ECCU 2017 CONFERENCE & EXHIBITION • A CALL TO ACTION...AND ALL THAT JAZZ!

A Second Chance

Joseph P. Ornato, MD, FACP, FACC, FACEP

Professor & Chairman, Department of Emergency Medicine
Operational Medical Director, Richmond Ambulance Authority,
Richmond Fire & EMS, Henrico County Division of Fire

Virginia Commonwealth University Health System
Richmond, VA, USA

ECCU2017
Emergency Cardiovascular Care Update

CITIZEN CPR FOUNDATION
Helping citizens and communities save lives

Career

- Professor & Chairman, Department of Emergency Medicine
- Board certified – IM, Cardiology, EM
- 40 years of experiences as an EMS
  EMS Operational Medical Director
    NY City, US Army, Nebraska, Virginia
- AHA volunteer since 1974
- American Editor, *Resuscitation*
- Flight physician – helicopter & fixed wing
- Pilot – instrument rated, propjet

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Meridian PA46T

N28NK

- 6-passenger, pressurized propjet
- 30,000 ft ceiling
- 300 mph cruise
- 1,200 mi range

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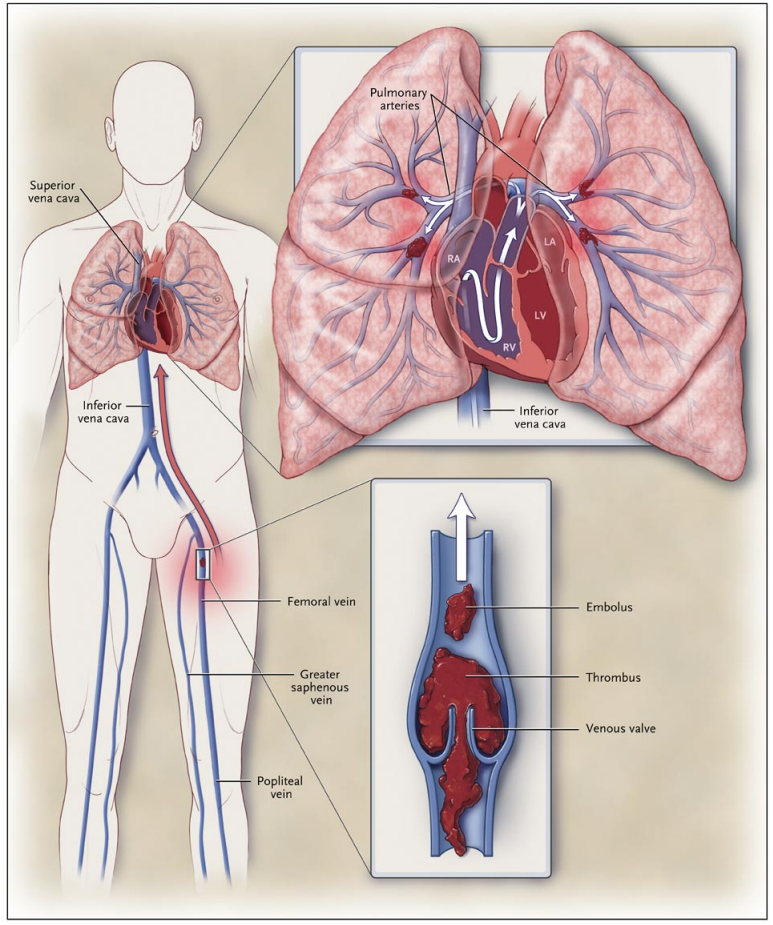
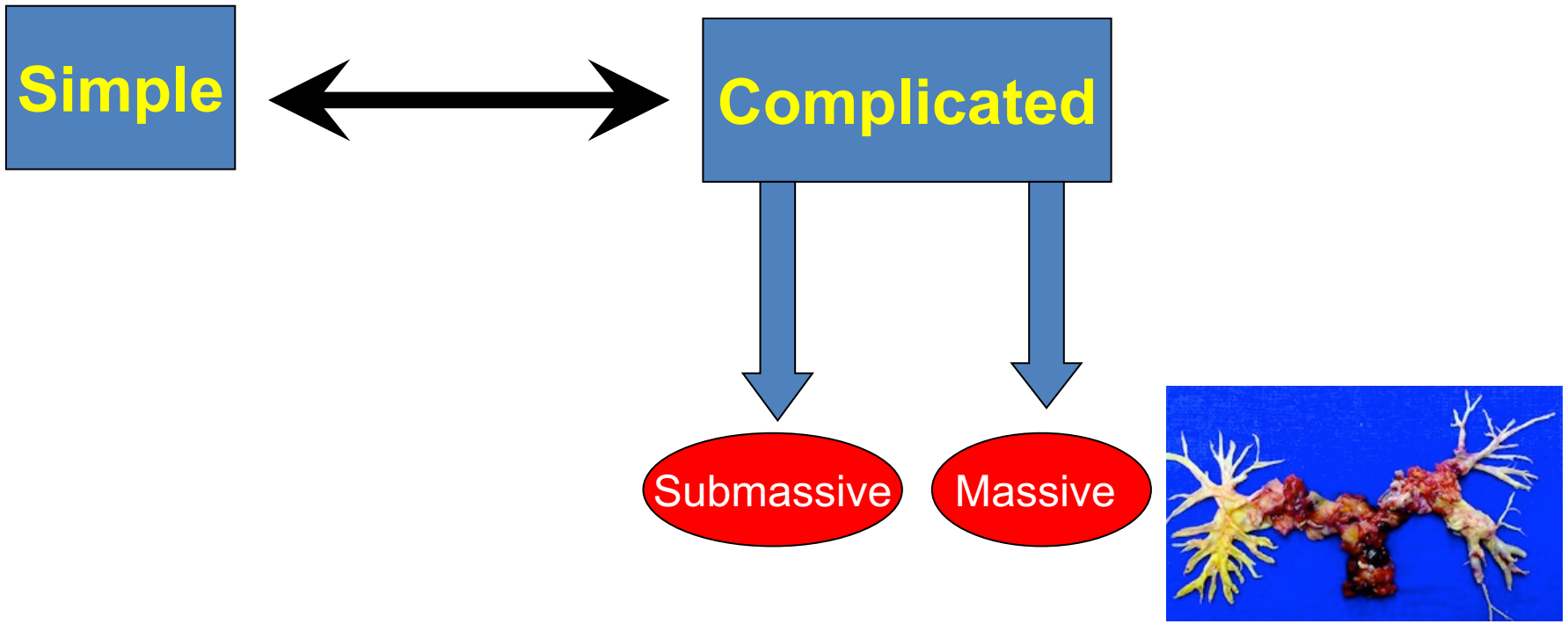
Pulmonary Embolism

- 600,000 PEs/300,000 deaths each year in USA
- 3rd most common cause of CV death (after coronary artery disease and stroke)
- Found in 18% of all autopsies
  - 70% main cause of death
- Incidence increases with age
- Affects men and women equally
- Origin of the blood clot
  - Leg vein, esp above knee
  - Pelvic vein
  - Upper extremity vein



Clinical Spectrum

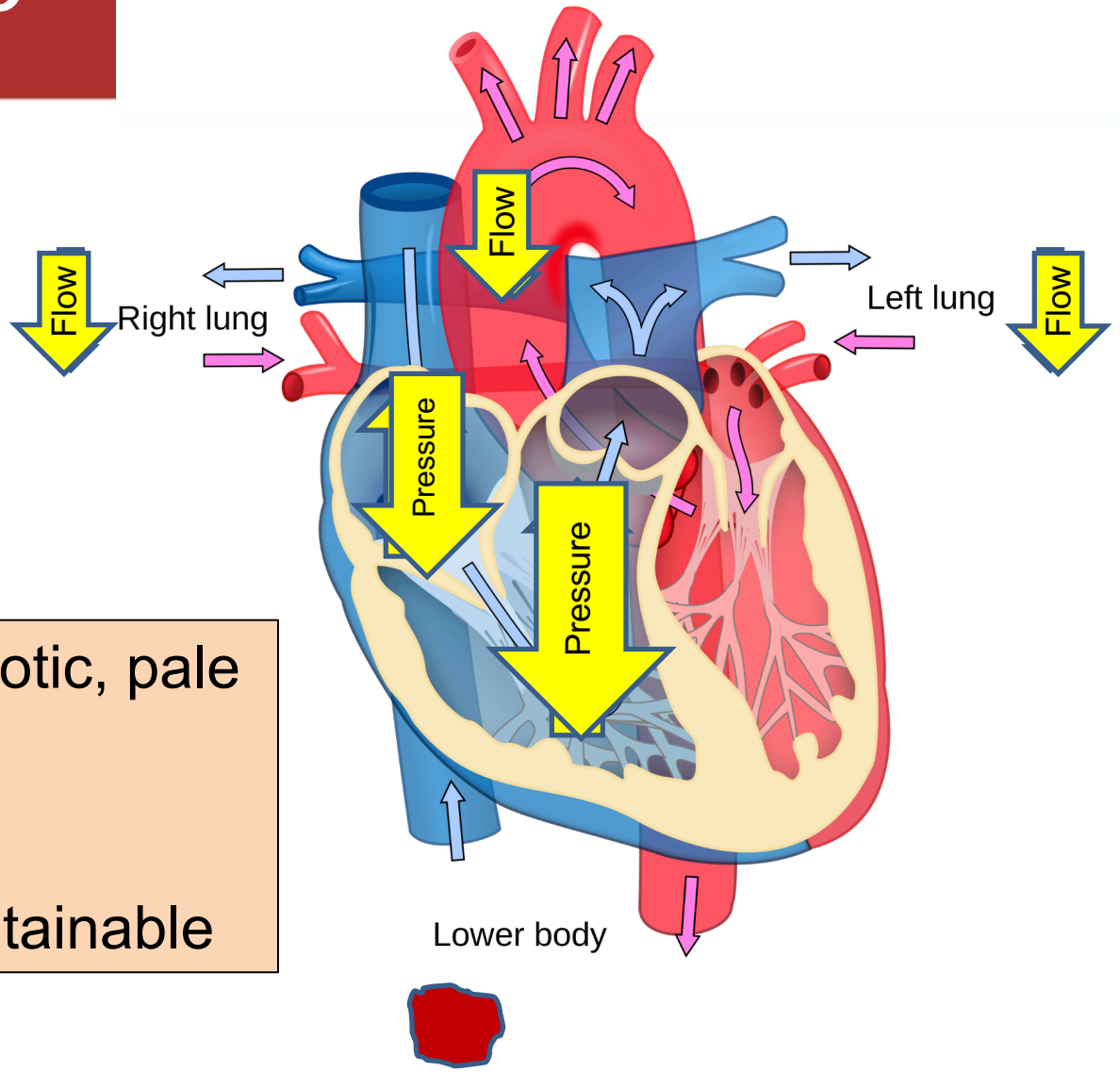


Case history

- Sept 2014 - asymptomatic large kidney stone discovered
- Plan: monthly lithotripsy procedures until gone
- 2 weeks post-op 6th lithotripsy procedure developed increasing shortness of breath on exertion
- Chest xray + non-contrast CT consistent with bilateral bronchopneumonia – placed on oral antibiotics
- 3 days later, sudden onset severe lightheadedness, severe shortness of breath, rapid pulse rate

EMS at house

RSI, vasodilator drugs



- Able to talk but cyanotic, pale
- Pulse 120, regular
- BP unobtainable
- Pulse oximetry unobtainable

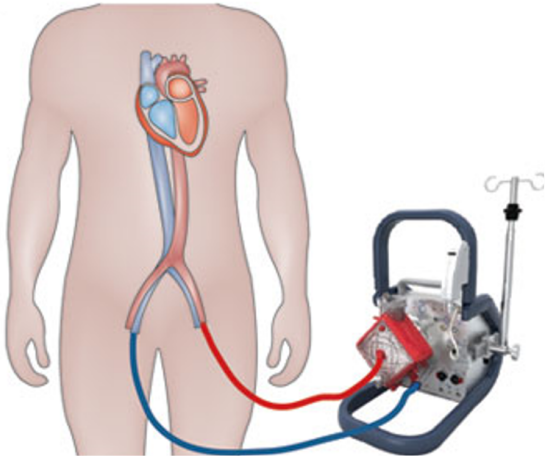
Destination hospital?

- Several excellent community hospitals 7-10 min away with no emergency department ECMO capability
- Virginia Commonwealth University (VCU) Medical Center with 100 bed ED, 18-bed resuscitation unit with ECMO in ED capability (100 emergency ECMO cases/year), and cardiac surgical team/OR standing by

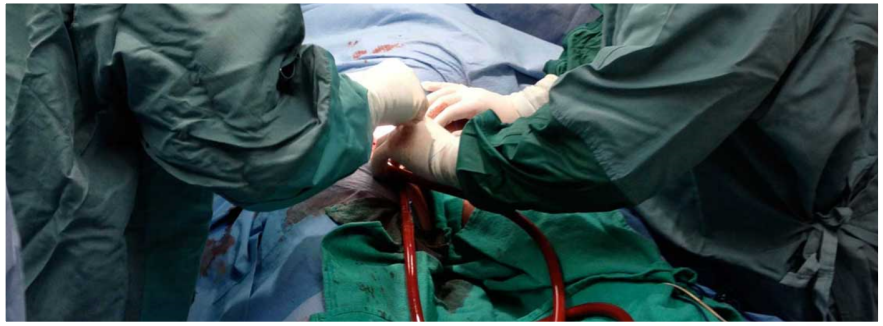
Enroute to VCU Medical Center

- Able to talk but still cyanotic, pale
- Pulse 120, regular
- BP still unobtainable
- Pulse oximetry still unobtainable

ED Arrival



Extra**C**orporeal **M**embrane **O**xygenation
(ECMO)



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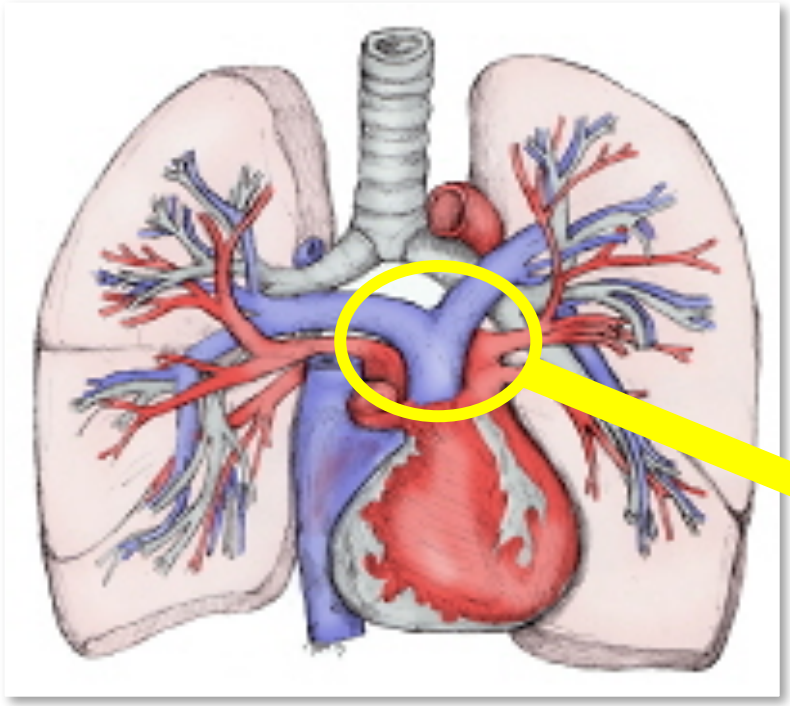
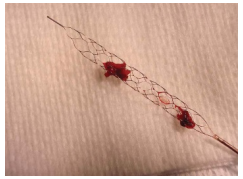
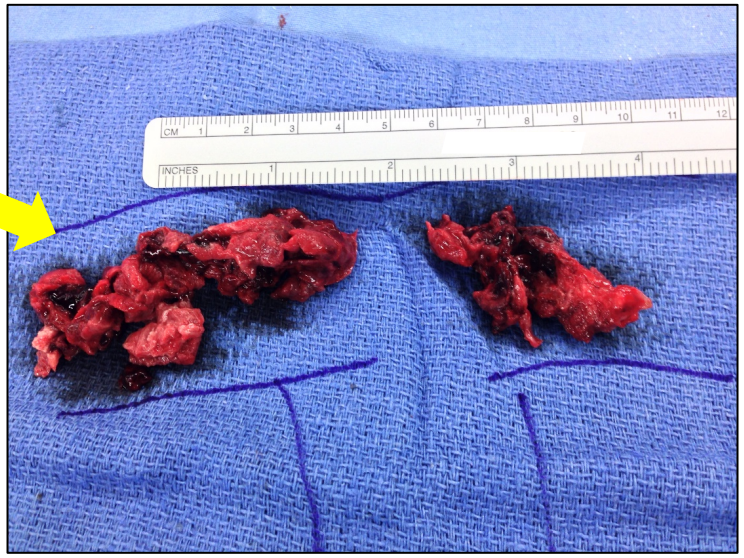
Surgical Embolectomy

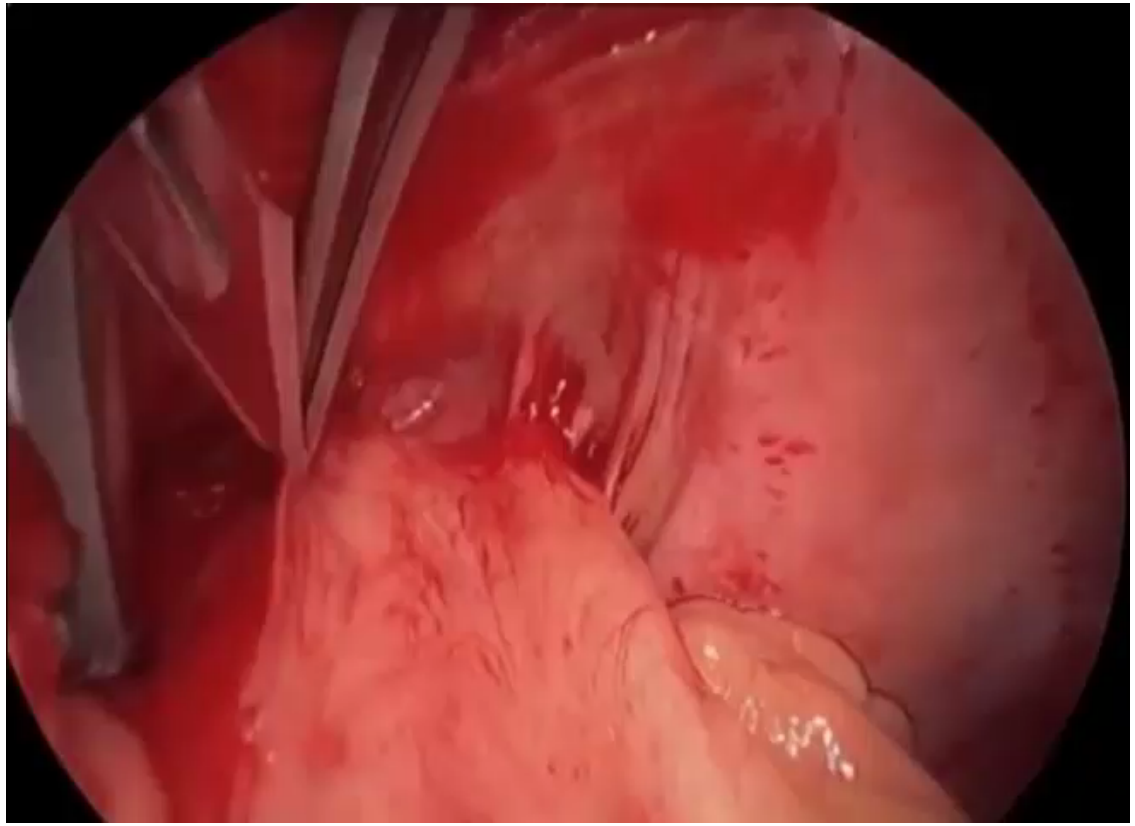


Comparison clot size removed from a coronary artery in a STEMI patient





Surgical embolectomy



Recovery

- Cardiac Surgical ICU
- EMS crew visit
- Telemetry
- Rehab
- Return to work
- Return to full flight status

ExtraCorporeal Membrane Oxygenation ("ECPR")
AHA 2015 Guidelines
Link MS et al. Circulation 2015; 132[Suppl 2]:S444-464

- Ideal duration of CPR <45 minutes
- Indications
  - Massive pulmonary embolism
  - Recurrent/refractory VF arrest
- Survival 20-33%

VCU ED ECMO Guidelines

INCLUSION CRITERIA

- Age <70
- Suspected massive PE
  - Follows commands
- Cardiac arrest
  - Witnessed, initial rhythm VF
  - No sustained ROSC after 20 min ALS in field
  - Transport time to VCU <20 min
  - Potentially correctible cause (PE, refractory VT/VF)

EXCLUSION CRITERIA

- Unwitnessed arrest
- Initial rhythm not-VF
- >10 min without CPR
- Known symptomatic chronic organ failure, advanced illness, DNAR, etc.

Specialized In-House Alert Teams

Pulmonary Embolism Response Team (PERT Team) Alert

- Coronary ICU
- Medical Respiratory ICU
- Interventional Radiology
- Cardiac Surgery

ECMO (Pump Team) Alert

- Coronary ICU
- Cardiac Surgery
- Cardiac Surgery Intensivist

EMS Suspected Massive PE

Pearls & Pitfalls

- Maintain a high index of suspicion
- Load & go before the patient arrests
- High flow oxygen (CPAP may be harmful)
- Consider avoiding RSI in field or enroute if patient able to respond verbally, even if no pulse palpable
- Ideally transport to an experienced emergency ECMO-capable center with a highly experienced cardiac surgical embolectomy/interventional radiology team available
- Early notification enroute

Conclusions

- Hospital capability and experience matters
- Regionalization of complex, life-saving services can save more lives
- Right # of specialized centers in the right locations, not hospital bottom lines, need to drive regionalization
- Please continue to build/support your regional EMS system as if your life depends on it