Right atrial function index in chronic thromboembolic pulmonary hypertension before and after pulmonary thromboendarterectomy
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Background:
Chronic thromboembolic pulmonary hypertension (CTEPH) can be effectively treated with pulmonary thromboendarterectomy (PTE). The standard for assessing postoperative success is through right heart catheterization measurements of mean pulmonary arterial pressure (mPAP) and peripheral vascular resistance (PVR). Recently, a novel echocardiographic parameter (right atrial function index, RAFi) was shown to predict clinical outcomes in patients (pts) with precapillary PH. In this study, we assessed the utility and predictive value of this novel index in CTEPH patients before and after PTE.

Methods:
50 consecutive CTEPH pts with pre- and post-PTE echocardiograms (echos) were studied. RA volumes were assessed in the apical 4 chamber view. RA end-systolic volume (ESV) was measured just before tricuspid valve opening; RA end diastolic volume (EDV) was assessed at tricuspid valve closure. RV outflow tract velocity time integral (VTI) was also obtained in all patients.

Calculations:
RAEF = ([RAESV-RAEDV]/RAESV)*100
RAESVi = RAESV/mL/BSA(m2)
RAFi = (RAEF (%)*VTI (cm))/RAESVi (mL/m2)

Results
The mean pre-op RAFi was 24.1 ± 23.5; mean post-op RAFi was 20.2 ± 17.7 (p=0.27). Before PTE, there was a modest correlation between RAFi & mPAP (R= -0.399, p<0.005) and RAFi & PVR (R= -0.495, p<0.005). Surprisingly, however, no statistically significant correlation of these variables was present after PTE. In addition, RAFi trended downward (i.e. worsened, p = 0.271) post-PTE.

Discussion
In our patient population, RAFi was surprisingly unchanged statistically (and trended downward) after successful PTE. This trend may be due to sudden changes in RAESV and RAEDV or postoperative RV stunning, which could have caused the minimal change in RVOT VTI. Thus, RAFi cannot be used as a noninvasive parameter of post-PTE success. However, there is a significant correlation between pre-op RAFi and traditional invasive measurements that may be useful in the noninvasive assessment of pts with CTEPH.