A 15-year-old athlete presented with sudden cardiac death while training. Pulseless electrical activity was diagnosed on the field and advanced life support was started. On admission, electrocardiogram (Panel A) showed anterior myocardial infarction. Immediate cardiac catheterization and aortography showed normal right coronary artery and aberrant position of left main (LM) with probable stenosis (Panel B1 and see Supplementary data online, Video S1). Once selectively catheterized, after several attempts, the left system showed no significant stenosis but an unusual angulation of elongated LM (Panel B2 and see Supplementary data online, Video S2). To confirm the anomalous origin and course of the LM, a three-dimensional transoesophageal echocardiography (TEE) and colour Doppler were performed in situ. Peri-interventional TEE confirmed that LM originated from the right coronary sinus at a higher and more anterior position than usual (Panel C1) and had interarterial course between aorta (Ao) and pulmonary artery (PA) and flow (Panel C1 and see Supplementary data online, Video S3 and S4).

With different angulation, an intramural course in the patent LM was revealed (Panel C2 and see Supplementary data online, Video S5). The left ventricle was dilated with normal wall thickness and akinesia of the anterior and lateral wall. For subsequent scheduled LM surgical translocation, an extracorporeal membrane oxygenation was set for recovery of the stunned myocardium and 1 week later was safely removed. Afterwards, the patient underwent multidetector computed tomography coronary angiography which confirmed the diagnosis (Panel D, white arrow points—LM ostium). This case highlights the relevance of three-dimensional TEE performed in the acute setting of aborted sudden cardiac death when anomalous origin of the coronary arteries is suspected.

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