Doppler demonstration of combined systolic pulmonary and aortic valve regurgitation

Philippe Unger*, Martin Chaumont, Maria Kyriakopoulou, Aurelia David-Cojocariu, and Jean-Luc Vandenbossche

Université Libre de Bruxelles (ULB), Cardiology Department, CHU Saint-Pierre, 322 rue Haute, B-1000 Brussels, Belgium

* Corresponding author. Tel: +32 2 5353350; Fax: +32 2 5353362. E-mail: punger@ulb.ac.be

A 70-year-old man was admitted for heart failure and fast atrial fibrillation (average ventricular rate 140 bpm) and was referred for transoesophageal echocardiography before cardioversion. Left ventricular ejection fraction was 45%. Two-dimensional colour (83°, Panel A, Supplementary data online, Video S1) and colour-M-mode (Panel B) transoesophageal echocardiography demonstrated intermittent and mild pulmonary (full arrow) and aortic valve (dashed arrows) systolic regurgitations. Transthoracic continuous wave Doppler confirmed pulmonary (Panel C) and aortic (Panel D) regurgitant flows during systole. Characteristically, pulmonary and aortic valve regurgitations were observed during the systole that followed a cycle lengths of short duration (*). During these short cycles, continuous wave Doppler studies demonstrated tricuspid (Panel E) and mitral regurgitation (Panel F) persisting throughout the cardiac cycle, thereby not enabling forward ventricular filling. Thus, ventricular under-filling during the subsequent beat explains the failure of right and left ventricular systolic pressures to exceed pulmonary and aortic pressure, respectively. Consistent with this mechanism are the observations of tricuspid and mitral regurgitation of lower velocities (arrowheads) during this beat.

Systolic aortic regurgitation has been described in patients with arrhythmias, including atrial fibrillation (as in the present case), where it tends to be associated with heart failure, during weaning from aorto-coronary bypass and in patients with a left ventricular assist device. Here we show for the first time that systolic pulmonary valve regurgitation may also occur. Moreover, this case provides more insight into the mechanisms involved in the unusual timing of these valvular regurgitations.

Supplementary data are available at European Heart Journal – Cardiovascular Imaging online.

Published on behalf of the European Society of Cardiology. All rights reserved. © The Author 2016. For permissions please email: journals.permissions@oup.com.