One-stop-shop cardiac diagnosis in a single heart beat using 320-slice computed tomography: ascending aortic aneurysm, hypertrophic cardiomyopathy and mixed valvular heart disease

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A 63-year-old woman underwent dynamic volume computed tomography imaging. The scanner’s wide area detector is equipped with 320 rows of 0.5 mm detector elements and has a width of 16 cm covering the entire heart. A four-dimensional data set containing all diagnostic information (Fig. 1, Videos 1 and 2) was obtained within a single heartbeat.

Fig. 1. Three-dimensional colour-coded volume-rendered images (panels A and B) show an aneurysm of the ascending aorta (Ao) with a maximum diameter of 50 mm, dilatation of the main pulmonary artery (PA) with a maximum diameter of 46 mm, and normal coronary arteries (right coronary artery, RCA; left anterior descending artery, LAD; left circumflex artery, LCx). Multiplanar reformatted images (panels C and D) illustrate circumscribed thickening of the septal myocardium (asterisk) without relevant subvalvular obstruction. Additional images (panels E–H) demonstrate reduced opening area of both the aortic valve (orifice area 1.3 cm²) and mitral valve (orifice area 1.1 cm²) as well as incomplete closure of both valves (arrows). Considerable thickening of the aortic valve cusps and the mitral valve leaflets and partial commissural fusion of the aortic valve (open arrow) resulting in bicuspid valve morphology is also presented.

Appendix A. Supplementary data