An innovative treatment of anomalous origin of the left coronary artery from the pulmonary artery

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A 10-year-old girl was admitted with cough and palpitation, a transthoracic and transoesophageal echocardiography showed anomalous origin of the left coronary artery from the pulmonary artery (ALCAPA). A computed tomographic scan demonstrated an enormously dilated, tortuous, and dominant right coronary artery originating from the right coronary cusp, with a large number of collateral vessels filling the left main coronary artery (LMCA) (Panels A–D, arrow = ALCAPA). The blood flow was from the LMCA to the main pulmonary artery (MPA).

The procedure was performed through superior partial sternotomy. After anticoagulation with heparin (100 U/kg), two parallel pursestring sutures of 5-0 polypropylene (Ethicon, Inc.) were placed on the anterior wall of the MPA. The MPA was punctured within the pursestring sutures, and the sheath loaded with the PDA occluder (8/10 mm, Starway Medical Technology, Inc., Beijing, China) was introduced into the LMCA under echocardiographic guidance (Panel E). The occluder was placed in a proper position between the orifice and bifurcation of the LMCA (Panels F and G, arrowhead = occluder). A 20-min occlusion test of LMCA was well tolerated; there was no evidence of myocardial ischaemia on a continuous electrocardiogram, confirming good collateralization from RCA. Echocardiography demonstrated normal left ventricular function with normal anterior wall function. Serial CKMB and troponin levels in the first 48 h were within normal limits. Follow-up echocardiography and CT imaging confirmed the appropriate device position (Panels H and I, arrowhead = occluder).

ALCAPA is an extremely rare but potentially fatal congenital cardiac malformation which constitutes 0.24% of all congenital heart defects. Different surgical approaches have been reported, including ligation of the LMCA, intrapulmonary baffling or Takeuchi procedure, and aortic reimplantation of the anomalous left coronary artery. In this study, we describe a minimally invasive technique of perpulmonary device occlusion of an ALCAPA and demonstrate that this procedure represents a safe and effective alternative therapy for selected patients.