

STATE OF THE ART

Trauma Edition 2023



34M

BP 101/84 HR 97
Tender abdomen, E-FAST negative

36F

BP 78/54 HR 117 GCS 6
Chest and pelvic trauma
Intubated on scene

64M

BP 145/88 HR 78
Mid-face trauma, LeFort 2

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Tender abdomen, E-FAST negative

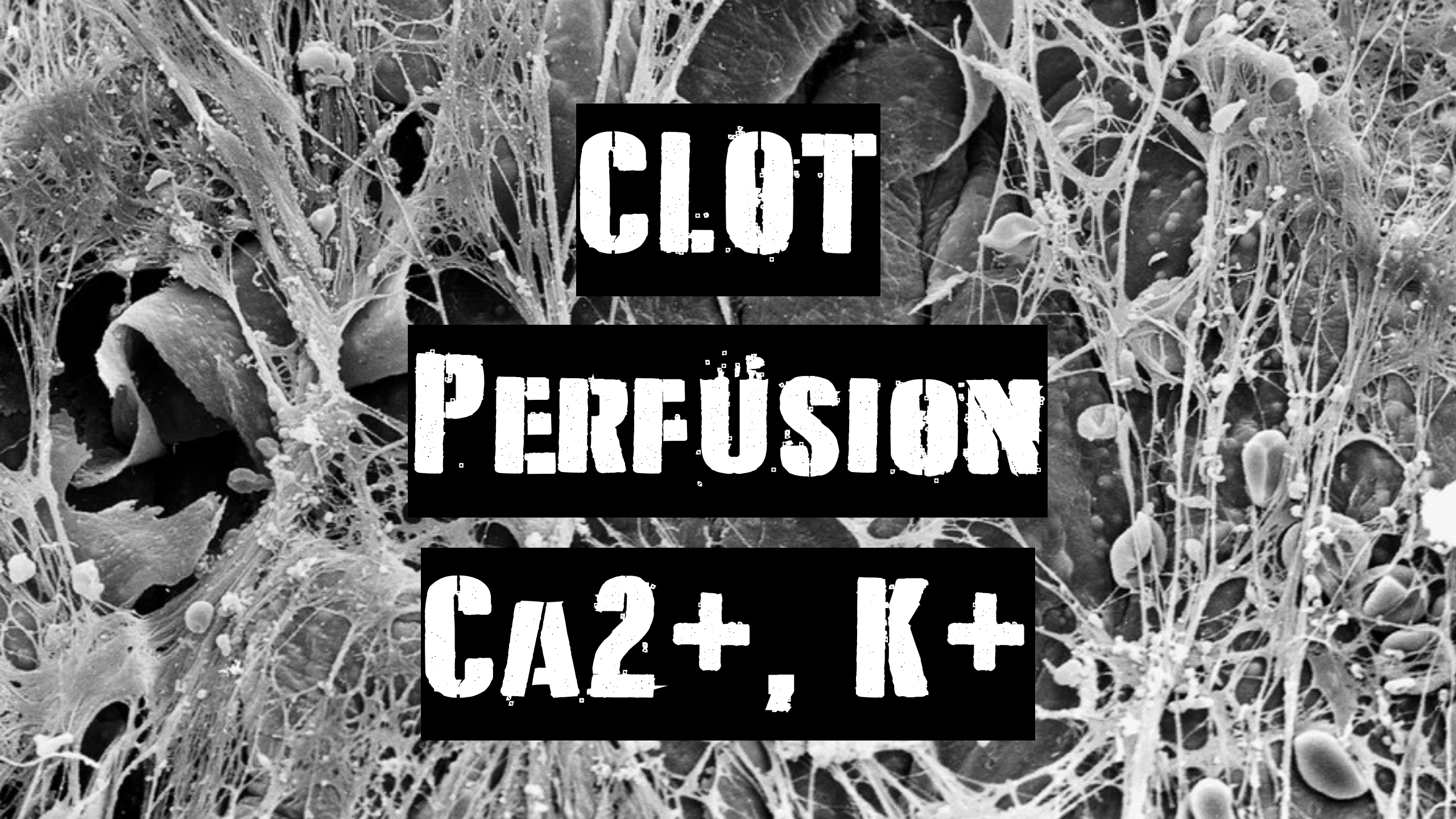
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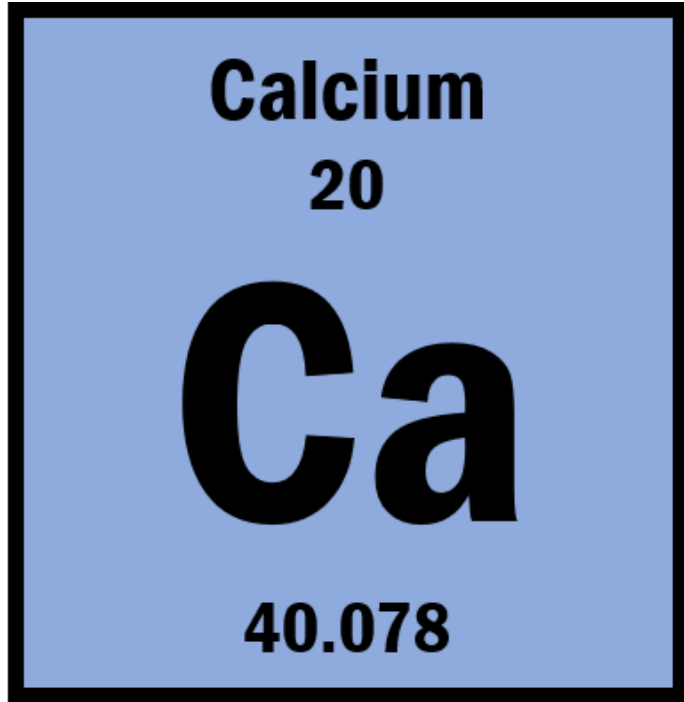




CLOT

PERFUSION

CA²⁺, K⁺



PLATELET FUNCTION
CLOTTING CASCADE
CONTRACTILITY

SYSTEMATIC REVIEW

OPEN

Hypocalcemia in trauma patients: A systematic review

**Mayank Vasudeva, MBBS, Joseph K. Mathew, MBBS, FACEM, Christopher Groombridge, MBBS, FACEM,
Jin W. Tee, MD, FRACS, Cecil S. Johnny, MBBS, FACEM,
Amit Maini, MBBS, FACEM, and Mark C. Fitzgerald, MD, FACEM, Melbourne, Australia**



Death

Associated with higher mortality
in all studies

Transfusion

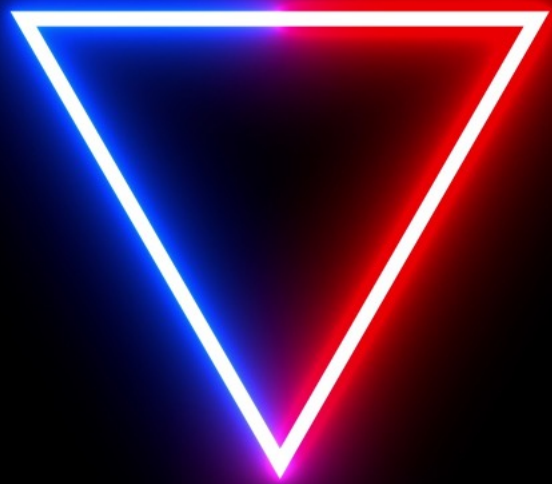
Paralleled severity of
hypocalcemia

Coagulopathy

More significant and severe

1:1:1:1

MIHP STARTER PACK



2U PRBC
2g TXA
2g CaCl

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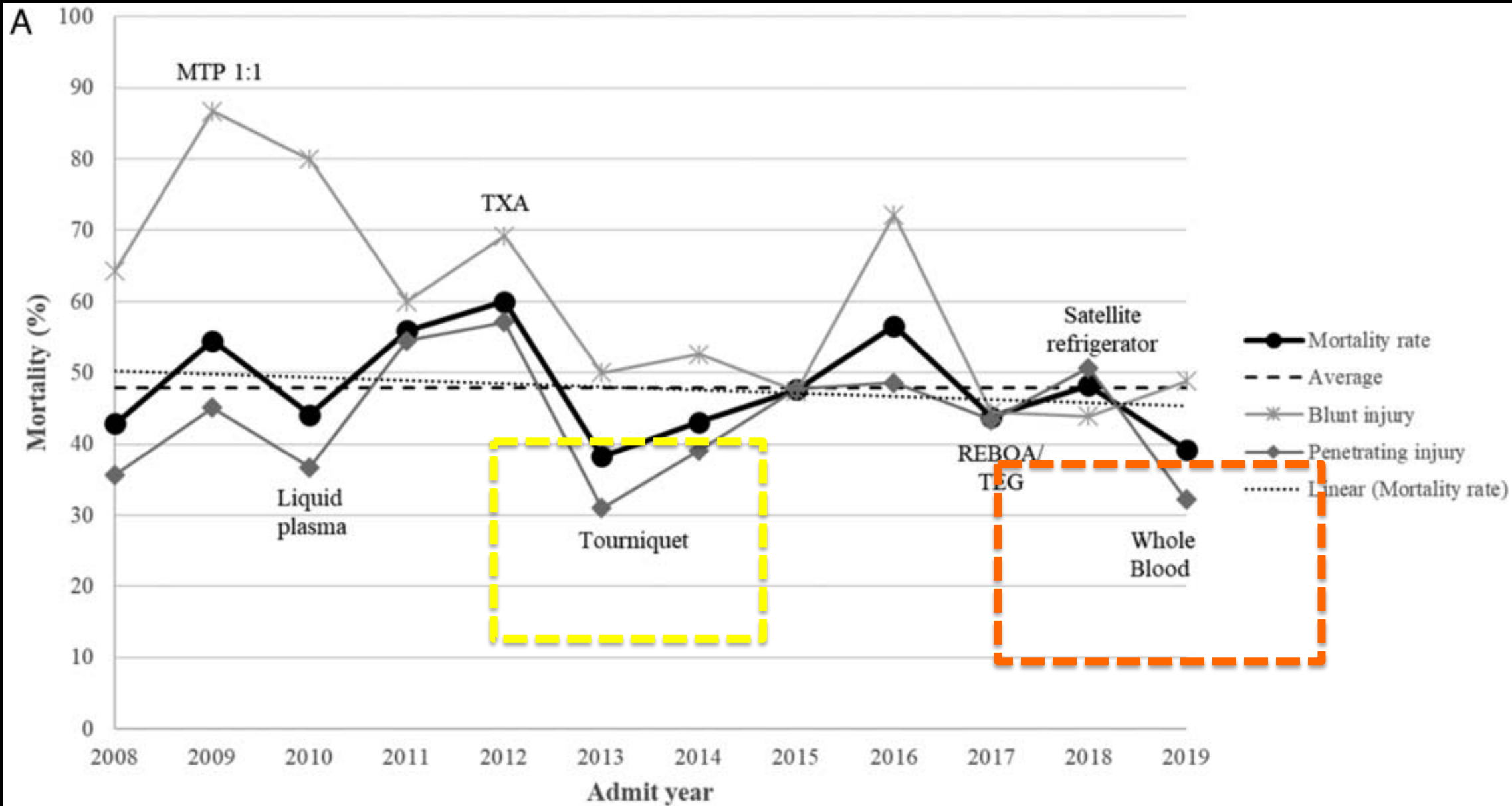
REVIEW

TRANSFUSION

Trauma-induced hypocalcemia

Margot DeBot¹  | Angela Sauaia^{1,2} | Terry Schaid¹ | Ernest E. Moore³

PRBC / FFP / PLT / FC / TXA







STORED WB
1-6C, 5-21 DAYS
LOW TITRE O+

	1:1:1	WB
HCT	29%	38-50%
PLT	80 000	NORMAL
COAGS	65%	100%
FIBRINOGEN	1G	1G
VOLUME	700 ml.	500 ml.

LEUKO-REDUCED

LTOWB

1:120 000

Low Titer O+ Whole Blood – Trauma

History

- What was the mechanism of injury – blunt (MVC, fall, blow to body) vs. penetrating (stabbing, GSW, foreign body)?
- Did a medical condition contribute to the mechanism of injury? Other medical conditions?
- Medications – Coumadin? Plavix? Aspirin? Pradaxa? Xarelto? Eliquis? (any blood thinners or anticoagulants)
- Beta Blockers and Calcium Channel Blockers may not allow HR to increase appropriately

Key Concepts

- Low Titer O + Whole Blood is now being used to treat severely injured trauma patients who have or are at risk for severe hemorrhage

MARCHES Protocol

- **M**assive bleeding control
- **A**irway – NPA/OPA/ Crich
- **R**espiratory – decompress chest if tension pneumothorax, occlusive dressing for open pneumothoraces
- **C**irculation- IV/IO Tq, pelvic binder, wound packing
- **H**ypothermia care
- **E**ye injuries – cover with rigid shield and no pressure on the eye
- **S**pinal motion restriction if indicated



SURVIVAL.

4X

JACS 2022, 234(4): 408-418

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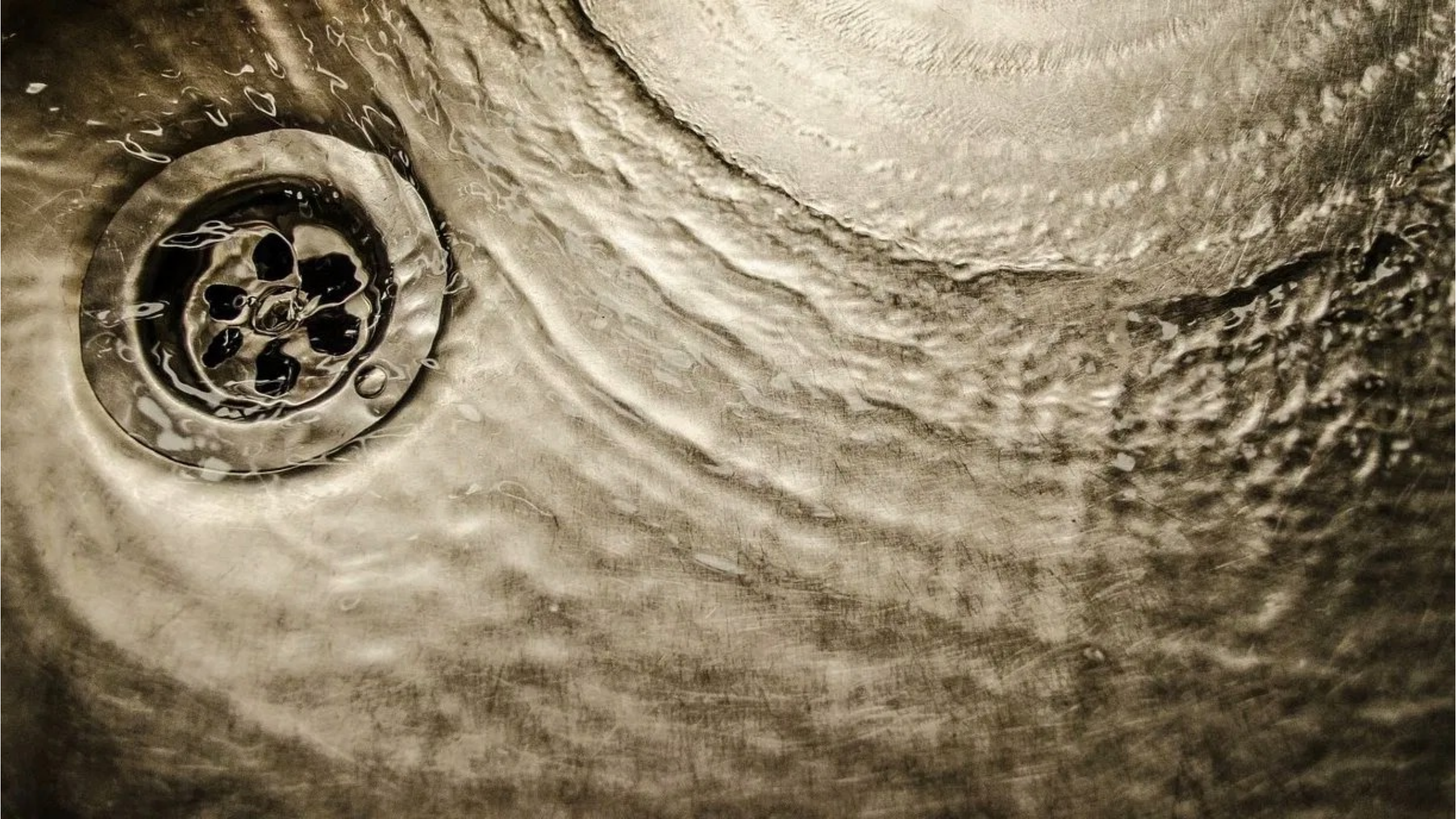
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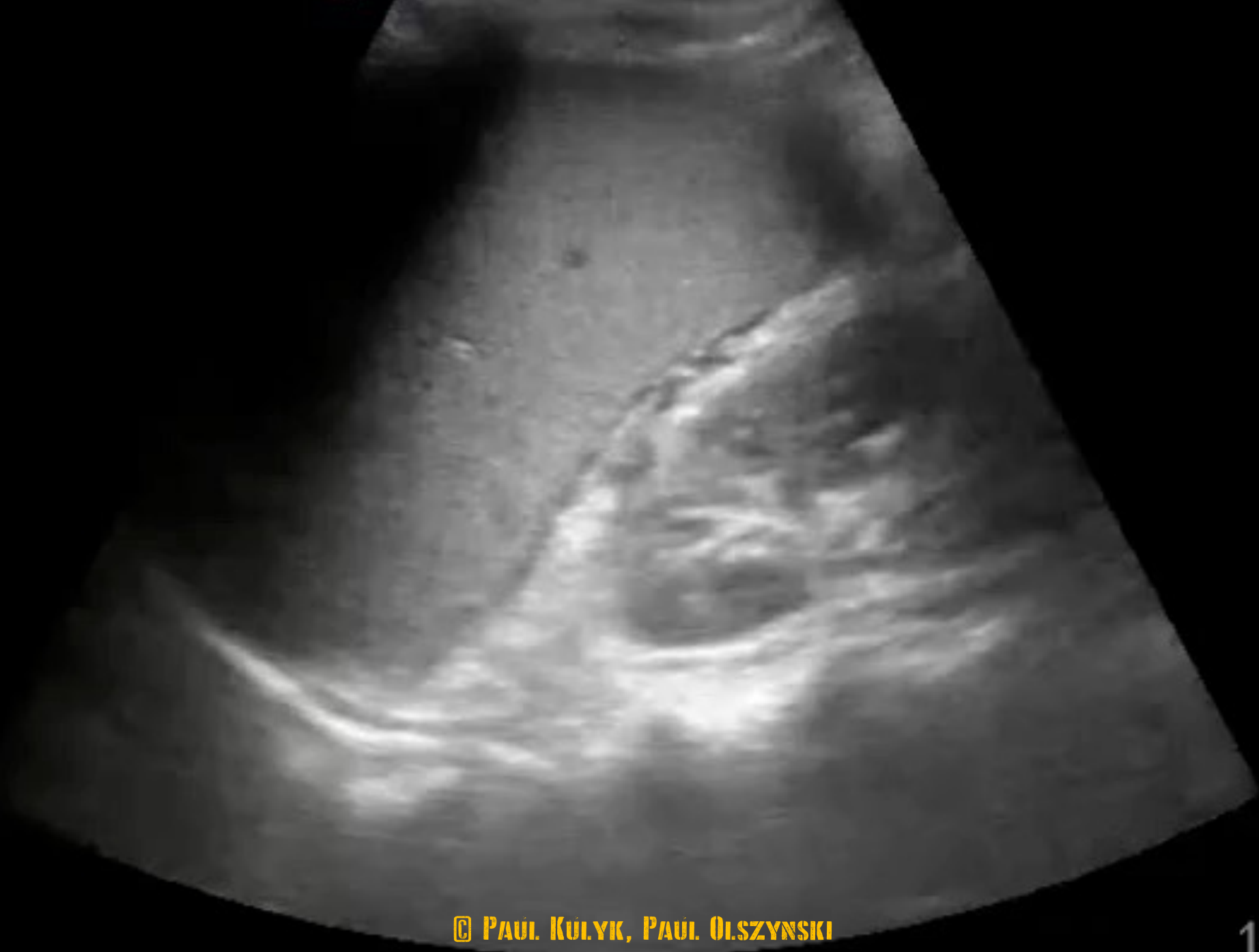
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101

84

92

78

Prehospital Narrow Pulse Pressure Predicts Need for Resuscitative Thoracotomy and Emergent Intervention after Trauma

Morgan Schellenberg, MD, MPH, Natthida Owattanapanich, MD, Joelle Getrajdman, MD, Kazuhide Matsushima, MD, and Kenji Inaba, MD*

Division of Trauma and Surgical Critical Care, LAC+USC Medical Center, University of Southern California, Los Angeles, California

Hypo

T

NFTI

Resuscitative thoracotomy

Emergent intervention

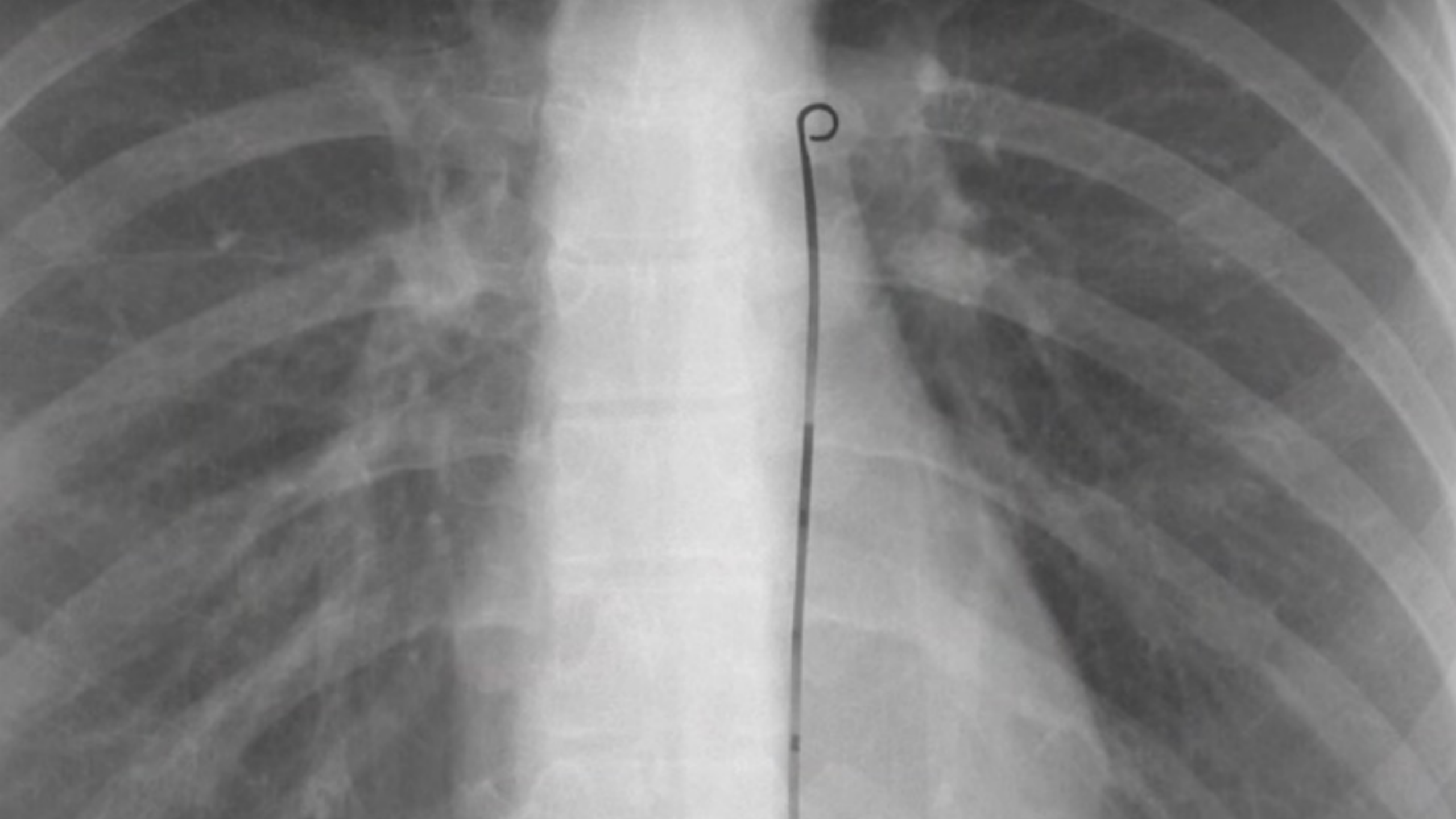
Normo

T

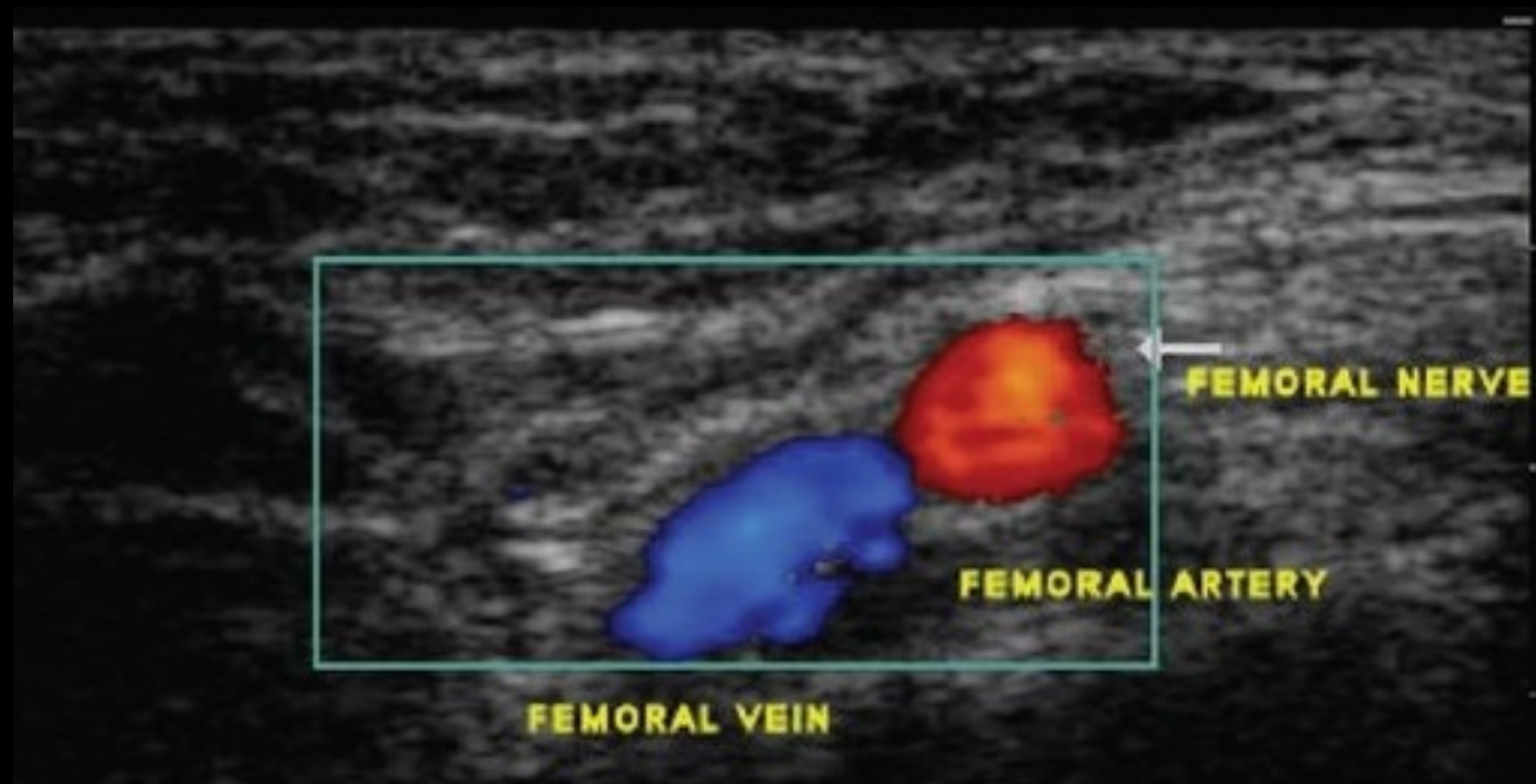
**Prehospital narrow PP
should be recognized as a
proxy for major trauma**

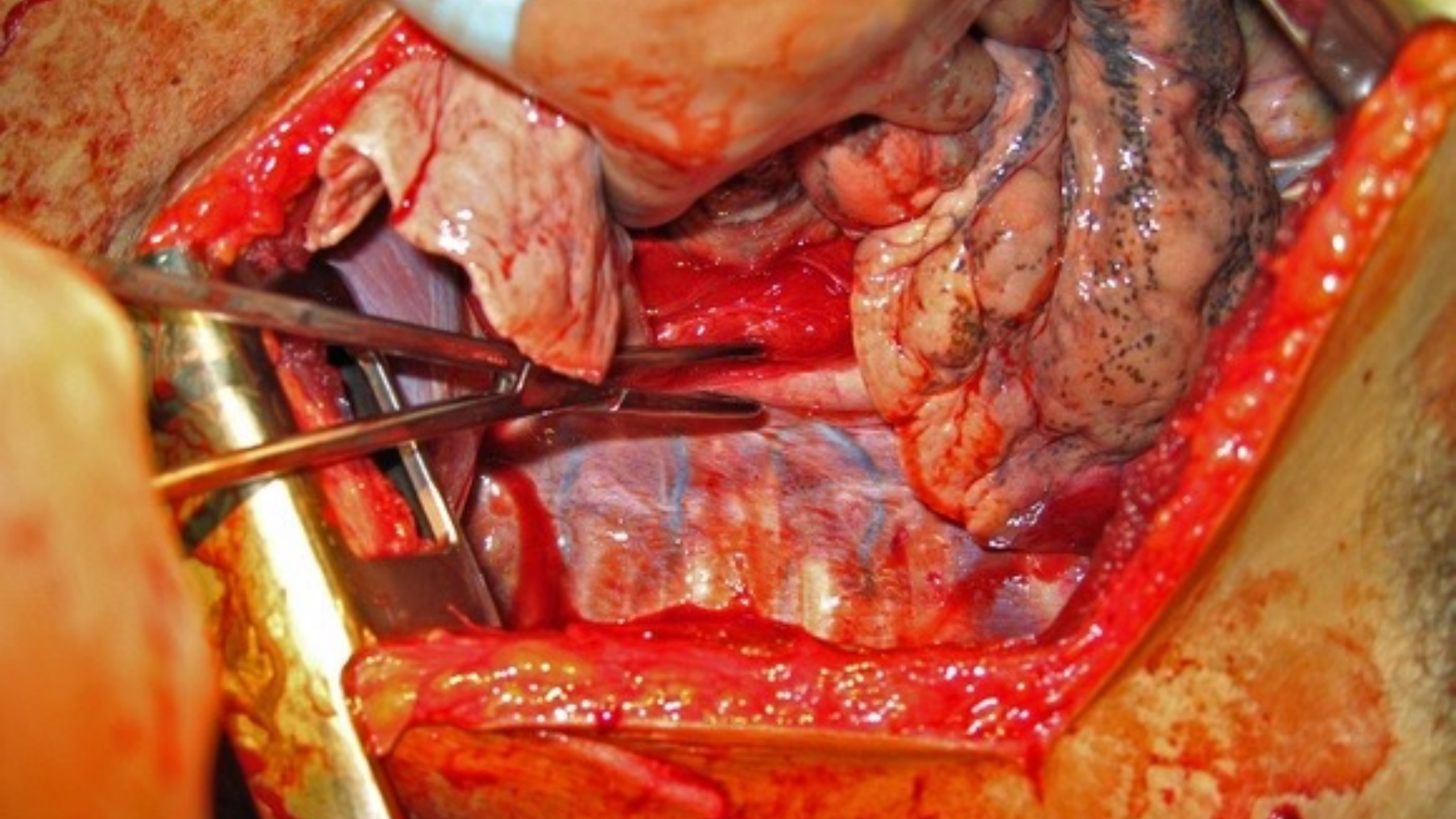
Schellenberg et al

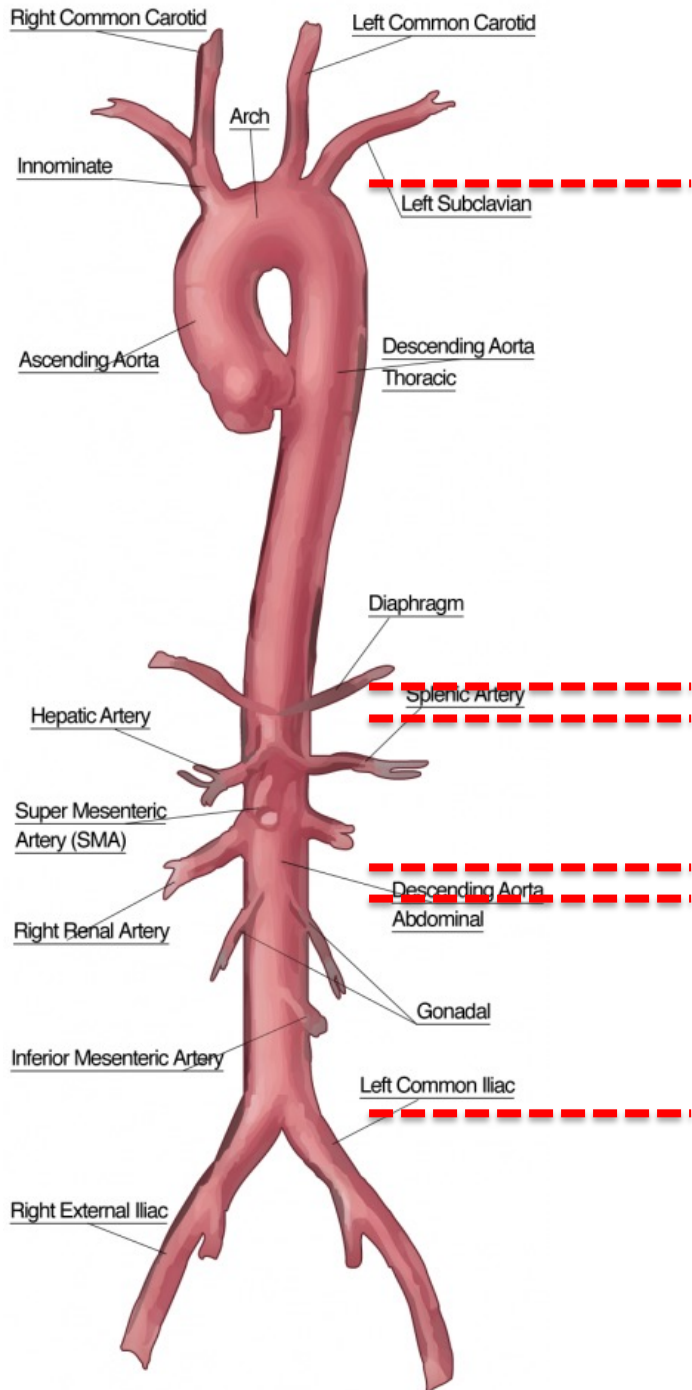




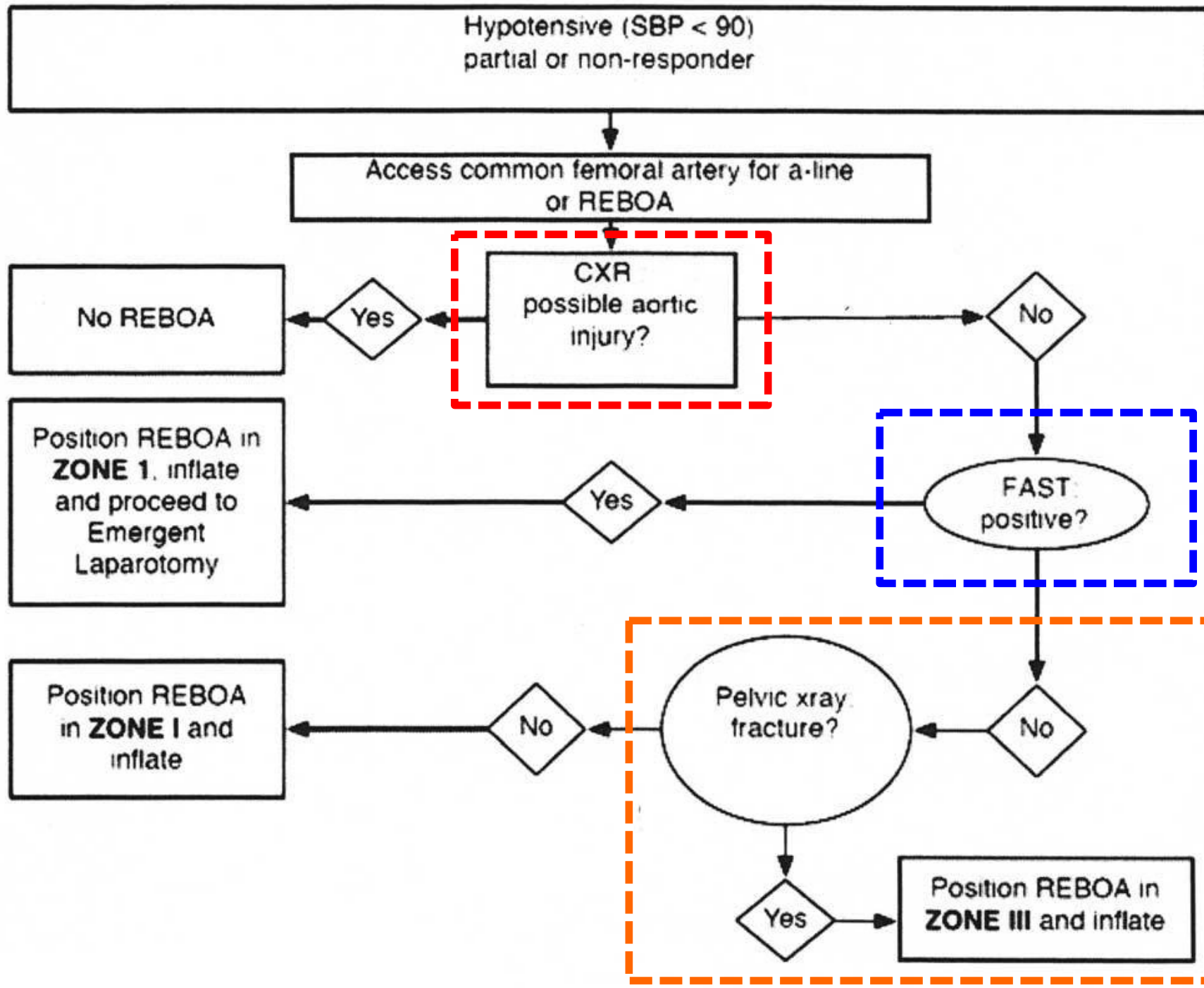








<p>ZONE ONE</p>	<p>~ 20 cm To Xyphoid</p>	<p>Intra-abdominal hemorrhage</p>
<p>ZONE TWO</p>	<p>~ 3 cm</p>	<p>NO FLY ZONE</p>
<p>ZONE THREE</p>	<p>~ 10 cm Umbilicus</p>	<p>Pelvic hemorrhage</p>



DECISION

- Pelvic Fracture or Positive FAST AND sBP <90
- No tamponade or aortic injury
- Designate alternate TTL & notify trauma surgeon

ARTERIAL ACCESS

- Set-up equipment & sterile drapes
- REBOA RN present
- common femoral artery access with 5F

SHEATH INSERTION

- upsize 5F art line to 7F introducer

PREPARE & MEASURE

- MEASURE catheter placement sternum (Zone 1) or xiphoid (Zone 3)
- FLUSH & DEFLATE balloon

REBOA INSERTION

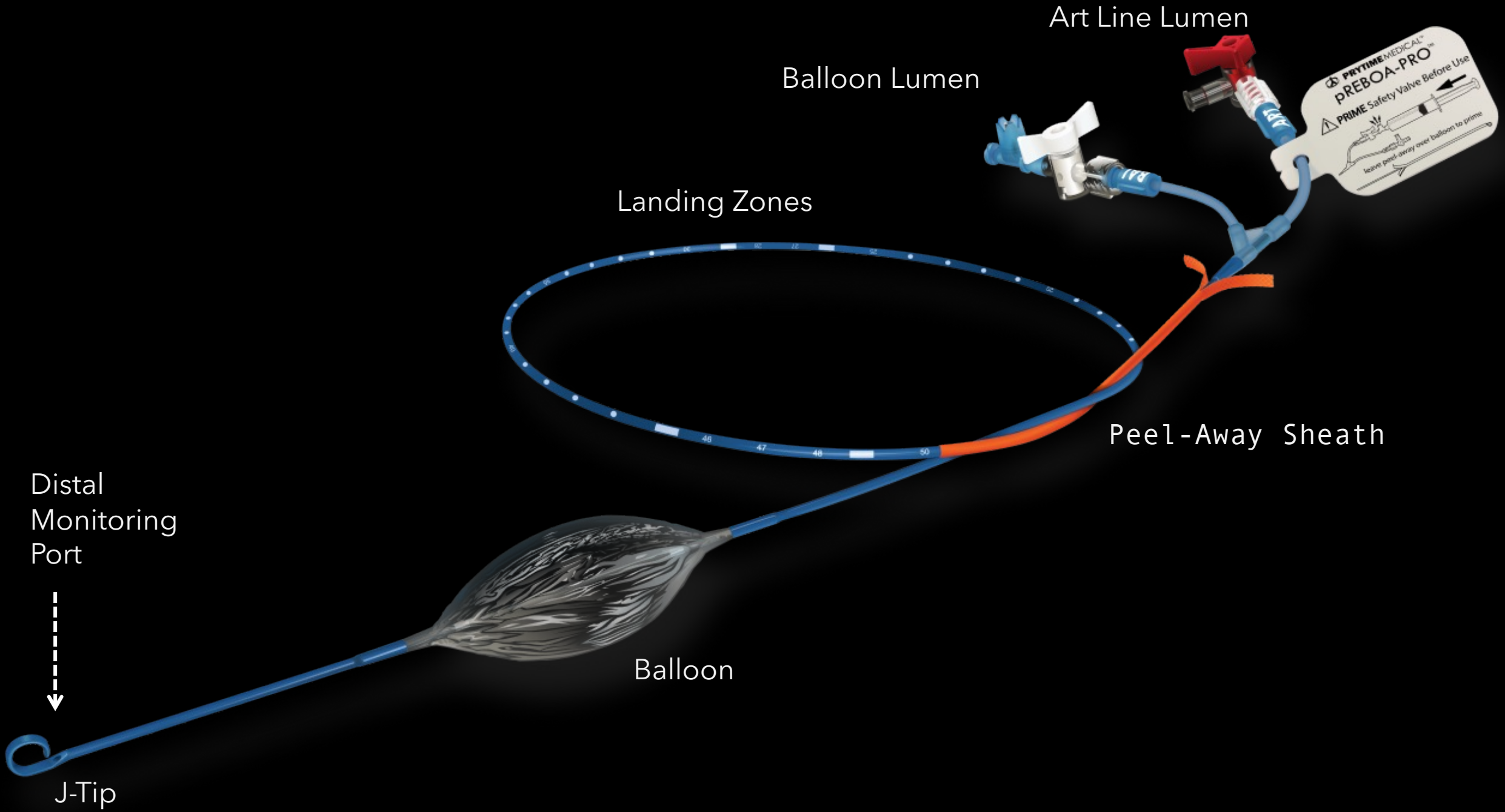
- Attach & flush arterial line BEFORE insertion
- Insert REBOA catheter to desired depth
- CONFIRM location with X-ray

BALLOON INFLATION

- INFLATE balloon (**8cc Zone 1** or **2cc Zone 3**)
- Document time, zone and balloon volume
- SECURE catheter to skin

PROMPT TRANSFER

- EXPEDITE RAPID transfer to OR or IR



Art Line Lumen

Balloon Lumen

Landing Zones

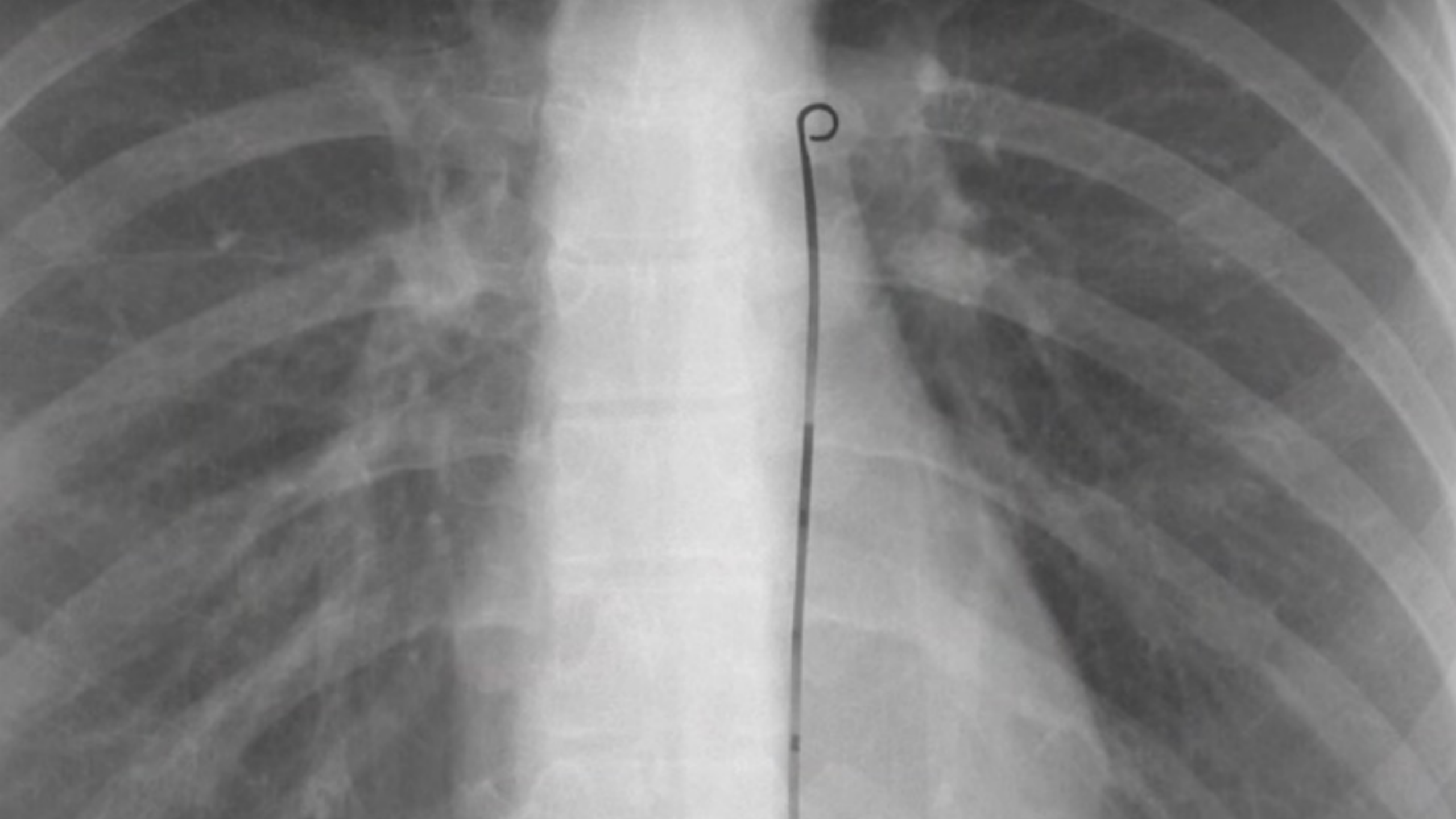
Peel-Away Sheath

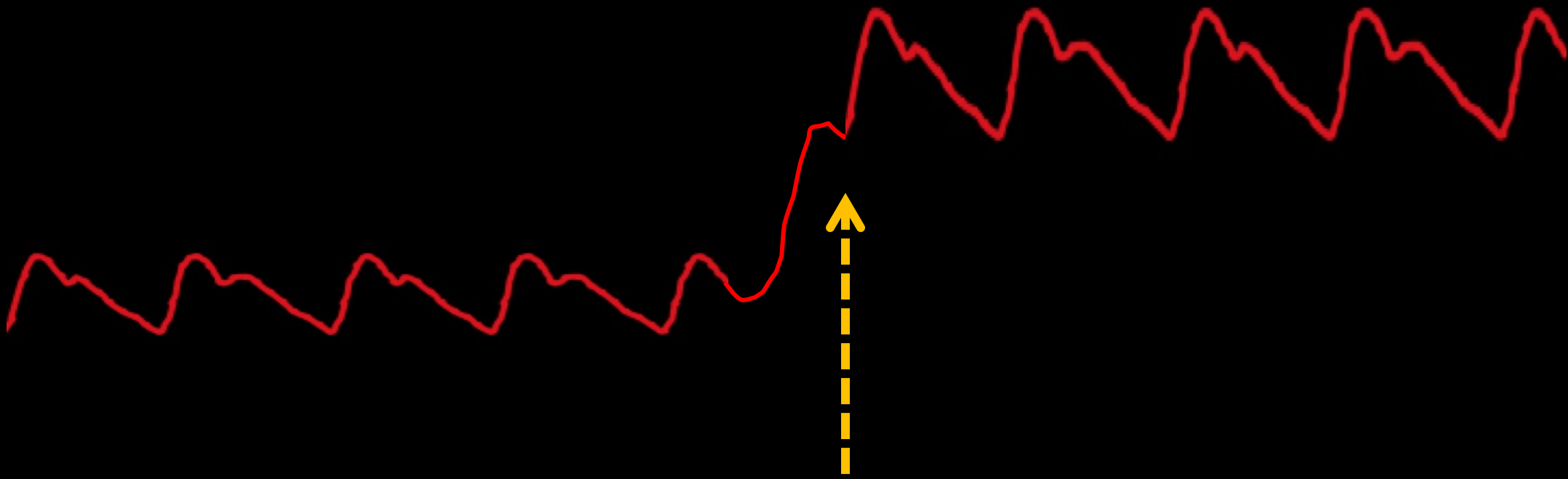
Distal Monitoring Port



J-Tip

Balloon





MHP Starter Pack

Whole Blood is the Future

Pulse Pressure

p-REBOA



@HUMANFACTORZ