Connective Tissue Disease Related Pulmonary Arterial Hypertension

DR I. Rajendra Vara Prasad
Associate Professor
Department of Rheumatology
Nizams Institute of Medical Sciences
Pathophysiology of PAH

- Vasculopathy
- Vasculitis
- Thromboembolism

Connective tissue disease (CTD)-associated PAH

• CTD-associated PAH accounts for 15% to 25% of all PAH cases in worldwide registries, with systemic sclerosis and systemic lupus erythematosus as the leading causes.

• Estimated 30% 1-year mortality, compared to 15% in IPAH.

## Prevalence in connective tissue disease

<table>
<thead>
<tr>
<th>Connective Tissue Disease</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scleroderma</td>
<td>7%–27%</td>
</tr>
<tr>
<td>Systemic lupus erythematous</td>
<td>0.5%–43%</td>
</tr>
<tr>
<td>Sjogren syndrome</td>
<td>Rare</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>Rare</td>
</tr>
<tr>
<td>Mixed connective tissue disease</td>
<td>50%–60%</td>
</tr>
<tr>
<td>Polymyositis/dermatomyositis</td>
<td>25%</td>
</tr>
</tbody>
</table>

UK Registry data

Diagnosed with CTD-PAH at a UK PH centre. n=484.

CTD-PAH

<table>
<thead>
<tr>
<th>Condition</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSc</td>
<td>315</td>
<td>74%</td>
</tr>
<tr>
<td>MCTD</td>
<td>36</td>
<td>8%</td>
</tr>
<tr>
<td>SLE</td>
<td>35</td>
<td>8%</td>
</tr>
<tr>
<td>DM/PM</td>
<td>18</td>
<td>4%</td>
</tr>
<tr>
<td>RA</td>
<td>13</td>
<td>3%</td>
</tr>
<tr>
<td>UCTD</td>
<td>9</td>
<td>2%</td>
</tr>
<tr>
<td>Sjogren’s</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>429</strong></td>
<td></td>
</tr>
</tbody>
</table>

PAH on exercise only. n=55

Isolated CTD-PAH

<table>
<thead>
<tr>
<th>Condition</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSc</td>
<td>259</td>
<td>76%</td>
</tr>
<tr>
<td>MCTD</td>
<td>28</td>
<td>8%</td>
</tr>
<tr>
<td>SLE</td>
<td>28</td>
<td>8%</td>
</tr>
<tr>
<td>DM/PM</td>
<td>7</td>
<td>2%</td>
</tr>
<tr>
<td>RA</td>
<td>12</td>
<td>3%</td>
</tr>
<tr>
<td>UCTD</td>
<td>6</td>
<td>2%</td>
</tr>
<tr>
<td>Sjogren’s</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>343</strong></td>
<td></td>
</tr>
</tbody>
</table>

Respiratory Disease-associated CTD-PH. n=86

American Journal Of Respiratory And Critical Care Medicine Vol 179 2009
Prognosis
UK registry Data

• One- and 3-year survival rates were 78 and 47% for patients with isolated SSc-PAH.
• With respiratory disease–associated SSc-PAH (28%; P =0.005)
• Exercise-induced SSc-PAH - (86%; P=0.001).
• SLE-PAH -75%
REVEAL Registry (n=1982)

• Largest US cohort
• IPAH - 46.2%(n=1251), APAH - 50.7%,
• CTD- APAH - 49.9%(n=641),
• 1-year survival
  – SSc-related APAH(n=399) -82%
  – SLE-APAH (n=110) – 94%
  – MCTD APAH- 88%
  – RA APAH - 96%

12-month survival in SSc-APAH, SLE-APAH, MCTD-APAH, and RA-APAH

REVEAL Registry
12-month survival and freedom from all-cause hospitalization in IPAH vs CTD-APAH cohorts.

(86% vs 93%, \( P, .0001 \)) and (67% vs 73%, \( P, .03 \))
CTD-PAH Data from NIMS
Demographic Profile

• In-Patient data between Jan 2015 – Jan 2016 (n=1013)
• Total number of CTD-PAH Patients - 63
• Female sex - 57
• Mean Age of patients – 31.1±11.5 years
• Disease duration - 12±40.7 months
• NYHA Class
  ▪ I - 22, II - 6, III - 5, IV - 3
<table>
<thead>
<tr>
<th>CONNECTIVE TISSUE DISEASE</th>
<th>NUMBER OF CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systemic Lupus Erythematosus (with APS-5)</td>
<td>36</td>
</tr>
<tr>
<td>Scleroderma</td>
<td>9</td>
</tr>
<tr>
<td>Overlap-SSC</td>
<td>9</td>
</tr>
<tr>
<td>Mixed connective tissue disease</td>
<td>3</td>
</tr>
<tr>
<td>Antiphospholipid Syndrome</td>
<td>1</td>
</tr>
<tr>
<td>Vasculitis</td>
<td>1</td>
</tr>
<tr>
<td>Rheumatoid Arthritis</td>
<td>1</td>
</tr>
<tr>
<td>Sarcoidosis</td>
<td>1</td>
</tr>
<tr>
<td>Takayasu Arteritis</td>
<td>1</td>
</tr>
<tr>
<td>Undifferentiated Arthritis</td>
<td>1</td>
</tr>
</tbody>
</table>
Hemodynamic parameters of SLE Patients

• PAH severity
  – Mild – 19
  – Mod – 12
  – Severe – 6
• RVSP – 45.5 ± 13.7 mm
• RV dyskinesia – 4
• LVF – 1
Lab profile

- Positive Anticardiolipin Antibodies – 18/36
- Positive ds DNA – 27
- CT Pulmonary Angiogram – 2 patients, normal
Treatment for SLE-PAH

- Steroids – 36
- Cyclophosphamide pulses – 20 (mild -10, mod and severe – 5)
- Azathioprine -4
- Mycophenolate Mofetil – 4
- Methotrexate - 4
- Vasodilators – 22
- Anticoagulation 10 patients
Treatment for Scleroderma and Overlap patients

- All (n=18) Received vasodilators
- Antocoagulation – 3
- Cyclophosphamide – 5, Azathioprine -1, Mycophenolate Mofetil- 3
RISK FACTORS FOR PAH
Risk Factors for Scleroderma

- Long standing disease (>5 years)
- Limited cutaneous disease
- Older age at onset
- Telangiectasia
- DLCO <60 percent predicted
- FVC percent/DLCO percent >1.6
- Anti-centromere antibody
- Anti-nucleolar pattern
- Anti-U1 RNP antibody
- Absence of anti-Scl 70 antibody
- N-terminal pro BNP
- Exercise induced PAH

Risk Factors for Scleroderma

• Partial validation of the 6MWT in PAH-SSc

• ACLs, and a weak association with anti-endothelial cell antibodies.

• Eng and ET-1 could represent a useful tool as PAH biomarkers in scleroderma.
  – Rheumatol Int. 2009 Jul; 29(9): 1017-24
DETECT algorithm

PAH patients + non-PH patients (n=408)

Step 1
Non-echocardiographic variables
- FVC % predicted / DLCO % predicted
- Current / past telangiectasias
- Serum ACA
- Serum NTproBNP
- Serum urate
- ECG: right axis deviation
Total risk points > 300?
(n=356)

No referral to echocardiography
True PAH negative (n=50)
False PAH negative (n=2)

Cut-off for Step 1:
(pre-defined sensitivity 97%)
97%
AUC=84.4%
(79.5%, 89.8%)

Missing data (n=52)

No (n=52)
Yes (n=304)

Step 2
Total risk points from Step 1 plus echocardiographic variables
- Right atrium area
- TR velocity
Total risk points > 35?
(n=267)

No referral to right heart catheterisation
True PAH negative (n=68)
False PAH negative (n=1)

Cut-off for Step 2:
(pre-defined specificity 35%)
99%
AUC=98.1%
(82.4%, 99.3%)

Missing data (n=37)

No (n=69)
Yes (n=198)

Right heart catheterisation
True PAH positive (n=69)
False PAH positive (n=129)
DETECT study

• Prospective international multicenter study
• 466 patients with SSc at increased risk of PAH (SSc for >3 years and a DLCO <60 percent predicted)
• All patients underwent a RHC
• Accurately identified 62 percent of patients who needed RHC and indicated a PAH prevalence of 19 percent in SSc.

PHAROS (Pulmonary Hypertension Assessment and Recognition of Outcomes in Scleroderma) registry

• Pre-PAH
  – DLCO < 55% predicted
  – predicted forced vital capacity/DLCO ratio ≥1.6
  – estimated right ventricular systolic pressure > 35 mm Hg on echocardiography

• PAH
  – right heart catheterization mean pulmonary artery pressure ≥ 25 mm Hg within previous 6 months
Risk Factors for SLE-PAH

• In SLE Pericarditis, pleuritis and anti-RNP positivity
  – Chinese SLE Treatment and Research group registry (1934 patients)
  – Lupus. 2014 Sep;23(10):1085-91

• Raynaud's phenomenon, anticardiolipin antibodies, and anti-U1RNP were independent predictors of PAH in SLE.
Serological risk factor variables between PAH and non-pah patients with SLE

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Non-PAH patients, n</th>
<th>PAH patients, n</th>
<th>Positive in non-PAH patients, n (%)</th>
<th>Positive in PAH patients, n (%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANA (titre ≥1:40)</td>
<td>271</td>
<td>12</td>
<td>225 (83)</td>
<td>12 (100)</td>
<td>0.226</td>
</tr>
<tr>
<td>Anti-dsDNA</td>
<td>271</td>
<td>12</td>
<td>112 (41)</td>
<td>7 (58)</td>
<td>0.371</td>
</tr>
<tr>
<td>ENA</td>
<td>265</td>
<td>12</td>
<td>148 (56)</td>
<td>10 (83)</td>
<td>0.076</td>
</tr>
<tr>
<td>Anti-Ro</td>
<td>265</td>
<td>12</td>
<td>98 (37)</td>
<td>4 (33)</td>
<td>1.000</td>
</tr>
<tr>
<td>Anti-La</td>
<td>265</td>
<td>12</td>
<td>56 (21)</td>
<td>6 (50)</td>
<td>0.030*</td>
</tr>
<tr>
<td>Anti-Sm</td>
<td>265</td>
<td>12</td>
<td>29 (11)</td>
<td>1 (8)</td>
<td>1.000</td>
</tr>
<tr>
<td>Anti-Jo</td>
<td>265</td>
<td>12</td>
<td>1 (0)</td>
<td>0 (0)</td>
<td>1.000</td>
</tr>
<tr>
<td>Anti-scl70</td>
<td>265</td>
<td>12</td>
<td>6 (2)</td>
<td>0 (0)</td>
<td>1.000</td>
</tr>
<tr>
<td>Anti-RNP</td>
<td>265</td>
<td>12</td>
<td>67 (25)</td>
<td>3 (25)</td>
<td>1.000</td>
</tr>
<tr>
<td>Low C3 (&lt;0.75)</td>
<td>271</td>
<td>12</td>
<td>29 (11)</td>
<td>0 (0)</td>
<td>0.619</td>
</tr>
<tr>
<td>Low C4 (&lt; 0.14)</td>
<td>271</td>
<td>12</td>
<td>64 (24)</td>
<td>5 (42)</td>
<td>0.173</td>
</tr>
<tr>
<td>LAC</td>
<td>205</td>
<td>11</td>
<td>32 (16)</td>
<td>6 (55)</td>
<td>0.005**</td>
</tr>
<tr>
<td>aCL (IgG/IgM)</td>
<td>271</td>
<td>12</td>
<td>63 (23) (44/38)</td>
<td>5 (42) (3/3)</td>
<td>0.168</td>
</tr>
</tbody>
</table>

Screening for SLE-PAH

- The reported prevalence of PAH in SLE ranges from 0.5% to 43.0%.
- Role of screening for PAH in SLE is still under question

ASSESSMENT
Outline of Management

- **Routine baseline and annual assessment**
  - ECHO Doppler Clinical assessment
    - eRVSP <45 mm Hg
    - DLCO >55% predicted
    - No unexplained dyspnea
    - No cardiac disease
  - Follow

- **Advanced assessment**
  - Right heart catheterization ± exercise, ± vasodilator challenge
    - PAH confirmed
      - Resting mean PAP ≥25 mm Hg or exercise PAP ≥30 mm Hg and PCW ≤15 mm Hg
      - THERAPY
  - Exclude other causes of PAH
    - Thromboembolic disease
    - Pulmonary venous hypertension (left heart disease)
    - Hypoxemic pulmonary disease (COPD, sleep disorder, ILD)

**Risk stratification**
- WHO functional class
- Submaximal exercise testing (6-minute walk)
- Hemodynamic assessment (peak PA pressure, CI, PVR)
MANAGEMENT
Specific therapy in CTD-PAH
TRUST study

• 53 patients with symptomatic PAH (WHO functional class III) associated with SSc (n - 42), SLE (n - 5) or undifferentiated or overlapping CTDs (n - 6).

• Bosentan therapy was associated with improved or unchanged WHO functional class at 16 and 48 weeks in 94% and 85% of the patients, respectively.

Ambrisentan Treatment on Exercise-Induced Pulmonary Hypertension in Systemic Sclerosis: A Prospective Single-Center, Open-Label Pilot Study

<table>
<thead>
<tr>
<th></th>
<th>Baseline (n = 12)</th>
<th>Posttreatment (n = 11)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resting, mean ± SD</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mPAP, mm Hg</td>
<td>20.9 ± 2.9</td>
<td>22.2 ± 5.8</td>
<td>0.65</td>
</tr>
<tr>
<td>CO, liters/minute</td>
<td>4.8 ± 0.9</td>
<td>5.9 ± 0.7</td>
<td>0.01</td>
</tr>
<tr>
<td>PCWP, mm Hg</td>
<td>11.3 ± 3.5</td>
<td>11.9 ± 2.3</td>
<td>0.58</td>
</tr>
<tr>
<td>Svo₂, %</td>
<td>71.1 ± 4.1</td>
<td>71.4 ± 6.1</td>
<td>0.58</td>
</tr>
<tr>
<td>PVR, dynes × seconds/cm^5</td>
<td>169.1 ± 67.7</td>
<td>138.9 ± 65.4</td>
<td>0.12</td>
</tr>
<tr>
<td>TPR, dynes × seconds/cm^5</td>
<td>358.7 ± 81.9</td>
<td>298.9 ± 81.6</td>
<td>0.12</td>
</tr>
<tr>
<td>HR, beats per minute</td>
<td>81.1 ± 17.2</td>
<td>78.8 ± 14.9</td>
<td>0.52</td>
</tr>
<tr>
<td>SV, ml</td>
<td>60.2 ± 9.9</td>
<td>78.4 ± 16.0</td>
<td>0.003</td>
</tr>
<tr>
<td>SVI, ml/m²</td>
<td>33.7 ± 5.6</td>
<td>43.5 ± 10.7</td>
<td>0.006</td>
</tr>
<tr>
<td><strong>Exercise, mean ± SD</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mPAP, mm Hg</td>
<td>41.5 ± 5.3</td>
<td>37.4 ± 8.3</td>
<td>0.02</td>
</tr>
<tr>
<td>CO, liters/minute</td>
<td>8.4 ± 1.6</td>
<td>9.8 ± 2.2</td>
<td>0.006</td>
</tr>
<tr>
<td>PCWP, mm Hg</td>
<td>16.5 ± 5.2</td>
<td>17.8 ± 3.5</td>
<td>0.88</td>
</tr>
<tr>
<td>Svo₂, %</td>
<td>51.2 ± 8.0</td>
<td>51.4 ± 5.6</td>
<td>0.83</td>
</tr>
<tr>
<td>PVR, dynes × seconds/cm^5</td>
<td>247.1 ± 69.1</td>
<td>161.3 ± 66.7</td>
<td>0.003</td>
</tr>
<tr>
<td>TPR, dynes × seconds/cm^5</td>
<td>405.7 ± 73.8</td>
<td>312.7 ± 82.9</td>
<td>0.0008</td>
</tr>
<tr>
<td>HR, beats per minute</td>
<td>131.5 ± 19.9</td>
<td>119.2 ± 18.7</td>
<td>0.006</td>
</tr>
<tr>
<td>SV, ml</td>
<td>62.7 ± 13.4</td>
<td>80.7 ± 17.3</td>
<td>0.002</td>
</tr>
<tr>
<td>SVI, ml/m²</td>
<td>35.0 ± 7.4</td>
<td>44.5 ± 9.3</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Ambrisentan and Tadalafil Up-front Combination Therapy in Scleroderma-associated Pulmonary Arterial Hypertension

• Prospective, multicenter, open-label trial, 24 treatment-naive patients with SSc-PAH received Ambrisentan 10 mg and tadalafil 40 mg daily for 36 weeks

• Right ventricular (RV) mass and pulmonary vascular resistance

• Stroke volume/pulmonary pulse pressure ratio, tricuspid annular plane systolic excursion, 6-minute walk distance, and N-terminal pro-brain natriuretic peptide as secondary endpoints.

Am J Respir Crit Care Med. 2015 Nov 1;192(9):1102-10.
Contd...

- Significantly improved hemodynamics, RV structure and function, and functional status in treatment-naive patients with SSc-PAH
Immunosuppression
Immunosuppression

• Patients with SLE- and MCTD-APAH may experience clinical improvement with first-line immunosuppressive therapy or in combination with vasodilators.

• SSc-APAH are unlikely to respond to immunosuppression alone.


Immunosuppressive Therapy in Connective Tissue Diseases-Associated Pulmonary Arterial Hypertension

• Of 28 patients, 8 responded
• 5/12 SLE and 3/8 MCTD
• significantly improved 6-min walking distance (available in five patients) and a significant improvement in hemodynamic function.
• No patients with systemic sclerosis responded
• Patients with a lower baseline NYHA functional class and better baseline pulmonary hemodynamics (p < 0.05) were more likely to benefit from immunosuppressive therapy.

# Cyclophosphamide in SLE

<table>
<thead>
<tr>
<th>Study</th>
<th>Drug/design</th>
<th>Baseline characteristics</th>
<th>Outcome/treatment suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gonzalez-Lopez et al. [6]</td>
<td>i.v. CYC, 0.5/m² monthly for 6 months or oral enalapril 10 mg/day for 6 months + oral steroids &lt;15 mg/day</td>
<td>34 patients with SLE PAH Age, mean (s.d.), years: 38 (11) Duration of SLE, median (range), years: 6 (range 1–8) SLEDAl score, mean (s.d.): 2.1 (2.6) PASP, mean (s.d.), mmHg: 39 (6)</td>
<td>Significant reduction in PASP in both groups at 6 months. Twice the reduction in PASP in the CYC group. In patients with PASP &gt;35 mmHg, only the CYC group had a significant reduction in the RVSP. Improvement in the NYHA functional class in the CYC group.</td>
</tr>
<tr>
<td>Xavier Jais et al. [2]</td>
<td>Included both SLE (n = 13) and MCTD (n = 10) i.v. CYC 0.6 g/m² monthly for 6 months Oral steroids 0.5 mg/kg for 4 weeks (later tapered) ± VT</td>
<td>IIT group (n = 16) Age, mean (s.d.), years: 31 (10) PASP, mean (s.d.), mmHg: 48 (12) SLEDAl score, mean (s.d.): 4 (4.8) NYHA class I and II 7 IIT + VT group (n = 7) Age, mean (s.d.), years: 38 (9) PASP, mean (s.d.), mmHg: 58 (10) SLEDAl score, mean (s.d.): 5 (5.3) NYHA class I and II 0</td>
<td>Patients with less severe disease may respond to treatment with IIT. In more severe disease, VT should be started, possibly in combination with IIT.</td>
</tr>
<tr>
<td>Miyamichi-Yamamoto et al. [15]</td>
<td>i.v. CYC + oral glucocorticoids + VT Observational single-centre study with historical control</td>
<td>Eight SLE patients Age, mean (s.d.), years: 42 (8) RVSP, mean (s.d.), mmHg: 39.5 (9.2) NYHA class: I, II and III</td>
<td>IIT Significantly decreased PASP Tended to decrease PVR Normalized haemodynamics in a few patients</td>
</tr>
</tbody>
</table>
Pulmonary arterial hypertension in systemic lupus erythematosus may benefit by addition of immunosuppression to vasodilator therapy: an observational study

Sirisha Kommireddy¹, Srinivas Bhyravavajhala², Kishorebabu Kurimetı¹, Srinivasa Chennareddy¹, Suresh Kanchinadham¹, Irlapati Rajendra Vara Prasad¹ and Liza Rajasekhar¹
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (s.d.), years</td>
<td>25.38 (8.04)</td>
</tr>
<tr>
<td>Duration of SLE, median (range), months</td>
<td>36 (1-168)</td>
</tr>
<tr>
<td>Duration of PH, median (range), months</td>
<td>1.5 (0-36)</td>
</tr>
<tr>
<td>Duration of follow-up, median (range), months</td>
<td>12 (6-53)</td>
</tr>
<tr>
<td>NYHA functional class</td>
<td></td>
</tr>
<tr>
<td>III and IV</td>
<td>13</td>
</tr>
<tr>
<td>I and II</td>
<td>6</td>
</tr>
<tr>
<td>Asymptomatic</td>
<td>5</td>
</tr>
<tr>
<td>Pulmonary artery systolic pressure, mean (s.d.), mmHg</td>
<td>59.33 (18.68)</td>
</tr>
<tr>
<td>Severe (&gt;60 mmHg)</td>
<td>11</td>
</tr>
<tr>
<td>Moderate (46-59 mmHg)</td>
<td>6</td>
</tr>
<tr>
<td>Mild (30-45 mmHg)</td>
<td>7</td>
</tr>
<tr>
<td>CYC dose, mean (s.d.), g</td>
<td>5.1 (1.37)</td>
</tr>
<tr>
<td>Indication for CYC</td>
<td></td>
</tr>
<tr>
<td>PAH</td>
<td>10</td>
</tr>
<tr>
<td>Nephritis</td>
<td>13</td>
</tr>
<tr>
<td>Psychosis</td>
<td>1</td>
</tr>
<tr>
<td>SLEDAI, mean (s.d.)</td>
<td>14.61 (8.70)</td>
</tr>
<tr>
<td>Auto-antibody positive, n</td>
<td></td>
</tr>
<tr>
<td>ANA</td>
<td>24</td>
</tr>
<tr>
<td>Anti-dsDNA antibodies</td>
<td>23</td>
</tr>
<tr>
<td>aCL</td>
<td>2</td>
</tr>
</tbody>
</table>
Response to CYC

• Responders –
  – PASP of >15 mmHg
  – improvement in their New York Heart Association functional class.

• 11 responded (45.83%), with a decrease in mean PASP from 59.33 mmHg at baseline to 43.29 mmHg at the end of 6 months (P < 0.0001).

Rheumatology 2015;54:16731679
ANTICOAGULATION
Effect of Warfarin Treatment on Survival of Patients With Pulmonary Arterial Hypertension (PAH) in the Registry to Evaluate Early and Long-Term PAH Disease Management (REVEAL). Circulation. 2015 Dec 22;132(25):2403-11
REVEAL STUDY

• There was no survival difference with warfarin in IPAH patients (adjusted hazard ratio, 1.37; \( P=0.21 \)) or in SSc-PAH patients (adjusted hazard ratio, 1.60; \( P=0.15 \)) in comparison with matched controls.

• Increased mortality in comparison with warfarin-naïve patients.
COMPERA Registry

4,069 patients with a diagnosis of PH enrolled in the database

1,655 not eligible because of other forms of PH (non-PAH PH)

2,414 patients with a diagnosis of PAH enrolled in the database

1,131 not eligible:
- 701 prevalent cases
- 134 PAWP > 15 mmHg
- 62 PAPm < 25 mmHg
- 19 PAPm not available
- 130 PCWP not available
- 85 no right heart catheter

1,283 patients with a diagnosis of PAH eligible for analysis

800 patients with IPAH

483 patients with other forms of PAH

208 patients with SSc-PAH

COMPERA Registry

- Anticoagulation was used in 66% of 800 patients with IPAH and in 43% of 483 patients with other forms of PAH
- 3Yr Survival improved in IPAH patients who received anticoagulation; not in patients with SSc-PAH

COMPERA Registry

Conclusions
Treatment of SLE-PAH

• Specific Therapy
• Immunosuppression – CYC is given if SLEDAI more than 12, Multiorgan involvement, nephritis, Major neurological involvement, medium vessel vasculitis
• Isolated PAH- individualised
  – Steroids
  – Azathioprine
  – CYC
• Anticoagulation if associated with APS
Treatment contd..

• Scleroderma
  – No immunosuppression/anticoagulation

• MCTD
  – Depending on clinical phenotype and serology
Perspective

• SLE and Sclerodema are the common causes
• Patients are routinely screened for PAH
• All PAH patients will be evaluated for APS
• Patients with PAH and a positive ANA, should be evaluated for SLE, sclerodema, sine scleroderma and MCTD
• Functional status assessment has limited due to comorbidities
Thank you