
The answer lies in the bubbles: a patient with superior sinus venosus defect, persistent left superior vena cava, and absent innominate vein

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A 38-year-old woman with atypical chest pain and exertional dyspnoea was referred to our service for a diagnostic work-up. Transthoracic echocardiography showed an enlarged coronary sinus (CS) and enlarged right-sided heart chambers without obvious atrial septal defect (Panel A). After injection of agitated saline contrast into the left cubital vein, immediate appearance of bubble contrast was noted in the CS and the right atrium consistent with drainage of a persistent left superior vena cava into the CS (Panel B). This finding left the dilatation of the right-sided heart chamber unexplained. Additional injection of agitated saline into the right cubital vein was the critical diagnostic hint, when bubbles appeared simultaneously in both atria (Panel C). This finding is almost pathognomonic for a superior sinus venosus defect. The absence of bubble contrast in the left atrium after injection into the left cubital vein is consistent with the absence of an innominate vein, which was subsequently confirmed on cardiac magnetic resonance imaging (Panel D).

This case demonstrates the utility of agitated saline contrast for clarification of the cardiac anatomy, especially in the presence of an otherwise unexplained dilatation of the right-sided heart chambers. It also underlines, that in the odd case of rare anatomic variants, injection into both cubital veins may be necessary for a comprehensive and complete diagnostic work-up.

Panel A. Apical four-chamber view, showing dilated right-sided heart chambers and a dilated CS (arrow).
Panel B. After injection of agitated saline contrast into the left cubital vein, the CS (arrow) and right-sided heart chambers are opacified; there are no bubbles in the left heart chambers.
Panel C. After injection of agitated saline contrast into the right cubital vein, simultaneous opacification of right and left heart chambers is obvious.
Panel D. Three-dimensional reconstruction of a cardiac magnetic resonance angiogram showing a right superior and a persistent left superior vena cava (arrows). An innominate vein is absent.