

ALCAPA: 3D MDCT presents an intuitive perspective

Uday Surana, Keyur Vora

Anomalous origin of the left coronary artery from the pulmonary artery (ALCAPA) is one of the rare congenital anomalies with exceptional presentation till adulthood. The complications include left ventricular dysfunction, severe mitral regurgitation and myocardial infarction. We report a case of a young female with dyspnea and murmur with left to right shunt which was finally diagnosed as ALCAPA by multi-detector cardiac computed tomography (MDCT).

A 45-year-old female presented with dyspnoea on exertion New York Heart Association [(NYHA) II class] and chest heaviness for seven days. Physical examination reveals 2/6 systolic diffuse murmur over the left sided chest with predominance over the pulmonary area. Electrocardiogram (ECG) reveals sinus rhythm with infrequent premature ventricular contractions (PVCs) and echocardiography reveals left to right shunt flow with inconspicuous ends. Cardiac computed tomography (CT) study reveals very interesting and unusual findings. Only one coronary artery was found to originate from the aortic root (Figure 1A and B). Right coronary artery (RCA) originates from the right coronary sinus as a large-sized and ecstatic artery with a highly tortuous course and abundant collaterals (Figure 1C). No coronary origin was detected from the left coronary cusp. Surprisingly, the left coronary equivalent artery was revealed, originating from the main pulmonary artery with course toward anterior interventricular groove and branching into left anterior descending and left circumflex coronary arteries with normal courses (Figure 1D and E). Finally, cardiac CT unveiled the definitive diagnosis of anomalous left coronary artery from the pulmonary artery (ALCAPA).

Approximately 90% of the infants with ALCAPA die during the first year of their life and very few survive till

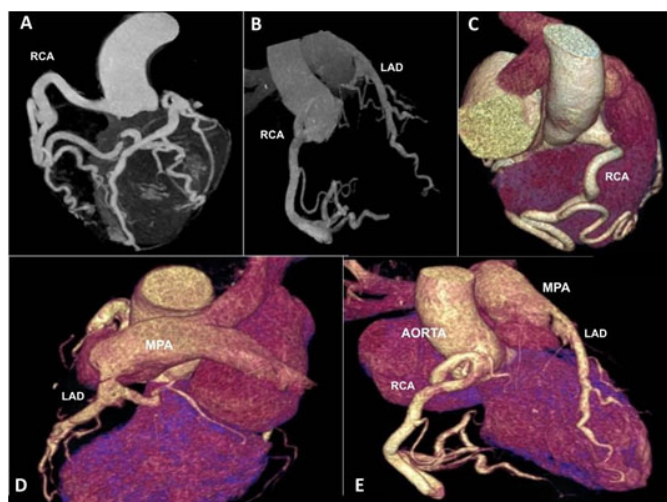


Figure 1: (A) MDCT volume rendered tree image shows RCA origin from aortic cusp, LCA origin separated from aorta, and multiple collaterals from RCA to LAD; (B) RCA origin from aorta and LCA origin from main pulmonary artery (MPA); (C) Volume rendered 3D heart image shows RCA origin, course, and collaterals; (D) LCA origin from MPA and course; (E) Volume rendered heart image shows RCA and LCA origin and course from aorta and MPA, respectively.

adulthood [1]. The adult cohort of ALCAPA is increasing due to better advanced cardiac imaging techniques like multidetector computed tomography (MDCT). It is characterized by exuberance in collateral coronary circulation from RCA to left coronary artery (LCA); thus allowing survival up to adulthood, coronary “steal” phenomenon from RCA to LCA and pulmonary “steal” phenomenon as LCA to PA [2]. In the adult type of ALCAPA, re-establishment of dual coronary system by ligation of the LCA from the pulmonary artery with coronary artery bypass grafting and reimplantation of LCA coronary button to aorta with interposition graft are the preferred methods of surgical approach [3].

Keywords: ALCAPA, Coronary anomaly, MDCT

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Author Contributions

Uday Surana – Conception of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Keyur Vora – Design of the work, Analysis of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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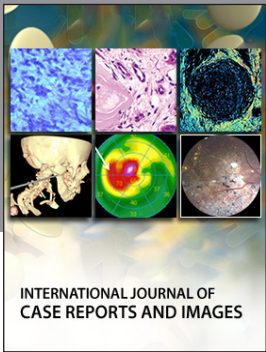
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