

39. Pulmonary Embolism

Third most common acute cardiovascular disease

- Dyspnea 77% (A-a gradient)
- Tachypnea 70%
- Chest Pain 55% (usually pleuritic)
- Tachycardia 43%
- Cyanosis 18%
- Hemoptysis 13%
- Syncope 10%

Clinically Silent PE in DVT disease as high as 45%. (Arch Intern Med, 24 Jan 2000)

Suggested Evaluation

- I. Electrolytes, LFT's, CBC, PT, PTT, EKG, CXR
 - II. D-Dimer (low risk without cancer, recent surgery or trauma)
 - III. Arterial Blood Gas (preferably on room air)
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- I. Spiral CT (1 to 3 mm helical cuts with 150 cc of Oxilan Contrast)
 - II. Lower extremity ultrasonography or Leg CT venogram during Spiral CT
 - III. Consider Echocardiography, (PA pressures, evaluation RV function)
 - IV. Angiography reserved for patients at high risk of anticoagulation.

1. Blood Gases A-a gradient has some predictive value in PE
 - Normal A-a gradient may be seen in PE (-6% of patients)
 - $A-a(O_2) = (FiO_2\%/100) * (Patm - 47 \text{ mmHg}) - (PaCO_2/0.8) - PaO_2$ (Patm: 760)
2. Fibrin D-Dimer (semiquantitative monoclonal agglutination assay)
 - D-Dimer <0.5ug/mL, For low risk DVT rule out : negative predictive value 92%
3. Primary Work up: Hereditary/Acquired Thrombophilia (top 2 are 60% of Thrombophilia)
 - I. Factor V Leiden (PCR) (7% of Whites-Hetero or Homozygous)-(1994)
 - II. Resistance to activated protein C (APC) (40% of DVT, 3% of population)
 - III. Prothrombin 20210 G≡A (20% of DVT, 3% of Whites) (PCR) (1996)
 - IV. Underlying malignancy, Estrogens, Trauma, Immobility, Obesity
4. Secondary Work up (5% of Thrombophilia)
 - I. Antithrombin III - absence, reduction, resistance (3 days of Heparin)
 - II. Protein C & S (Off Coumadin)
 - III. Vitamin K levels (Proteins C and S are Vitamin K dependent)
 - IV. Homocystinemia
 - V. Plasminogen Deficiency
 - VI. ANA, Anticardiolipin Ab (immunoglobulins M and G), Lupus anticoagulant

Therapy:

1. Conventional anti-coagulation (Heparin / Enoxaparin/ Warfarin/ Ximelagatran)
 - Untreated PE: 30% mortality, which is 8% with anticoagulation
2. Thrombolytic therapy
 - For Hemodynamic instability and/or RV Dysfunction-on echocardiogram
3. Embolectomy
 - Very selective cases, Perioperative mortality is 25-50%
4. Temporary Vena Caval Filters (Cook's Günther Tulip Vena Cava MReye™ Filter)
5. Permanent IVC Filter Placement Types: 1. Bird Nest, 2. Greenfield Venatech filter, 3. Simon-Nitinol filter
 - No definitive evidence for efficacy, but accepted therapy
 - Reserved for patients with recurrent PE on anti-coagulation