Is an echo the best right heart catheter?

PD Dr med. Bernhard Herzog
No disclosures
Can echo answer my question?
Right Heart Disease

- Pulmonary Hypertension
- Right Ventricular Infarction
- Tricuspid valve disease
- Pulmonary valve disease
- ARVC
- Shunts
Right Heart Disease

- Size & Function
  - Right Ventricle
  - Left Ventricle
  - Atria

- Pulmonary Hypertension

- Right Ventricular Infarction

- Pulmonary valve disease

- ARVC / Sarcoidosis

- Shunts

- Pulmonary Pressure

Challenging
Right Ventricular Size

RV linear dimensions
- inflow

RV linear dimensions
- outflow

RV end-diastolic area

RV 3D volume

RV modified / focused apical 4CH

J Am Soc Echocardiogr 2010;23:685-713
Right Ventricular Size - Limitations
- Image Quality-
Right Ventricular Size - Limitations
- Image Plane-

1. Label the RV and LV in the diagrams.
2. Identify the Image Plane representations.
Right Ventricular Size - Limitations

- Image Quality
- Image Plane
- Trabeculations
Right Ventricular Size - Limitations

- Image Quality
- Image Plane
- Trabeculations
- Normal Values
Right Ventricular Function

- FAC
- 3D function
- RV longitudinal function
  - TAPSE
- Pulsed tissue Doppler
  - S wave
- Color tissue Doppler
  - S wave
- Global longitudinal strain
- RIMP PW
- RIMP TDI

Right Ventricular Function - Limitations

• Image Quality
• Image Plane
• Trabeculations
• Normal Values
• Alignment
MPA / PAs & IVC
Pulmonary Hypertension

![Graph showing Doppler PASP mmHg vs RHC PASP mmHg with correlation r = 0.83, p < 0.001.](image)

*British Journal of Rheumatology 1997;36:239–243*
## Pulmonary Hypertension

<table>
<thead>
<tr>
<th>Peak tricuspid regurgitation velocity (m/s)</th>
<th>Presence of other echo ‘PH signs’</th>
<th>Echocardiographic probability of pulmonary hypertension</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤2.8 or not measurable</td>
<td>No</td>
<td>Low</td>
</tr>
<tr>
<td>≤2.8 or not measurable</td>
<td>Yes</td>
<td>Intermediate</td>
</tr>
<tr>
<td>2.9–3.4</td>
<td>No</td>
<td>High</td>
</tr>
<tr>
<td>&gt;3.4</td>
<td>Not required</td>
<td></td>
</tr>
</tbody>
</table>

### A: The ventricles
- Right ventricle/ left ventricle basal diameter ratio >1.0
- Right ventricular outflow Doppler acceleration time <105 msec and/or midsystolic notching

### B: Pulmonary artery
- Inferior vena cava diameter >21 mm with decreased inspiratory collapse (<50% with a sniff or <20% with quiet inspiration)
- Early diastolic pulmonary regurgitation velocity >2.2 m/sec
- Right atrial area (end-systole) >18 cm²
- PA diameter >25 mm.

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*J Am Soc Echocardiogr 2013;26:1-14*
Pulmonary Hypertension - Limitations

- Image Quality
- Image Plane
- Trabeculations
- Normal Values
- Alignment
- Severity of tricuspid regurgitation
- Right ventricular function
- Inspiration (higher with inspiration)
Take Home Message

- Echo is the first line modality
- Echo is not a right heart catheter
- RV assessment is challenging – NOT only for echo
- Get as many pieces of the puzzle as possible
- Take other imaging modalities if necessary