

Appendix 1

The following is the procedure for identifying the plane with the maximum left ventricular volume in the transverse section (*Figure S1A*): (I) align the green reference line with the line connecting the midpoint of the mitral valve P and the apex of the heart Q (representing the assumed left ventricular long axis) to obtain the heart's oblique sagittal position (*Figure S1B*); (II) within the oblique sagittal position, align the red positioning line with the line connecting the midpoint of the mitral valve P' and the apex Q'; (III) repeatedly fine-tune the positions of the two alignment lines on the aforementioned planes. After satisfactory alignment is achieved, the plane obtained by the yellow alignment line, perpendicular to the two planes mentioned above, is considered the standardized short-axis position of the left ventricle (*Figure S1C*); (IV) use the drawing tool within 3D Slicer to delineate and save the long axis of the left ventricle (*Figure S1D*).

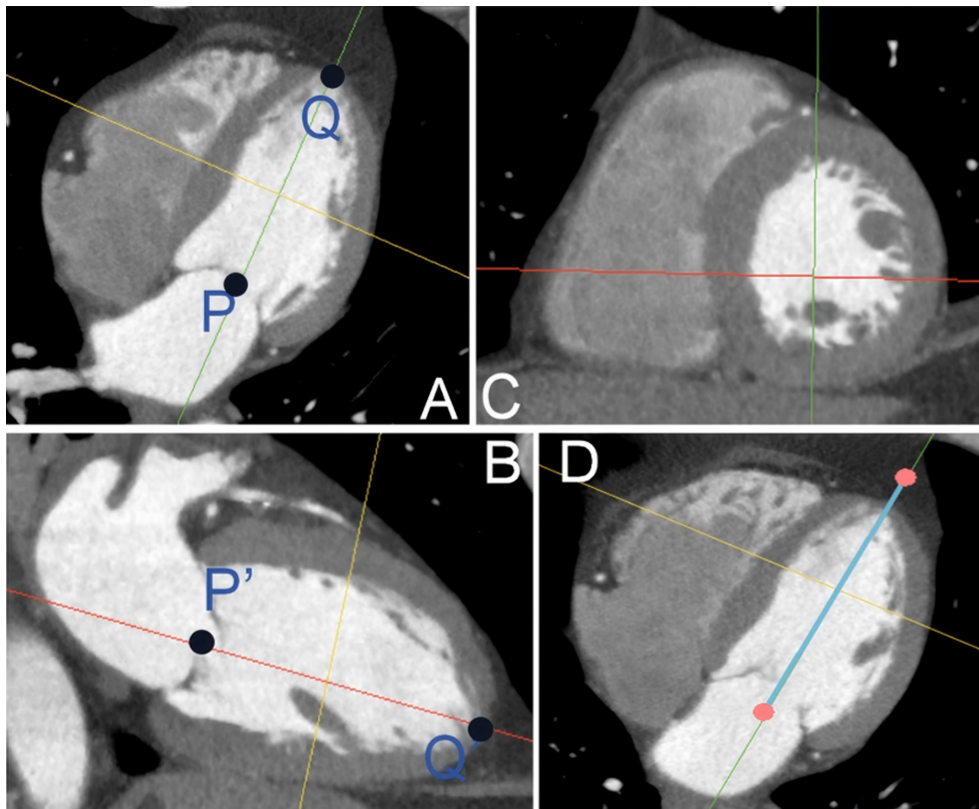


Figure S1 Process of physician annotation of the left ventricular long axis. (A) Transverse plane with the maximum left ventricular volume. (B) Alignment of the mitral valve midpoint (P) and apex (Q) to obtain the oblique sagittal plane. (C) Determination of the standardized short-axis plane (yellow line). (D) Delineation of the left ventricular long axis in 3D Slicer. P and P': mitral valve midpoint; Q and Q': heart apex.

Appendix 2

The processing of CCTA volumetric data involves two coordinate systems: the anatomical universal coordinate system (left-posterior-superior) (*Figure S2A*) and the geometric coordinate system in the field of computer image processing (xyz) (*Figure S2B*). In the context of image processing, graphical elements and vectors are represented and modeled with tools from a three-dimensional geometric coordinate system. The xyz axes are sequentially aligned with the anatomical LPS directions. The coordination interchange between these two systems is accomplished by comparing the coordinates of the geometric space origin with those in the anatomical space and taking into account the ratio of vector magnitudes along the coordinate axes in both geometric and anatomical spaces.

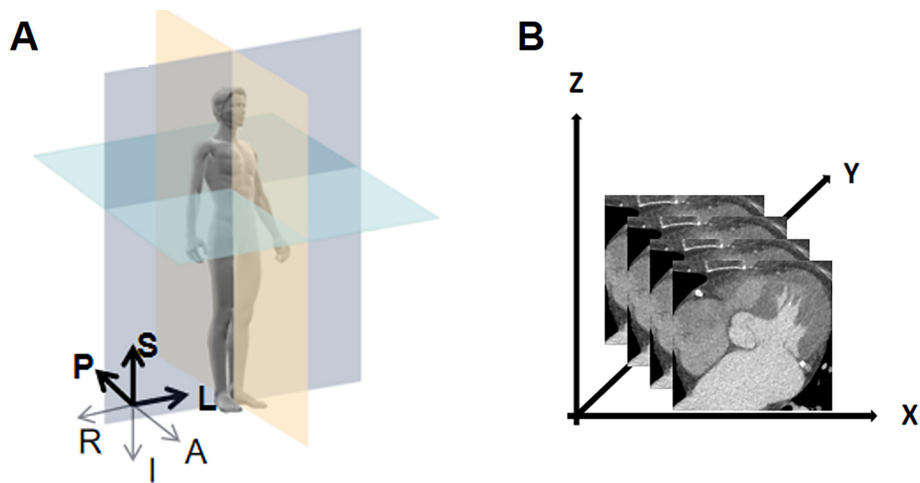


Figure S2 Illustration of the anatomical and geometric coordinate systems used in CCTA volumetric data processing. (A) Anatomical universal coordinate system (left-posterior-superior). (B) Three-dimensional geometric coordinate system (xyz). L, left; R, right; A, anterior; P, posterior; S, superior; I, inferior.