PULMONARY REGURGITATION

ETIOLOGIES

- Dilatation of valve ring secondary to pulmonary hypertension or dilation of pulmonary artery
- Endocarditis
- Surgical treatment of congenital PS
- Surgical treatment of Tetralogy of Fallot
- Congenital valve anomaly: absent, malformed, fenestrated or supernumerary leaflets
  - Associated with TdF, VSD, PS
- Rare: trauma, carcinoid, rheumatic involvement, injury due to PA catheter, syphilis

CLINICAL PRESENTATION

- Isolated PR cause RV volume overload
- Complicated eventually by pulmonary hypertension = RV failure
- Septic pulmonary emboli and pHTN in endocarditis

PHYSICAL EXAM

- RV Hyperdynamic – palpable systolic pulsations in left parasternal area, lift
- Enlarged PA – systolic pulsations of 2nd left intercostal space
- Auscultation
  - P2 2nd to pulmonary hypertension
    - Absent in congenital absence of pulmonary valve
  - Wide split of S2
  - Nonvalvular systolic ejection click 2nd pulmonary artery expansion – midsystolic murmur in 2nd LICS
  - S3 and S4 in 4th LICS, ↑ with inspiration
  - Diastolic murmur without pHTN
    - Low pitch
    - 3-4th LICS, near sternum
    - 0.04s after P2
    - ↑ with inspiration
  - Graham-Steel murmur: annular dilation 2nd to pulmonary HTN (PAPs > 55 mmHg)
    - High pitch
    - Decrescendo
    - After P2
    - 2-4th LICS
    - Loud P2 or fused S2
    - Ejection sound
    - Systolic murmur of TR
    - Low frequency presystolic murmur (flow across tricuspid valve – rare)
    - ↑ Inspiration
    - ↓ Valsalva

ELECTROCARDIOGRAPHY
- RV diastolic overload (rSr or rsR in precordial leads)
- RV hypertrophy in presence of pulmonary hypertension

**CHEST X-RAY**

- Enlarged PA
- Enlarged RV

**ECHOCARDIOGRAPHY**

- Doming of the leaflet
- Hypoplasia, dysplasia or absence of the valve
- Dilatation of the pulmonary artery, RA, RV
- In absence of pulmonary hypertension, systolic dysfunction and dilatation of RV is an indirect sign of significant pulmonary regurgitation (volume overload)


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<thead>
<tr>
<th></th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
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<tbody>
<tr>
<td>Pulmonary valve</td>
<td>Normal</td>
<td>Normal of abnormal</td>
<td>Abnormal</td>
</tr>
<tr>
<td>RV size</td>
<td>Normal</td>
<td>Normal of dilated</td>
<td>Dilated</td>
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<tr>
<td>Jet size by color Doppler</td>
<td>Thin</td>
<td>Intermediate</td>
<td>Large, wide origin and brief duration</td>
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<tr>
<td>Jet density - CW</td>
<td>Soft, slow deceleration</td>
<td>Dense</td>
<td>Dense, steep deceleration, early termination of diastolic flow</td>
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<tr>
<td>Pulmonary systolic flow - PW</td>
<td>Slightly increased</td>
<td>Intermediate</td>
<td>Increased</td>
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**CMR: important role – PA dilation, quantify PR severity, RV dilation and systolic function**

**MANAGEMENT**

- PR alone requires specific treatment
- PVR – pulmonary allograft is preferred
- Treat underlying cause of pulmonary HTN – will ameliorate the PR
### Content of this summary from these references: