Objective

- Right ventricular (RV) function is of diagnostic and prognostic importance in patients with pulmonary hypertension (PH). (McLaughlin et al, JACC, 2009, 53:1573-1619)
- The purpose of the present study was to evaluate RV regional systolic function and dyssynchrony in patients with PH using real-time three-dimensional echocardiography (RT3DE).

Methods

- A total of 70 patients with PH and 26 age-matched controls were enrolled.
- RT3DE images were acquired and analyzed to obtain RV regional (inflow, body, outflow) ejection fraction (EF) and time to minimal systolic volume (Tmsv).

Results

- Average RT3DE acquisition and analyze time was less than 10 minutes. RT3DE image quality was adequate to analyze in more than 95% of all the subjects.
- RV global and regional EF measured by RT3DE correlated with FAC, S and MPI in all the subjects (r=0.24-0.58, P<0.05).
- When compared with controls, EF-inflow and EF-global was lower in all patients with PH (P<0.05), while EF-body was decreased in moderate and severe PH (P<0.05) and EF-outflow changed in severe PH (P<0.001).
- Tmsv-SD% in mild and moderate PH was similar to that in the control group and was significantly lowered in severe PH (P<0.05).
- EF-inflow and EF-global correlated with PASP (r=-0.731, -0.769, P<0.001) and PVR (r=-0.789, -0.801, P<0.001) negatively.
- The relationship between other systolic parameters derived from RT3DE with PASP or PVR was weaker or not significant.
- The optimal cut-off value in determining PASP≥70 mmHg and PVR≥3 wood was 40.5% for EF-inflow (sensitivity and specificity was 97% and 55%, 93% and 61% respectively), and 42.2% for EF-global (sensitivity and specificity was 97% and 76%, 90% and 85% respectively).

Conclusions

- In patients with PH, RV inflow and global systolic function was impaired in inverse relationship with PASP and PVR.
- RV systolic synchronicity was impaired in severe PH.
- Evaluation of RV regional systolic function using RT3DE method may play a potential role in the non-invasive assessment of the severity of PH.

Disclosures

The authors have no conflicts of interest.