Catheter Directed Thrombolysis for PE. What are the Long Term Outcomes?

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Pulmonary Embolism – Increasing Incidence

- Most common preventable cause of in-hospital death
- 3rd most common CV disease after MI and stroke
- 4% will develop Pulmonary Hypertension at 2-3 years

Huang et al Am J Med 2014

Guidelines

Pulmonary Embolism – Treatment Guidelines
Anticoagulation ± Thrombolitics (?)

AHA 2011 Guidelines
ESC 2014 Guidelines
Thrombolysis
Evidence of RV Dysfunction or Myocardial Necrosis
Submassive
Intermediate -High
Intermediate -Low
Potential benefit
Mortality? Pulm. HTN?

Background

- Thrombolysis for Pulmonary Embolism and Risk of All-Cause Mortality, Major Bleeding, and Intracranial Hemorrhage: A Meta-analysis
  “In intermediate risk PE systemic thrombolysis is associated with lower mortality (OR 0.48) but more major bleeding events (OR 3.19)”
  Chatterjee et al JAMA 2014

- Randomized, Controlled Trial of Ultrasound-Assisted Catheter-Directed Thrombolysis for Acute Intermediate-Risk Pulmonary Embolism
  “In intermediate risk PE ultrasound assisted catheter directed thrombolysis was superior to heparin alone in reversing RV dilatation at 24 hours, without an increase in bleeding events”
  Kucher et al Circulation 2014

Objective

- Determine the short and mid term outcomes of Catheter Directed Interventions (CDI) compared to anticoagulation (AC) in patients with submassive Pulmonary Embolism (sPE)

Presented at the 2015 VAM

DISCLOSURES

- Nothing to disclose
Consecutive PE patients Jan 2009- Oct 2014

Excluded:
- Low risk PE (no RV dysfunction)
- High risk Massive PE (RV dysfunction + hypotension)
- Systemic Thrombolysis

Two Groups identified:
- AC Alone
- AC + CDI

Methods

30-day Outcomes
- Minor and Major Bleeding Complications
- Intervention related Complications
- Adverse Cardiovascular Events & Death
- Echo parameters change

Clinical Success: Decompensation Prevention without a major adverse event or in-hospital death

Midterm Outcomes
- Dyspnea and/or Exercise Intolerance and/or O2- Depend
- Death
- Echo parameters change

Baseline Data: 128 Patients

Procedural Data

- Bilateral PAs intervention: 89.1%
- IVC Filter: 89.1%

Standard CD Lysis (24) 37.5%
US assisted (EKOS) CD Lysis (37) 57.8%
On-table lysis only (1) 1.6%
Rheolysis (Angiojet) (1) 1.6%
Aspiration (VORTEX Angiovac) (1) 1.6%

Average tPA: 27±13.5mg (range 0-62)

Methods

Baseline 30-days Difference P-value

RV/LV ratio

Within 30-days Catheter Interventions achieved a significant improvement of RV function while AC did not (trend)… ”

ECHO Parameters

RV/LV ratio

“Within 30-days Catheter Interventions achieved a significant improvement of RV function while AC did not (trend)… ”

“The improvement of RV function trended higher for Catheter Interventions compared to AC alone…”
Mid-term Outcomes

<table>
<thead>
<tr>
<th></th>
<th>AC</th>
<th>CDI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent PE</td>
<td>1 (2.0%)</td>
<td>2 (3.8%)</td>
<td>1.000</td>
</tr>
<tr>
<td>Dyspnea or O2 Dependence at FU</td>
<td>5 (10.2%)</td>
<td>9 (15.4%)</td>
<td>0.556</td>
</tr>
</tbody>
</table>

**RV/LV Ratio**

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Mid-term</th>
<th>Difference</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 5-12.8 months</td>
<td>1.10±0.23</td>
<td>0.84±0.11</td>
<td>0.26±0.15</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Catheter Intervention 3-6 months</td>
<td>1.04±0.19</td>
<td>0.79±0.17</td>
<td>0.21±0.16</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

"Within 3-5 months RV function is normalized, irrespective of treatment modality…"

Mid-term Survival

Conclusions

- CDIs can achieve faster RV function recovery
  - Prevent decompensation (?)
- CDIs reduce the ICU length of stay
  - Cost effective (?)
- Higher minor complication rate
- Higher though not significant major complication rate
  - Small Sample (?)

Conclusions

- RV function normalizes for both AC and CDIs at 3-5 months
- Outcomes sustained at 14 months
- No evidence of short or mid-term clinical benefit
  - Small Sample (?)
- Our data supports the selective role of CDIs for sPE
  - Careful patient selection to achieve the best outcomes
  - High risk patients for decompensation

THANK YOU. chaerra@upmc.edu