Pulmonary Embolism

Pathophysiology

- Arguably, one of lungs' functions is to filter out emboli from systemic circulation
- With PEs, pulmonary vasculature resistance increases exponentially → RV failure → RV ischemia from poor coronary perfusion and high demand (positive loop)
- Decreased cardiac output, shock
- Arrhythmias → PEA

DIAGNOSIS

- CT chest angiogram is gold standard
- V/Q scan is a poor resolution test. Most likely to be read as positive only for big clot burdens. Often read as "intermediate probability"
- Imaging test should only be ordered based on clinical suspicion.
- If can't order CTA, consider a quick echocardiogram to assess for RV strain and pressures.

Pre-TEST probability, Risk of PE

WELLS' Criteria for PE

Clinical signs & symptoms of DVT	3
PE is #1 diagnosis	3
HR > 100	1.5
Recent immobilization or surgery in past 4 weeks	1.5
Prior DVT or PE	1.5
Hemoptysis	1
Malignancy within 6 months	1

Scoring

- 0-2 → low risk
- 2-6 → intermediate
- 6+ → high

SEVERITY

30-day mortality with known PE

sPESI
(Simplified PE Severity Index)

Any one factor makes test – high risk:

- Age>80
- Hx of cancer
- Hx of cardiopulmonary disease
- HR >110
- SBP <100
- O2 saturation <90%

Severity Categorization

- Based on risk of hemodynamic instability
- **Low risk** – no evidence of RV strain, stable patient
- **Intermediate risk ("sub-massive")** –
  - No hypotension, but …
  - Signs of stress to heart (RV dysfunction, EKG changes, changes, elevated troponins / BNP, etc)
- **High risk ("massive")** – persistent hypotension

MANAGEMENT

Treatment

- If stable and suspected to have uneventful course → can be directly started on DOAC (e.g. Apixaban).
- If patient may deteriorate or may need advance therapies, start on unfractionated heparin drip for easy on/off for procedures.
- If hemodynamically unstable, monitor in ICU and consider advance therapies

Advance therapies

- Systemic thrombolytics, catheter-directed thrombolytics, thrombectomy
- Keep preload and CVP pressure on low side. Avoid aggressive fluid boluses.
- IVC filter – don't forget to remove it
  - If anticoagulation is contraindicated
  - If big PE burden and large active DVT burden (potential worsening of PE)

Discharge criteria

- When hemodynamically stable and off of Oxygen.
- Low risk patients (young patient with PE (minimal symptoms – hemodynamically stable and on room air – may be started on DOAC and discharged home. Some may even argue for outpatient therapy.

Garg's Simple Medicine

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