Demonstration of bilateral superior vena cava by contrast echocardiography

Démonstration de veine cave supérieure bilatérale d’après contraste échocardiographique

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An 81-year-old woman underwent transthoracic echocardiography for evaluation of shortness of breath, which revealed a severely dilated coronary sinus (Fig. 1) measuring 40 × 32 mm in transverse section. Contrast echocardiography was performed to elucidate the cause. Injection of agitated saline into the right antecubital vein resulted in rapid appearance of contrast in the right atrium, but not in the coronary sinus (Fig. 2, video 1). Only after complete opacification of the right atrium, a few bubbles refluxed in the coronary sinus. However, a subsequent injection of agitated saline into the left antecubital vein was followed by the appearance of saline bubbles in the coronary sinus before entering the right atrium (Fig. 3, video 2). This demonstrated bilateral superior caval venous drainage, with a right superior vena cava (RSVC) draining normally into the right atrium and a persistent left superior vena cava (PLSVC) draining into the coronary sinus.

PLSVC is a rare vascular anomaly reported in about 0.3% of the general population and in 3—10% of patients with congenital heart disease. In 80—90% of the cases, PLSVC drains into the right atrium through the coronary sinus, which becomes enlarged. In less than 10% of the patients, PLSVC drains into the left atrium, producing a right-to-left shunt. A RSVC is present in 70—90% of the cases. PLSVC may have important clinical implications as it may complicate the placement of pacemaker leads and central venous catheters, and may preclude the use of retrograde cardioplegia during cardiac surgery.

A dilated coronary sinus should raise the suspicion of a PLSVC, particularly in patients with congenital heart disease. In these cases, PLSVC may be easily demonstrated by
Figure 1. Transthoracic echocardiogram (apical view) showing a dilated coronary sinus (CS). RA: right atrium.

Figure 2. Transthoracic echocardiogram (apical view) after injection of agitated saline into the right antecubital vein, showing saline bubbles appearing in the right atrium but not in the coronary sinus.

Figure 3. Transthoracic echocardiogram (apical view) after injection of agitated saline into the left antecubital vein, demonstrating opacification of the coronary sinus prior to contrast appearing in the right atrium.

Contrast echocardiography; the injection of agitated saline into the left antecubital vein leads to the appearance of bubbles in the coronary sinus before reaching the right atrium. The presence or absence of a RSVC may also be elucidated by injection of contrast into the right antecubital vein, which leads to opacification of the right atrium before the coronary sinus in the former case, and to the opposite sequence in the latter.

Conflicts of interests
None.

Appendix A. Supplementary data