Step-By-Step Technical Tips for Pharmaco – Mechanical Intervention for PE

**How I do It**

Gary M Ansel MD
System Medical Chief: Vascular
OhioHealth/Riverside Methodist Hospital
Columbus, Ohio

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System Based PE Algorithm

**OHVI App**

- Quick access to clinical pathways and easy to navigate

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Pharmacomechanical Thrombolysis

**Step by Step**

- Make the diagnosis and clinical decision consistently
  - PERT team or other consistent algorithmic mechanism
  - Hospital Environment may dictate options ie Tertiary vs community
- Have a STEMI like protocol to get patients to the to the correct environment
- Catheter vs EKOS institutional preference since there is a lack of randomized data and cost considerations

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Gary M Ansel MD.
Conflicts of Interest

- Consultant
  - Abbott Vascular
  - Boston Scientific
  - Medtronic
  - Cook Medical
  - BARD
  - Surmodics
  - WL Gore
  - CR Bard
  - Primacea
  - Venarum
  - Spectranetics/Philips
  - Veryan
  - Reflow Medical
- Equity
  - Primacea
  - Reflow Medical
- Royalties
  - Cook Medical

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The OhioHealth Vascular Institute
PE’s to be Treated are Algorithm Based

**Massive PE**

- SBP < 90
- Requiring vasopressors
- Assess contraindications to thrombolysis
- Massive PE – Full dose lysis (100mg tPA IV over 2 hours) started in ER
- Admit to Intensive Care Unit (within 1 hour if possible) Notify consultant
- Cardiothoracic surgery involvement on a case by case basis
- If anticoagulation is contraindicated, call consultant for consideration of IVC filter.

**Submassive Increased Risk**

- Must have mod/sev RV dysfunction (CT/ECHO) and/or trop with 1/5 features below:
  - Shock Index > 1.0 (HR/SBP)
  - Resp Dustress (tachypnea, RR > 26, accessory muscles
  - Requirinf > 40%  FiO2 (>5L NC) to keep oxygen staurations > 92%
  - Hypotension at any time
  - Syncope as presenting symptom
- Assess contraindications to thrombolysis
- Call consultant for consideration of endovascular therapy vs IV thrombolysis or mechanicothrombolysis
- Type / dose of thrombolytic per consultant and consider to be started in ER
- If endovascular therapy, rapid transport to angio suite
- Admit to Intensive Care Unit
- Cardiovascular surgery involvement on a case by case basis
- If anticoagulation is contraindicated, call consultant for consideration of IVC filter.

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Catheter mechanico – lysis with TNK (Personal Use)

- No uniform dosing in literature
- Typcially reduced dose
- Spin catheter during dosing?
- Local recommendation is 30% of typical dose over 5 minutes
- and observe for 25-30 minutes to see if pulmonary pressures improve
- If significant improvement no continued dose to 50% of Full dose
- If not improved continue infusion at 0.5 unit/ hour
We Primarily Use Lowered dose TNK (Tenectaplase) which is off label though most use TPA

Dosing beyond EKOS for TPA has not been standardized and is the Art of Medicine

Why we lowered the dose (PEITHO Trial: TNK (Tenectaplase))

- n = 1006 patients
- mean age 70 years
- 12 centers in Europe and Israel
- randomized to risk confirmed PE, an abnormal RV on echocardiography or CT, and a positive troponin I or T test result
- randomized blinded to heparin plus placebo or heparin plus full dose weight adapted bolus of tenecteplase
- combined primary end point: death from any cause or hemorrhagic collapse after seven days

Results

- primary and joint RRR of 56% if treated with tenecteplase and heparin, compared with the heparin-only group (2.6% in the tenecteplase group vs 5.6% in the placebo group, p=0.015)
- substantial reduction in the combined endpoint of early mortality or hemodynamic collapse in patients receiving systemic thrombolysis (as compared to heparin alone)
- significant increase in major hemorrhage (including intracranial hemorrhage), particularly evident among elderly patients aged >75y
- major bleeding was significantly increased with tenecteplase: 6.3% vs 1.5% in the placebo group (p<0.001)
- subgroup analysis by age, in the >75y group RRR was 37% and the risk of stroke almost 2%


TNK Full Dose (Weight Based)

<table>
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<tr>
<th>Weight</th>
<th>Dose</th>
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<tbody>
<tr>
<td>&lt; 60 kg</td>
<td>30 mg</td>
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<tr>
<td>60-69 kg</td>
<td>35 mg</td>
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<td>70-79 kg</td>
<td>40 mg</td>
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<tr>
<td>80-89 kg</td>
<td>45 mg</td>
</tr>
<tr>
<td>&gt; 90 kg</td>
<td>50 mg</td>
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</tbody>
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When Are We Done With Lytic?

Effects

- Hemodynamic improvement
  - PA pressures
  - HR
- Supplemental O2 requirement
- ? Repeat CTPA for “locked lung”
- Bleeding
  - Groin
  - Oral
  - Other

What About Supplemental Anticoagulation (Personal Experience)

- Should have already been anticoagulated acutely before transportation
- Post on table result: resume full anticoagulation with lovenox 1 mg/Kg BID and then change over to oral after 24 hours or so
- With EKOS Trials where with full Heparin
- With continued CDT we have a mixed use. We use ½ dose lovenox ie ½ mg/kg BID or low dose Heparin ie 500-600 units/hr. May adjust down but not up. Use somewhat dependent on extent of DVT

What About IVC Filter Use

- If known large IVC or iliac clot will place IVC filter first at beginning of procedure
- Advance long sheath through IVC filter
- Other use is dependent on patient stability and presumed ability to tolerate further PE
- We removed 92-94% of our IVC filters or use bioconvertible filter
Typical On Table PE result