



# Schulich

MEDICINE & DENTISTRY

# How I do it en traumatologie -

## Arrêt traumatique

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Chief of Surgery, Victoria Hospital, London Health Sciences Centre

*53<sup>e</sup> Congrès de l'Association Québécoise de Chirurgie  
Gatineau, Québec  
18 Mai, 2023*



# Conflit d'intérêts

- Conseiller médical pour Frontline Medical Technologies Inc.

# Introduction

Arrêt traumatique  $\neq$  Arrêt medical

ACLS a une utilisation très limitée...  
voire pas du tout



**Sont-ils vraiment morts ou presque morts???**

# Pourquoi?

- Trauma pénétrant cardiaque qui se présente en état de choc – jusqu'à 35% de survie
- Tous les traumas pénétrants thoraciques – 15% de survie
- Tous les patients avec traumas contondants – 1-2% de survie

# Prehospital traumatic cardiac arrest: Management and outcomes from the resuscitation outcomes consortium epistry-trauma and PROPHET registries

**Christopher C.D. Evans, MD, Ashley Petersen, Eric N. Meier, MS, Jason E. Buick, MSc, PCP, Martin Schreiber, MD, Delores Kannas, RN, MSN, Michael A. Austin, MBBS, and the Resuscitation Outcomes Consortium Investigators, Kingston, Ontario, Canada**

*J Trauma Acute Care Surg.* 2016;81: 285–293.

- 6,3% de survie à la sortie de l'hôpital
- La plupart avaient des signes vitaux à l'arrivée des ambulanciers

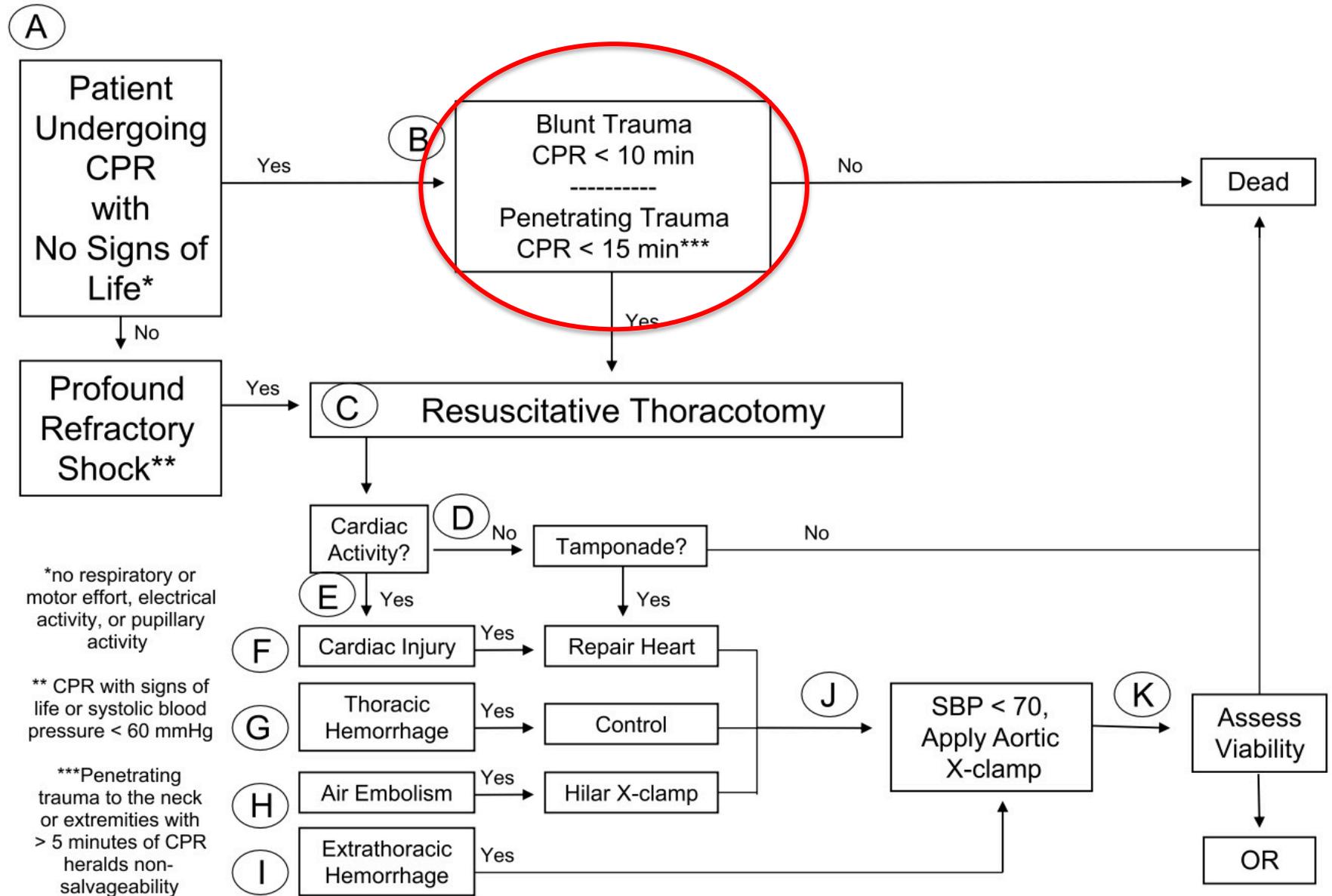
# Qui?

WTA 2012 ALGORITHM

## Western Trauma Association Critical Decisions in Trauma: Resuscitative thoracotomy

**Clay Cothren Burlew, MD, Ernest E. Moore, MD, Frederick A. Moore, MD, Raul Coimbra, MD,  
Robert C. McIntyre, Jr., MD, James W. Davis, MD, Jason Sperry, MD,  
and Walter L. Biffl, MD, Denver, Colorado**

# Qui?



# Qui?

## An evidence-based approach to patient selection for emergency department thoracotomy: A practice management guideline from the Eastern Association for the Surgery of Trauma

**Mark J. Seamon, MD, Elliott R. Haut, MD, PhD, Kyle Van Arendonk, MD, Ronald R. Barbosa, MD, William C. Chiu, MD, Christopher J. Dente, MD, Nicole Fox, MD, Randeep S. Jawa, MD, Kosar Khwaja, MD, J. Kayle Lee, MD, Louis J. Magnotti, MD, Julie A. Mayglothling, MD, Amy A. McDonald, MD, Susan Rowell, MD, MCR, Kathleen B. To, MD, Yngve Falck-Ytter, MD, and Peter Rhee, MD, MPH, Philadelphia, Pennsylvania**

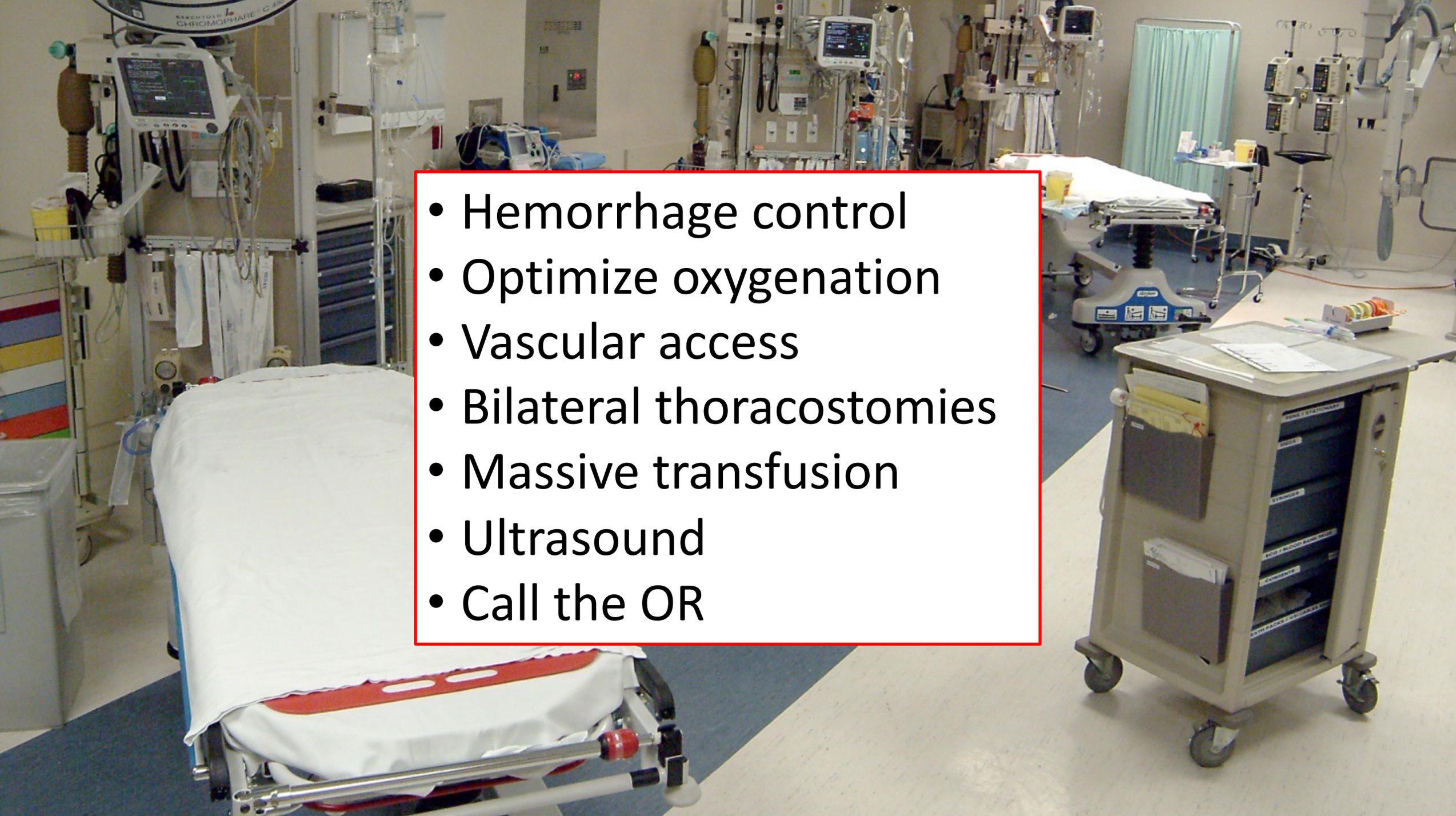
### CONCLUSION:

We strongly recommend that patients who present pulseless with signs of life after penetrating thoracic injury undergo EDT. We conditionally recommend EDT for patients who present pulseless and have absent signs of life after penetrating thoracic injury, present or absent signs of life after penetrating extrathoracic injury, or present signs of life after blunt injury. Lastly, we conditionally recommend against EDT for pulseless patients without signs of life after blunt injury. (*J Trauma Acute Care Surg.* 2015;79: 159–173. Copyright © 2015 Wolters Kluwer Health, Inc. All rights reserved.)

# Priorités avec l'arrêt traumatique

## Identifier les causes réversibles:

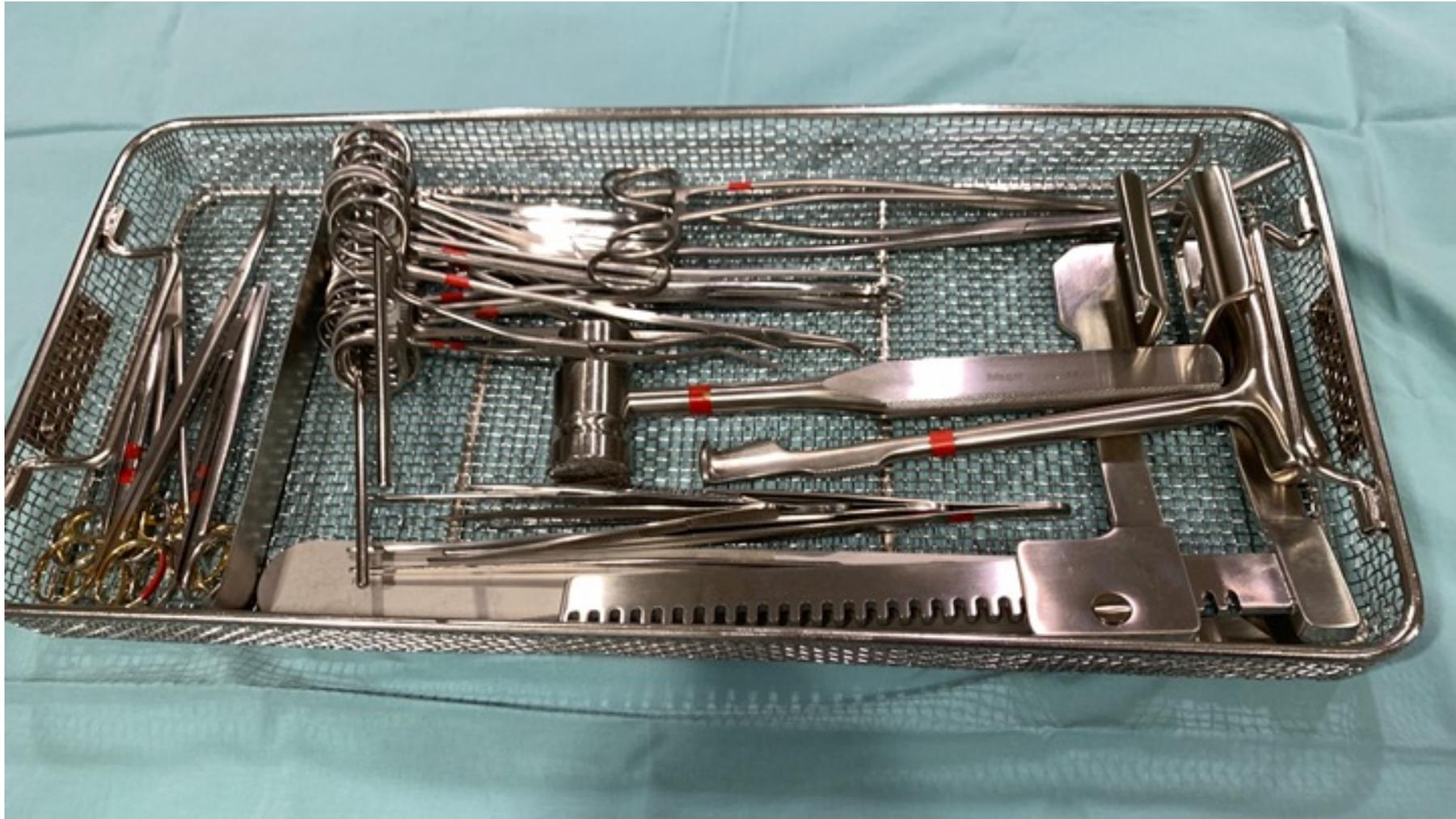
- Hémorragie
- Hypoxie
- Pneumothorax compressif
- Tamponnade cardiaque

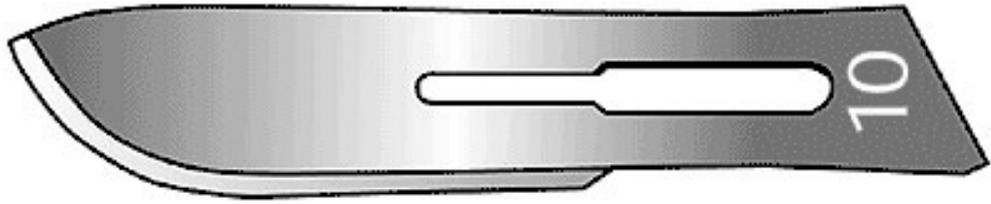
- 
- Hemorrhage control
  - Optimize oxygenation
  - Vascular access
  - Bilateral thoracostomies
  - Massive transfusion
  - Ultrasound
  - Call the OR

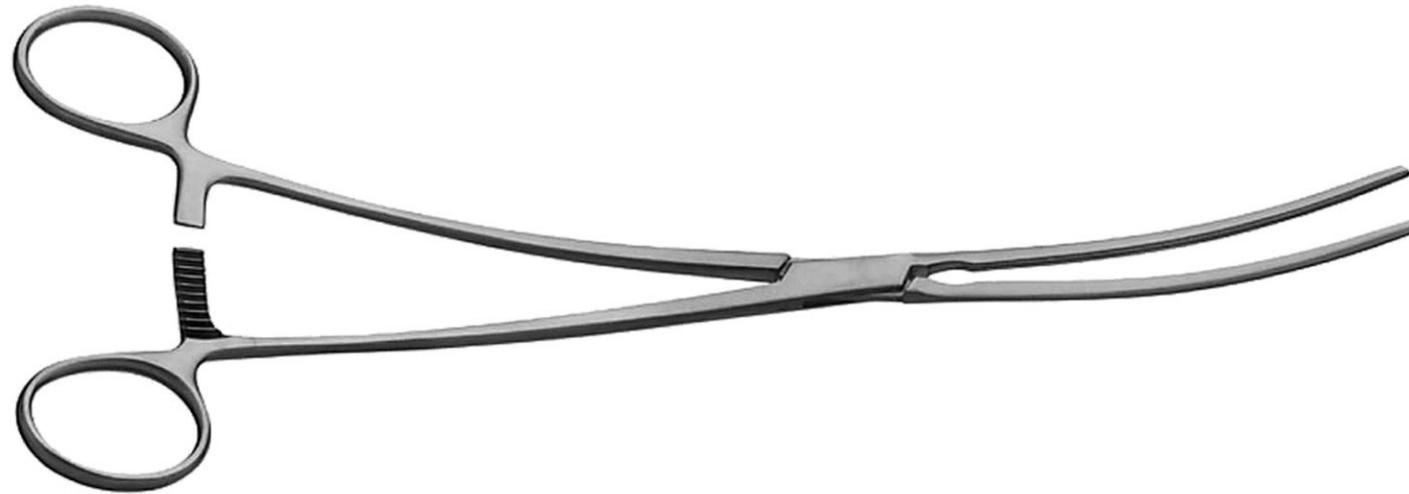
# Decision...



# Thoracotomie de réanimation



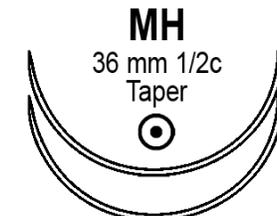




**3-0**  
(2.0 metric)  
**36" (90 cm)**

**8842H**

**PROLENE\***  
(Polypropylene) Suture  
**BLUE MONOFILAMENT**



**ETHALLOY\* NEEDLE ALLOY**

3 DOZEN

EXP

LOT

**ETHICON™**

Disclaimer: Needle sizes displayed on the Ethicon Product Center may vary depending on computer/tablet/smartphone screen ratios.



**Incision pour thoracotomie de réanimation**

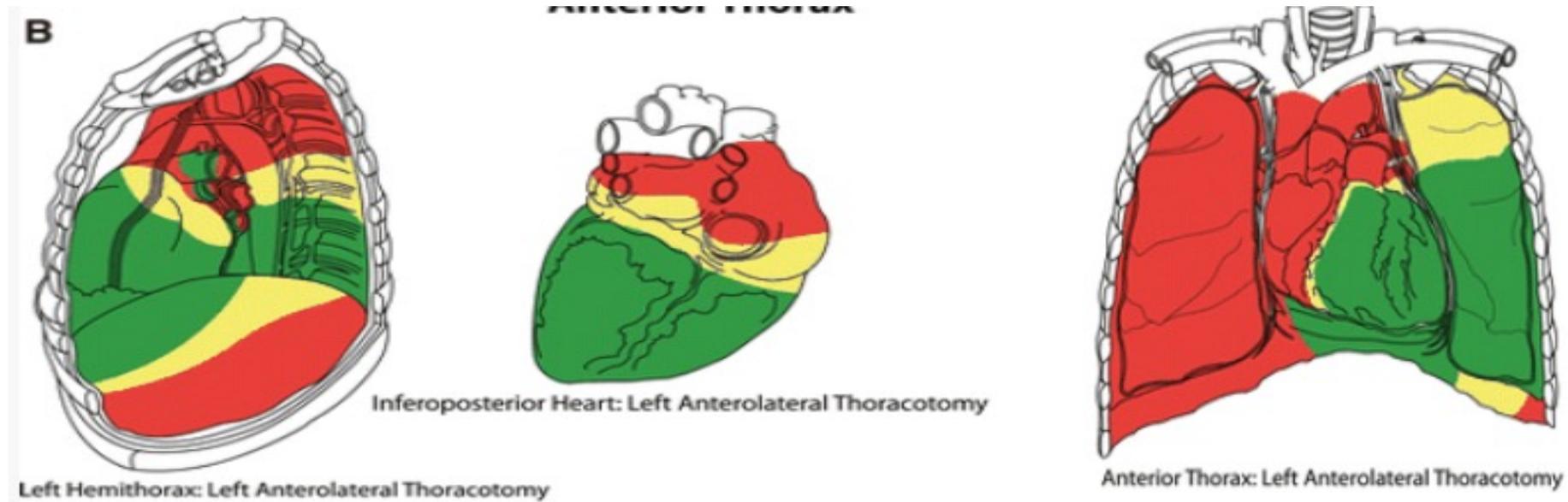
# Objectifs

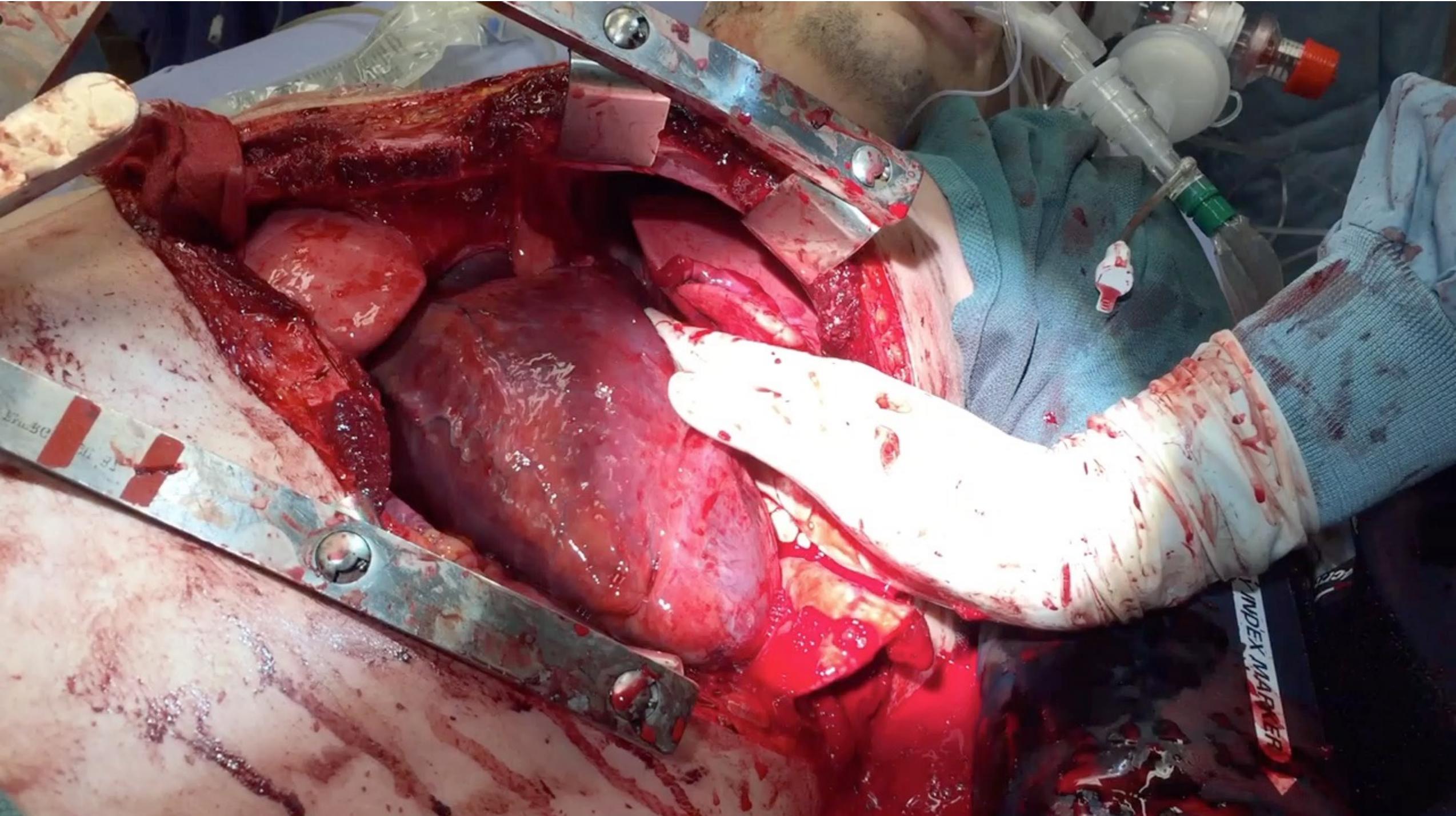
- Ouvrir le péricarde – contrôler l'hémorragie.
- Comprimer/clamper l'aorte thoracique descendante au-dessus du diaphragme
- Inspecter les poumons pour tout saignement - considérer clamper le hile pulmonaire
- Commencer la compression/défibriation cardiaque au besoin
- Vers la salle d'operation



**Rib spreader  
placed with  
handle in axilla**

# Thoracotomie antérolatérale gauche



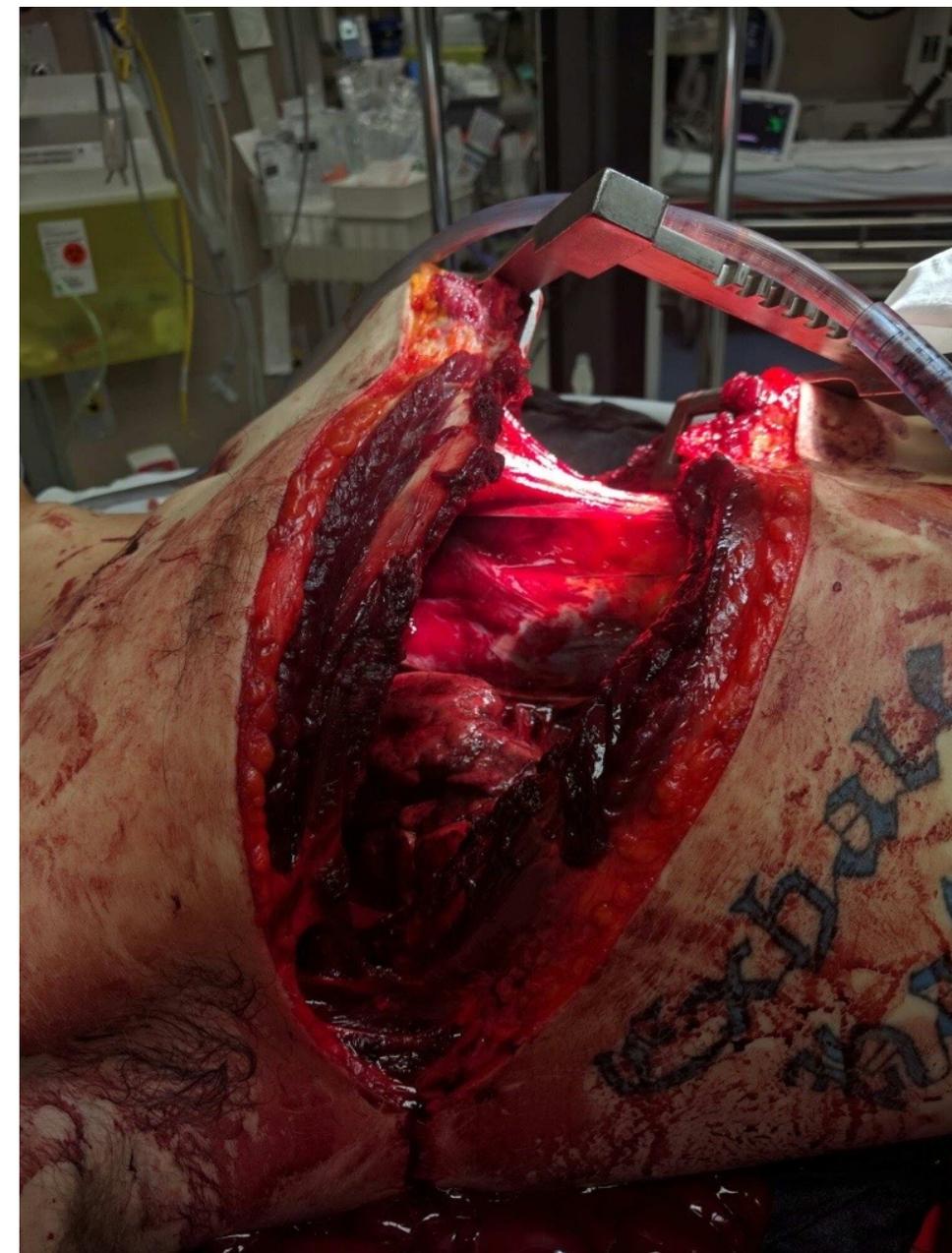
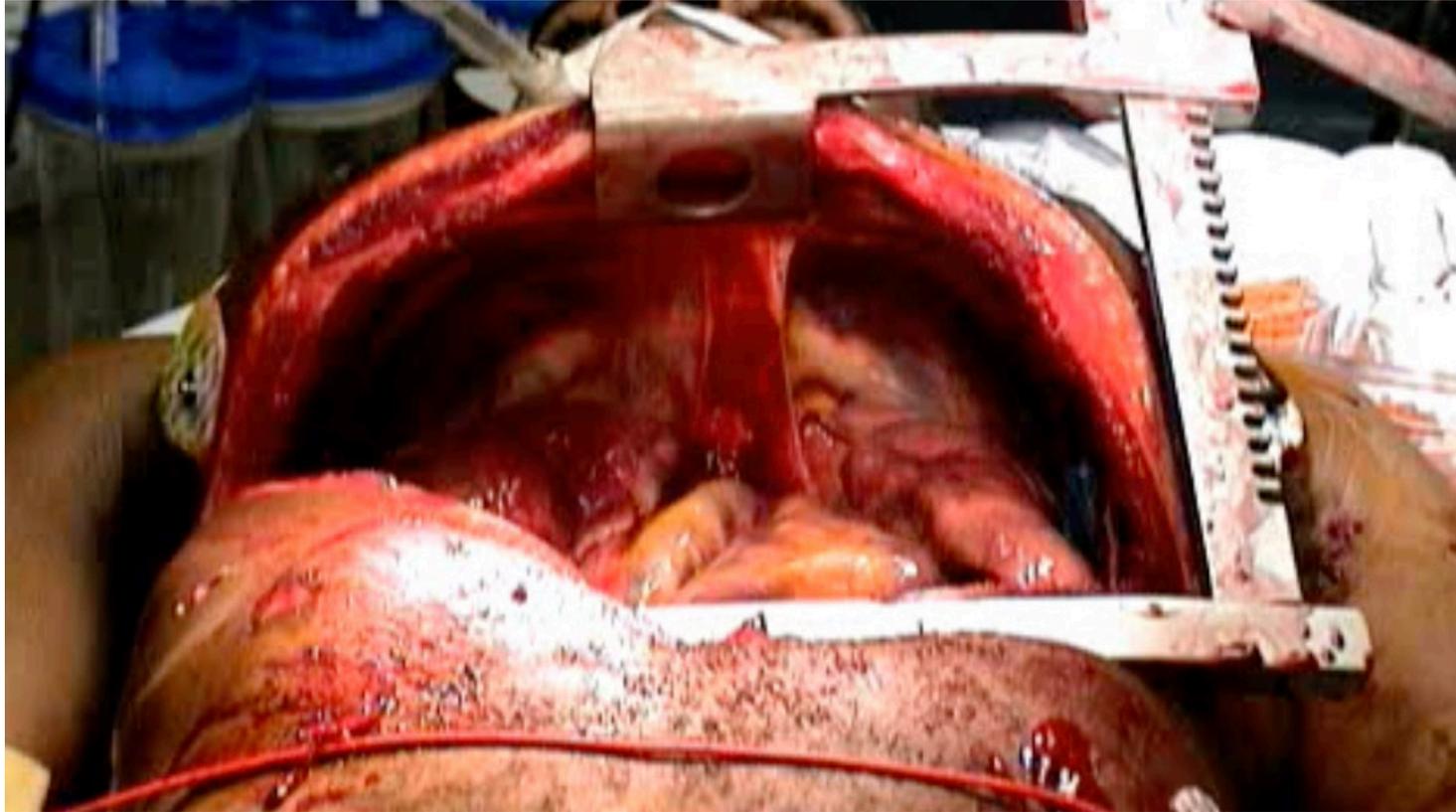


INDEX MARKER

**The Sternum is divided  
using a Lebske Knife**



# Clamshell



# Thoracotomie clamshell

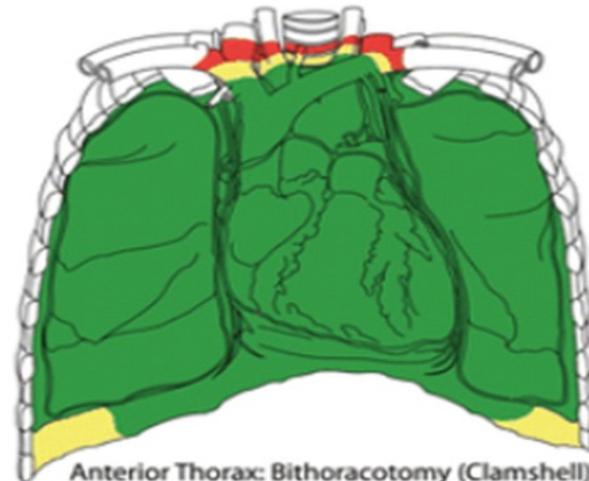
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Left Hemithorax: Bithoracotomy (Clamshell)



Right Thorax: Bithoracotomy (Clamshell)

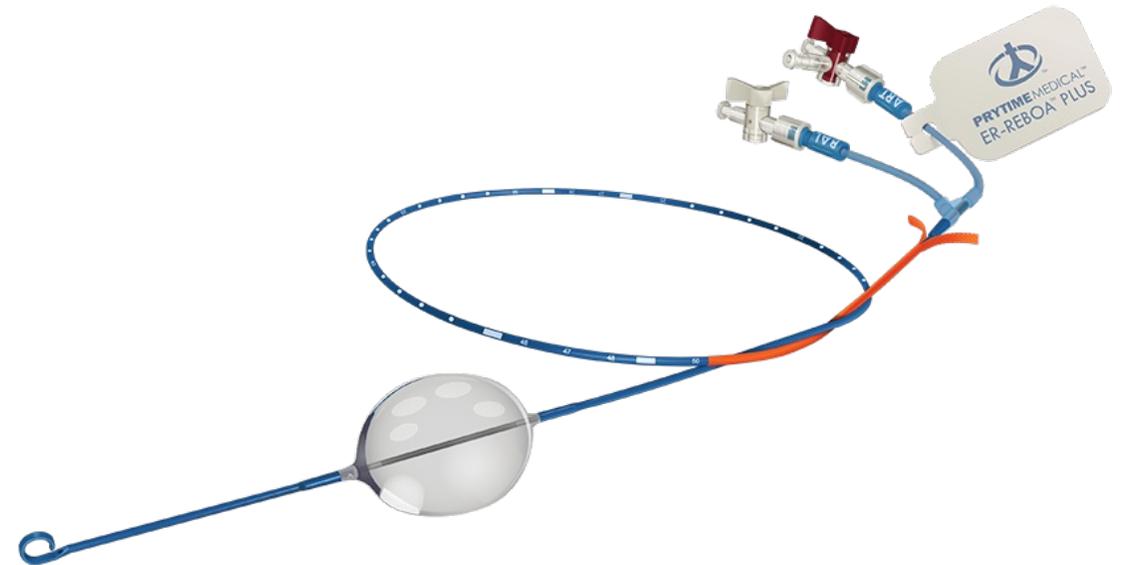
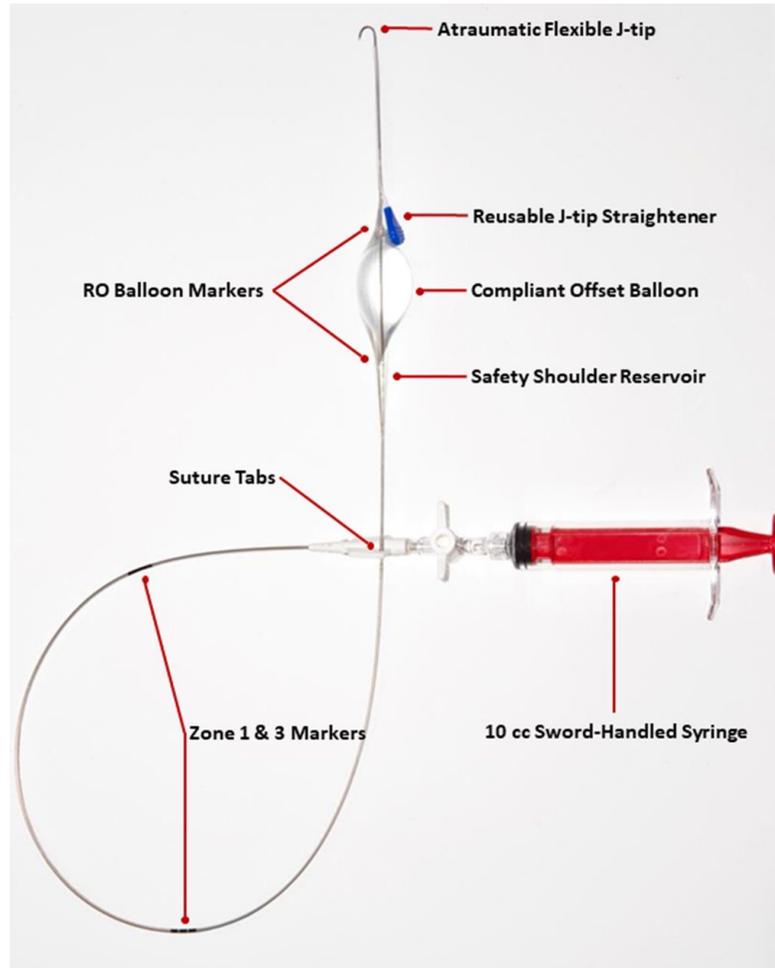


Anterior Thorax: Bithoracotomy (Clamshell)

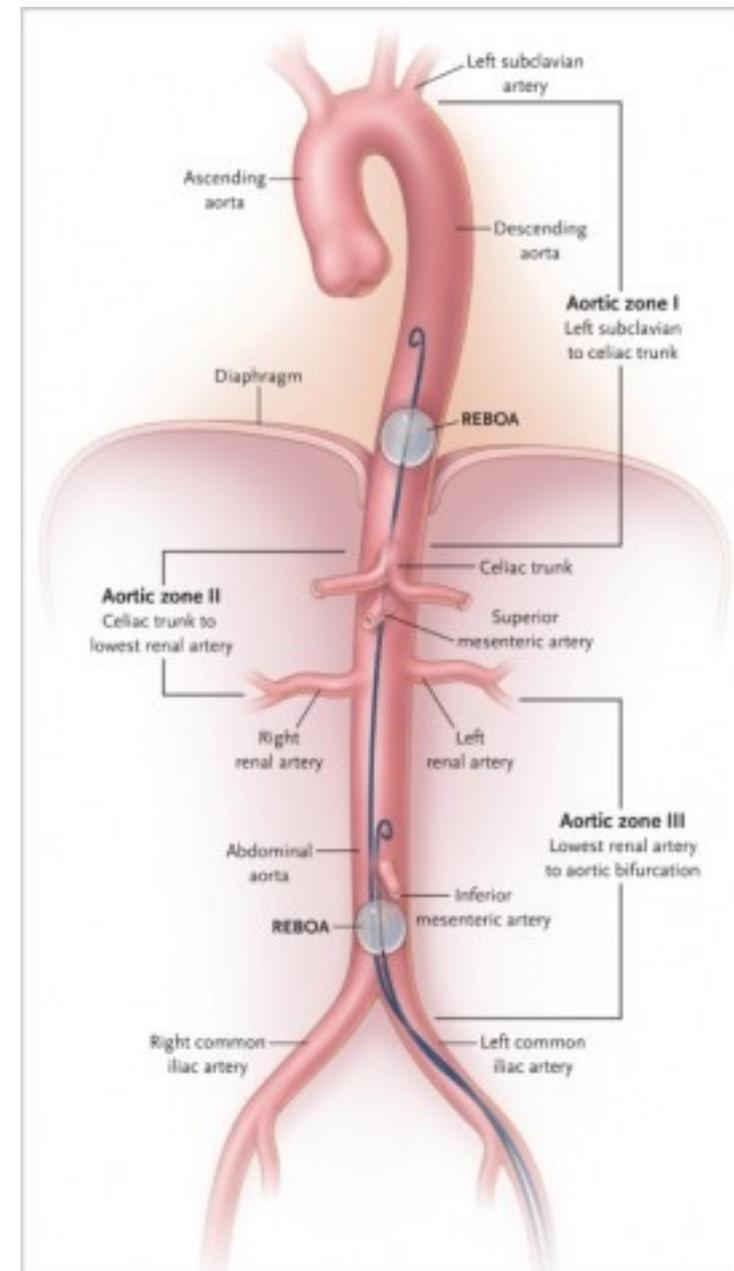
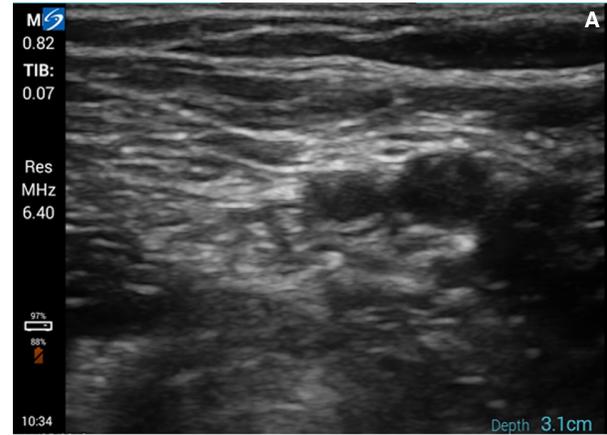


Inferoposterior Heart: Bithoracotomy

# REBOA



# REBOA



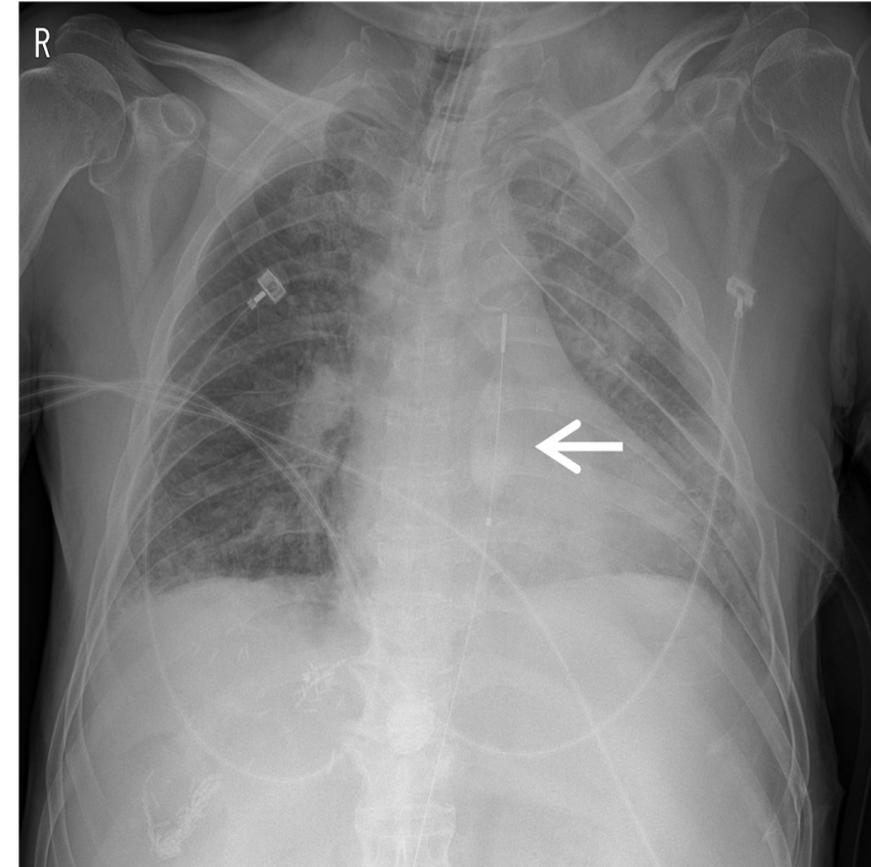
# REBOA

**Utilisé plus avec “presque morts”**

**L'hémorragie doit être sous le diaphragme**

Contre-indications

- Trauma pénétrant thoracique/cou
- Trauma de l'aorte contondant



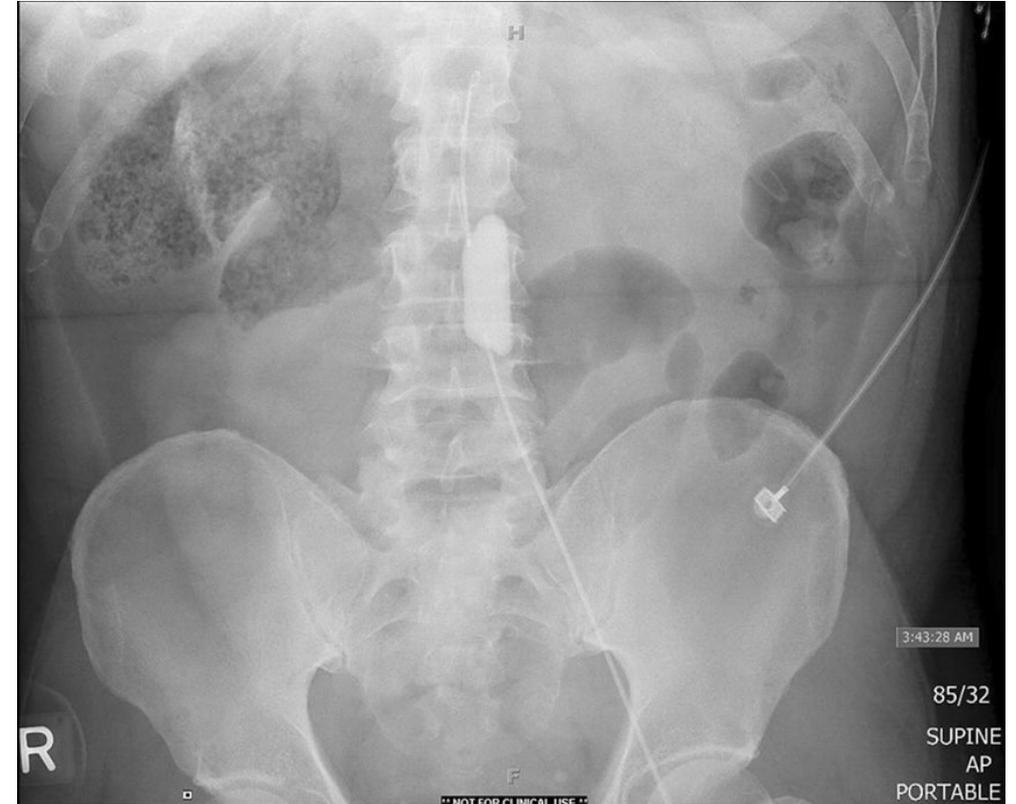
# REBOA

## Avantages

- Moins invasif
- Occlusion aortique partielle/REBOA

## Controverses

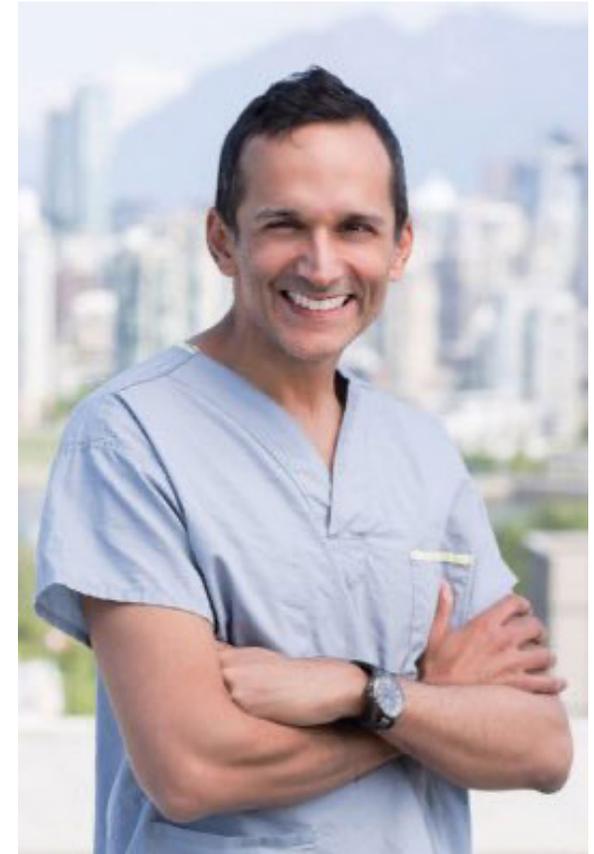
- Plus rapide/plus lent?
- Qui devrait le déployer



# Conclusion

- Bon système
- Identifier les causes réversibles
- Thoracotomie de reanimation pour tous trauma penetrant thoracique
- REBOA pour “presque mort” et thoracotomie de reanimation pour “vraiment mort”???

# Remerciements



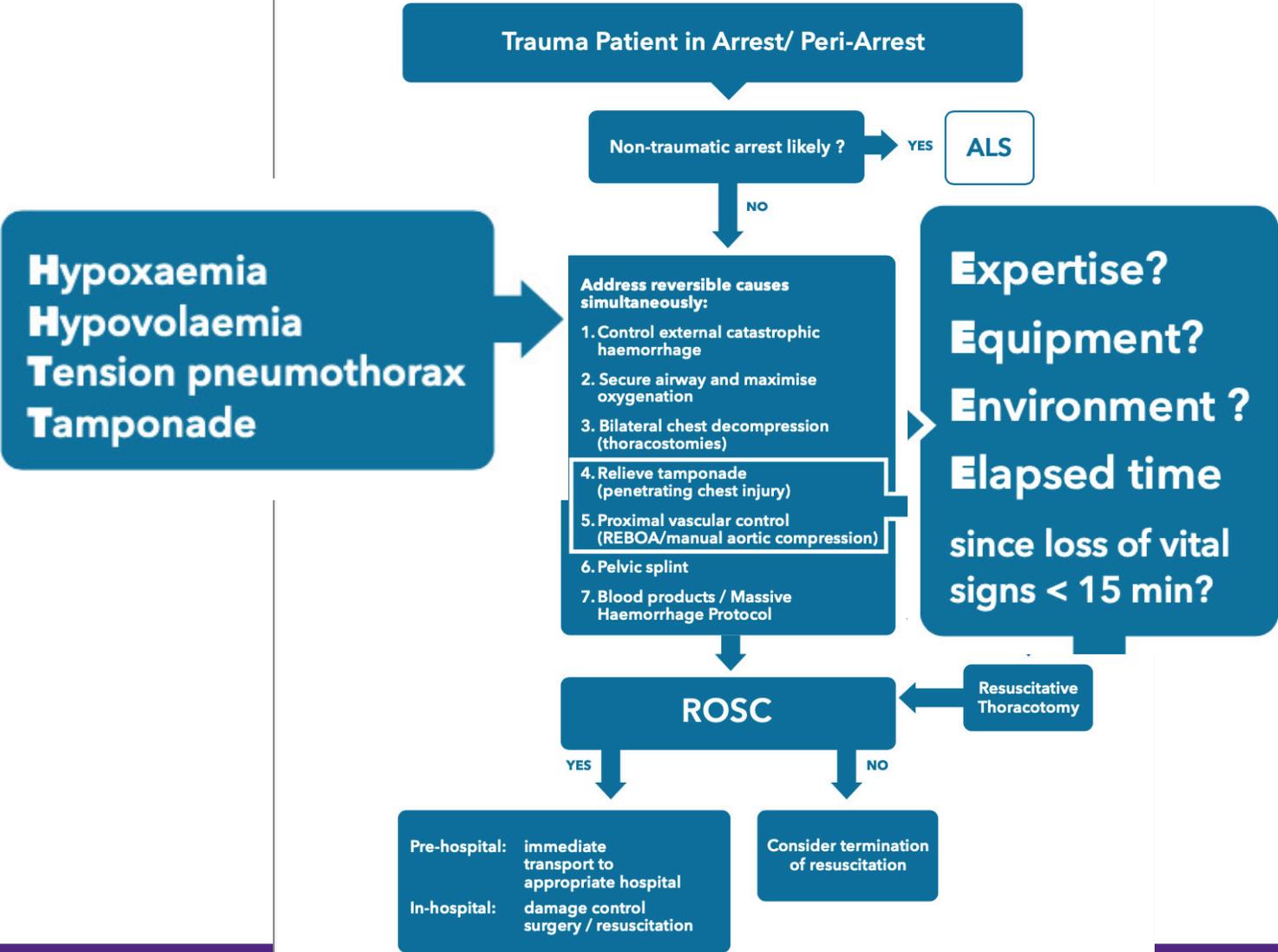
# MERCI





Western  
UNIVERSITY • CANADA

# TRAUMATIC CARDIAC ARREST/ PERI-ARREST ALGORITHM



Royal College of  
Emergency  
Medicine, UK  
September 2019

# TRAUMATIC CARDIAC ARREST ALGORITHM

**High Energy Mechanism**

**Confirm Cardiac Arrest**

- No Signs of Life
- No palpable pulses

**Box 1. Initial Life Saving Interventions**

- Haemorrhage Control incl. pelvic binder
- Optimise Oxygenation / Ventilation
- Vascular Access
- Bilateral Thoracostomies
- Rapid warmed blood and blood product transfusion

**Consider Resus Thoracotomy**  
especially penetrating trauma

**ROSC**

- Consider transfer to theatre for Damage Control Surgery (DCS)
- Consider vasopressors in Head Injury post-ROSC, pre-DCS
- Keep warm and address the coagulopathy
- Consider CT Imaging
- Arrange ICU transfer

**If Probable Medical Cause of Cardiac Arrest**  
eg. drowning or cardiac event preceding a collapse  
**Follow Standard ALS algorithms**

**Reversible Causes**

- Hypoxia
- Hypovolaemia
- Tension Pneumothorax
- Cardiac Tamponade

**Prioritise**

- Box 1 Interventions
- Cardiac Ultrasound

**De-Prioritise**

- ECC
- Defibrillation
- Vasopressors

**Resus Thoracotomy**

- Cardiac Tamponade
- Massive unilateral haemothorax

**Decision to STOP Resuscitation guided by:**

- Duration of Cardiac Arrest
- Lack of response to life saving interventions
- Persistently low ETCO<sub>2</sub>
- Cardiac standstill on ultrasound