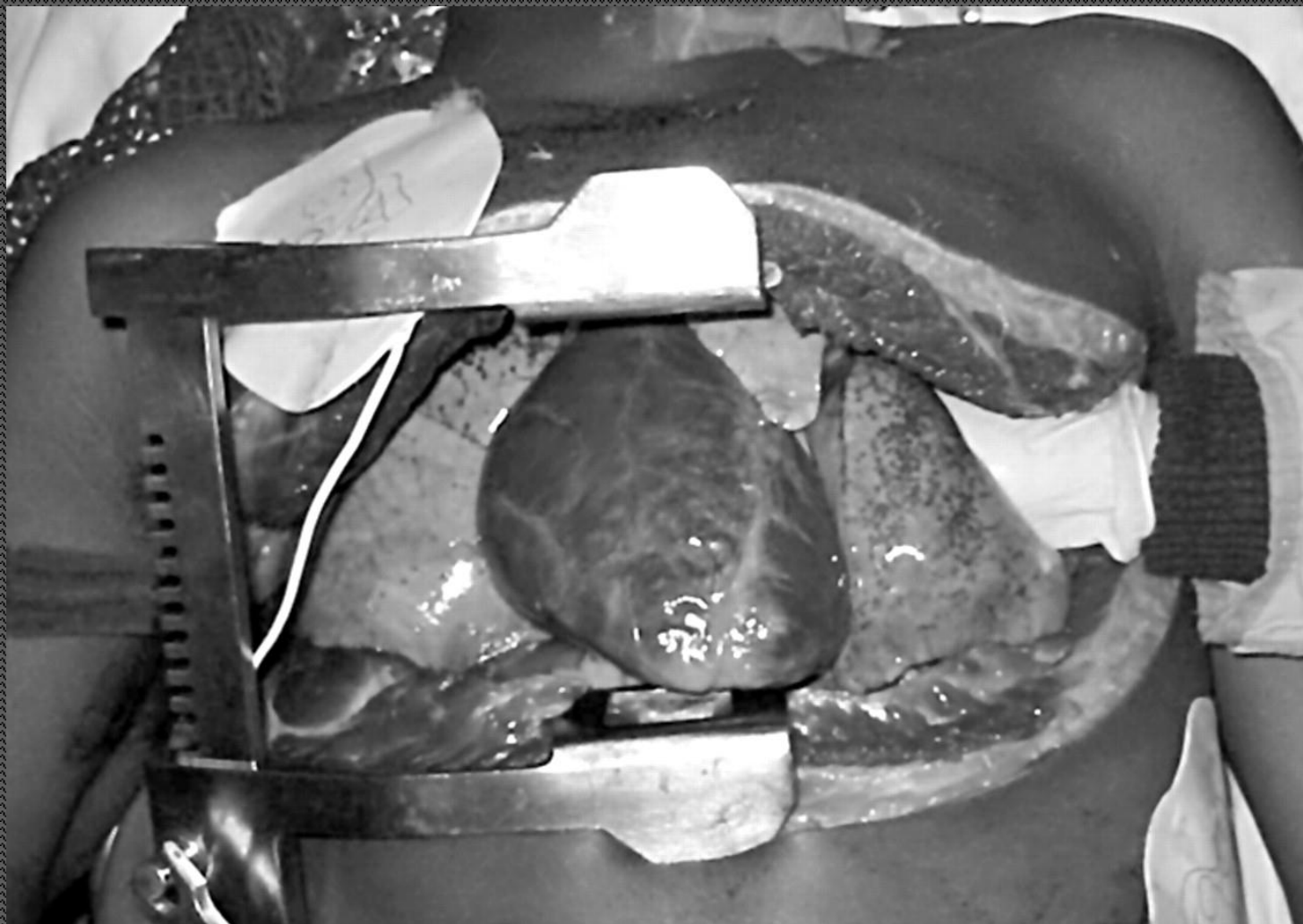
## The clam shell incision.



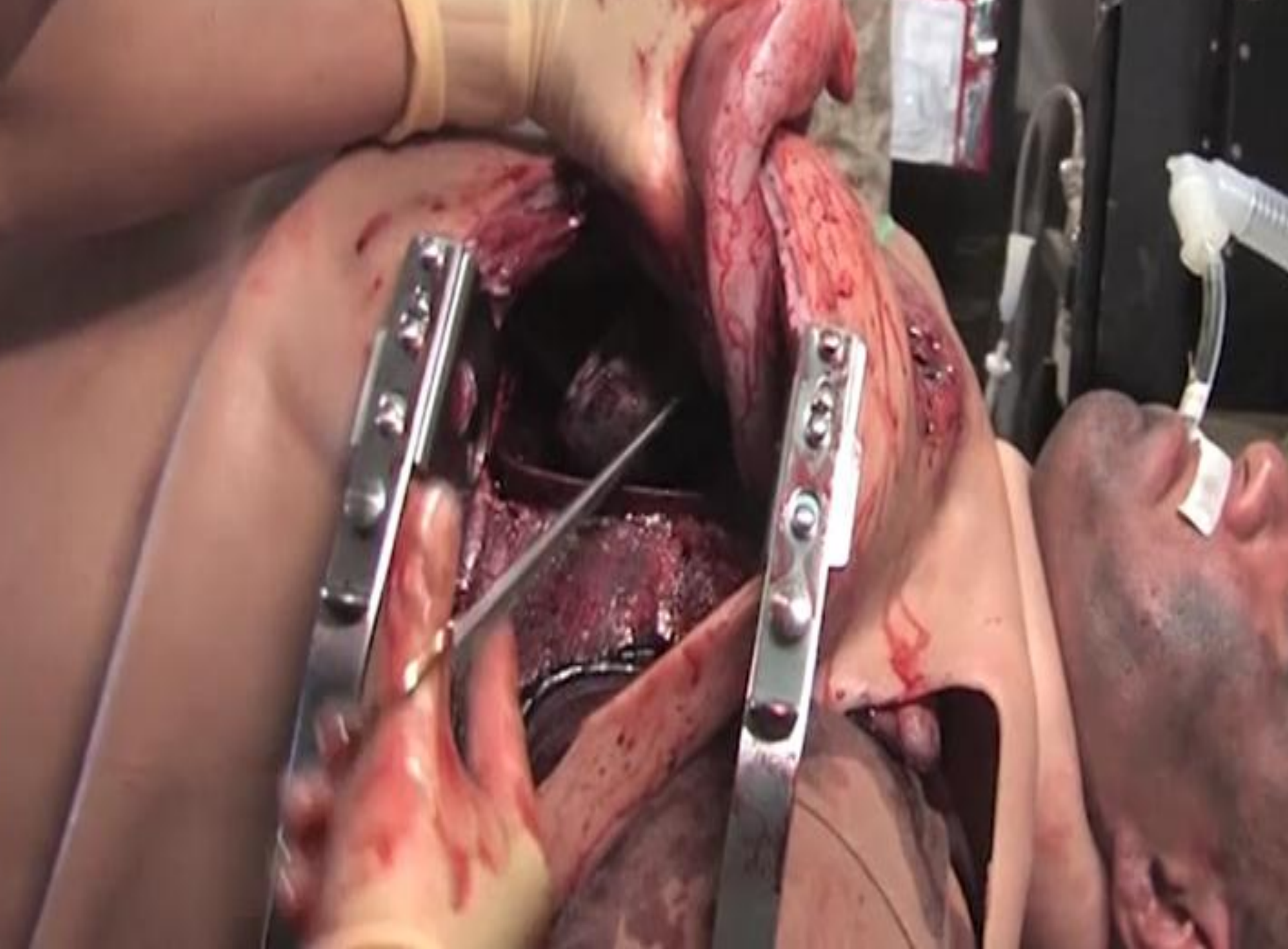
D Wise et al. Emerg Med J 2005;22:22-24



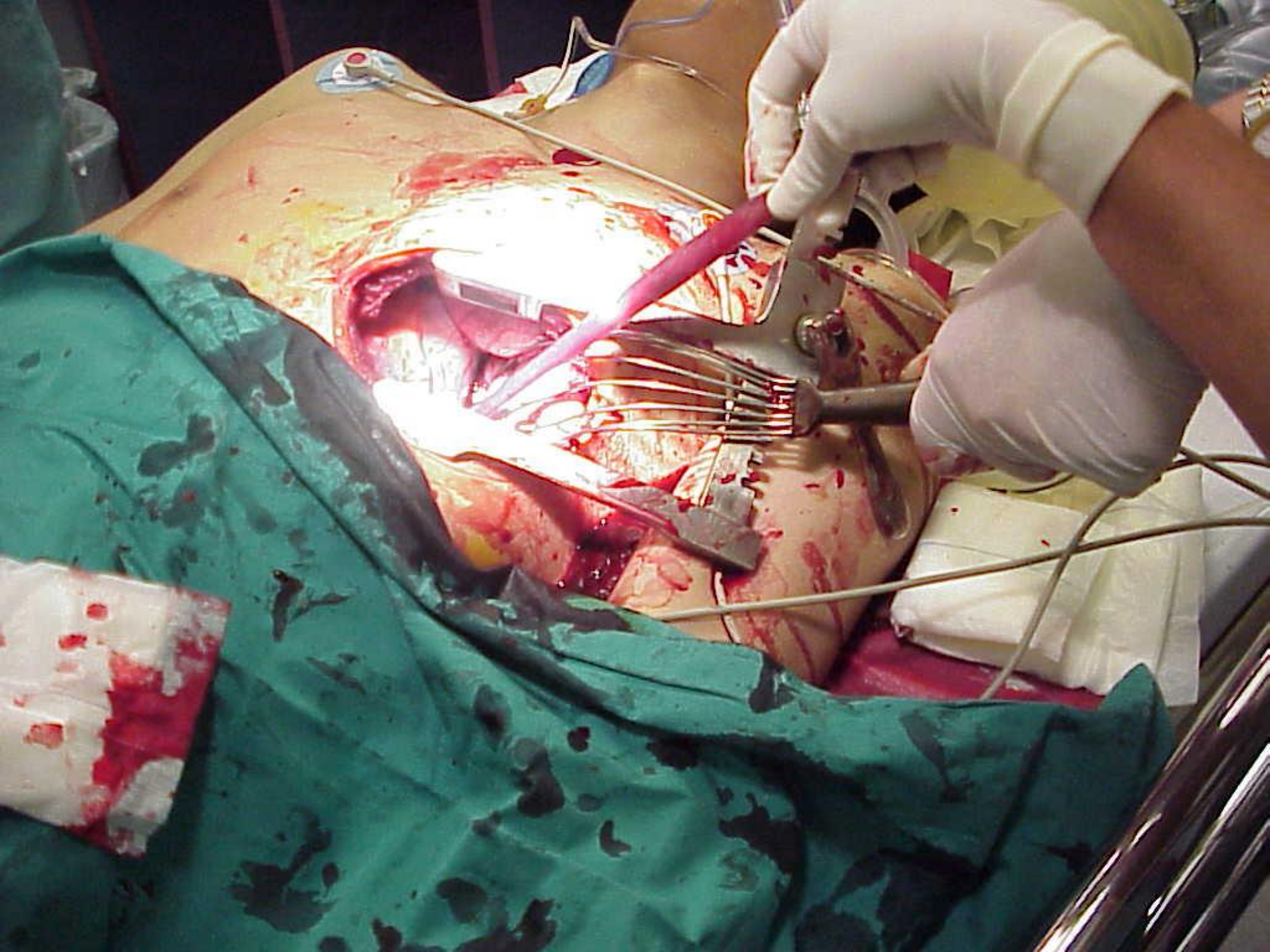
# Resuscitative Thoracotomy



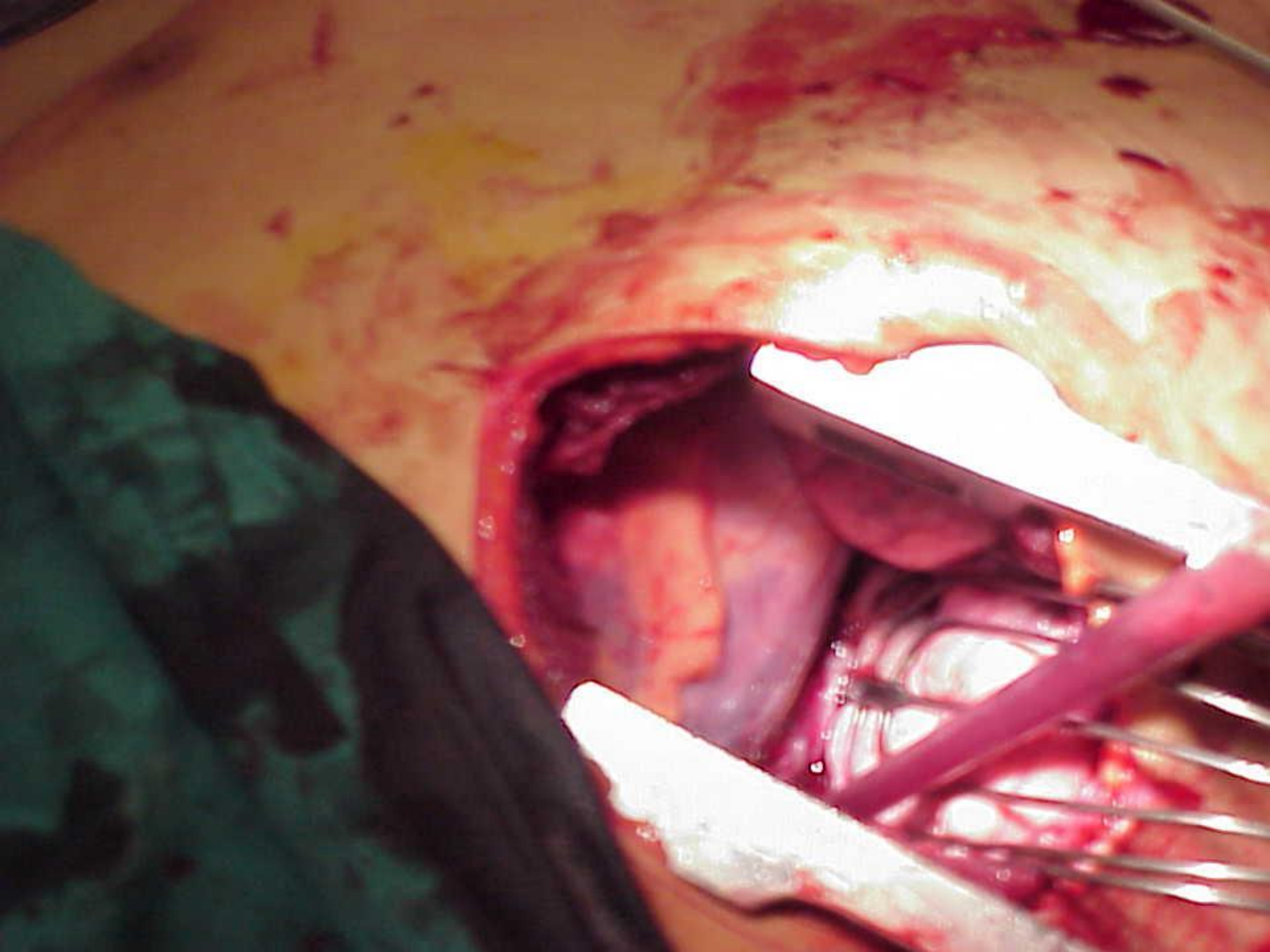
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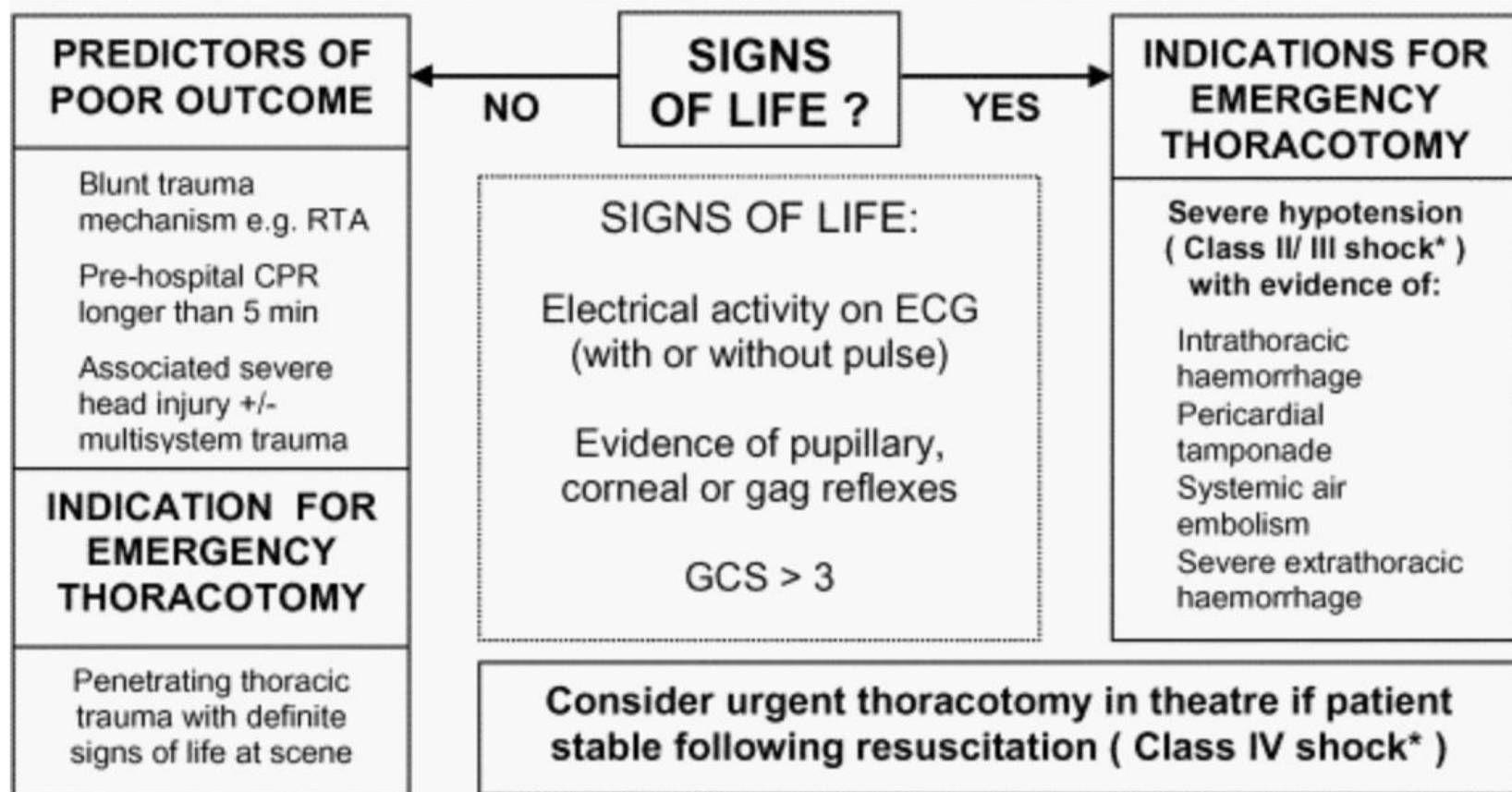




# Survival post thoracotomy

- Penetrating thoracic injury with signs of life at ED- 28-33%
- Penetrating thoracic injury with no signs of life at ED- 0-5%
- Extra thoracic injury 0-7%

# PATIENT PRESENTATION IN EXTREMIS FOLLOWING THORACIC TRAUMA



\* Table 5. Classification of physiological status. Note: absence of signs of life = Class I

Class II	Class III	Class IV
Any ECG electrical activity without palpable pulse or measurable blood pressure	SBP < 60 mmHg Transient response or unresponsive to fluid resuscitation	SBP 60 - 90 mmHg Stable response to fluid resuscitation

# EDT

- Because of the rarity of EDT and the speed at which it is usually done when indicated, true training is minimal.
- Therefore alternate training method and frequent skill practice sessions are important.

















Whatever we do  
everyday...

.....lets do it with a big HEART