PULMONARY EMBOLISM AND PERT

Jonathon Kirkland, DO
OSU Department Chair, Radiology
Head of Interventional Radiology

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OBJECTIVES

1. What are the clinical signs/symptoms of submassive PE?
2. What are the clinical signs/symptoms of massive PE?
3. Current treatment of submassive and massive PE?
4. Learn how to review a CT for evidence of right heart strain.

Pulmonary embolism - exact incidence is unknown. Up to 900K in the US annually.
60-100K Americans die of DVT/PE annually
- 25% sudden death is first symptom
- 1/3 will have recurrence in 10 years
5-8% of US population have inherited thrombophlias

Source: CDC VTE Website
(https://www.cdc.gov/ncbdd/dvt/data.html)
- 2.5M ER visits. 2.5% underwent CTA for PE
  - <1% in 2000, More than 4% in 2009.


WELLS CRITERIA

- Clinical signs/symptoms of PE or PE is #1 diagnosis- 3 points each
- Tachycardia, Immobilization for 3 days or recent surgery in last 4 weeks, Previous diagnosed PE/DVT. 1.5 points each
- Hemoptysis or malignancy with recent (<6 months) treatment or palliative care. 1 point each.

Management-
- Low risk (<2 points). Consider D-dimer.
- Moderate (2-6 points) consider D dimer or CTA
- High risk- Consider CTA

https://www.mdcalc.com/wells-criteria-pulmonary-embolism
CTA PE PROTOCOL

- Minimum of 20G IV
- Antecubital fossa needed
- 4 mL/second Power injection
- Contrast- Variable by institution. Generally 100 mL +/-
- ROI placed in SVC or intermittent visualization of the SVC
SAME PATIENT, 7 MINUTES APART
CLASSIFICATION OF PULMONARY EMBOLI

- Low risk PE- No heart strain or systemic arterial hypotension.
- Submassive PE (Intermediate risk)- Presence of right heart strain in the setting of normal blood pressure. ICOPER 90 day mortality 15.1% (International cooperative PE Registry).
- Massive PE (High risk PE) – Sustained systemic arterial hypotension <90 mm for 15 minutes or requiring pressure support. ICOPER 90 day mortality 58%
Submassive PE (right heart strain) 5.6%

Massive PE (Systemic hypotension or Pressure support) 58% Mortality

HR: 125, RR: 32, O2: 88% RA, Trop: .8, BNP: 400
TREATMENT

PERT
PULMONARY EMBOLISM RESPONSE TEAM

- Multidisciplinary conversation between Emergency Room (if patient in ED), Intensivist/IM, Cardiology, Vascular surgeon, Interventional Radiology.
- Clinical presentation - Extremely important. ?Syncope? BP, HR, RR, O2 sats. CAN THE PATIENT LIE FLAT? Any recent surgeries? Contraindications to TPA?
- Labs - CBC, INR, BMP, Troponin, BNP
- ECHO - If needed. CT is just as sensitive for right heart strain. ECHO can be used as an assistant in unclear patients.
- CTA
- EKG - Look for signs of heart strain and look for LBBB
PESI Score-
Age, Sex, History of CA, History of HF, Chronic lung dz, Heart rate >110, SBP <100, RR > 30, Temp <36C, AMS (disorientated, lethargic), O2 <90%
1 point for year old. Otherwise, variable point system (AMS is 60 points alone). Risk stratify 30 day mortality.
- 65YO Male who is tachy over 110, but all other negative. 3.2-7.1% 30 day mortality
- Same, but add hypoxia at <90% 4.0-11.4% mortality.

ACCP GUIDELINES- 2016
Please take with a grain of salt.
Massive PE- systemic TPA
- Submassive who are deteriorating, but not yet massive. TPA
- Suggest systemic over CDT (Catheter directed thrombolysis)
- If hypotension and high risk of bleeding, failed systemic, shock “that is likely to cause death before systemic thrombolysis can take effect” Suggest catheter assisted thrombus removal over nothing. Mechanical w/wo CDT.
ULTIMA TRIAL

- 59 patients (363 screened). RV/LV >1. EKOS/TPA and heparin vs heparin alone. 10mg per catheter over 15 hours.
- Statistically significant reduction in RV/LV with EKOS/TPA. Insignificant reduction with heparin alone.
- No major bleeding. Three site bleeds with lysis and one with heparin.
SEATTLE II

- All are EKOS trials (US assisted CDT)
- SEATTLE II - 24 MG TPA over 12 hours if bilateral catheters or 24 hours if unilateral. Statistically significant Reduction in RV/LV ratio, Mean PA pressure. One major bleed (Groin hematoma with transient hypotension) and 15 Moderate (10%).
- No ICH

OPTALYSE PE - 2017

- 101 patients, four cohorts.
  - 4 mg/catheter over 2 hours
  - 4 mg/catheter over 4 hours
  - 6 mg/catheter over 6 hours
  - 12 mg/catheter over 6 hours
- All had significant reduction in RV/LV 23-26%
- Three bleeds - one ICH in Cohort 4.
WHAT HAVE WE LEARNED IN OUR EXPERIENCE?

CONCLUSION

- Don’t fear the TPA. TPA saves lives.
- Prepare for the worst- Decompensation happens.
- Send them on over- Transfer for IR/CV services for more definitive treatment.
SOURCES

- CDC VTE Website (https://www.cdc.gov/ncbddd/dvt/data.html)
- https://www.mdcalc.com/wells-criteria-pulmonary-embolism
- http://journal.chestnet.org/article/S0012-3692(15)00335-9/fulltext