

A new variation in coronary artery anatomy: type VII dual left anterior descending artery

Nowy wariant anatomii tętnic wieńcowych:
podwójna lewa tętnica zstępująca przednia typu VII

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A 53-year-old man presented with chest pain. Laboratory and electrocardiography findings were normal. Echocardiography showed a normokinetic wall motion with left ventricular ejection fraction at 60%. Coronary computed tomography angiography identified no evidence of atherosclerosis and stenosis. However, an aberrant long left anterior descending (LAD) artery originating from the right coronary sinus and a short LAD originating from the left main coronary artery (LMCA) were observed. After running from the right coronary sinus, the long LAD segment coursed intramyocardially within the septal crest and entered the anterior interventricular groove (AIVG) below the termination point of the short LAD. The short LAD terminated high in the AIVG after originating from the LMCA (Fig. 1A, B). The septal perforators originated from both short and long LAD, and the diagonal branches originated from the short LAD (Fig. 2A, B). Dual LAD is a rare anomaly and has been categorised into 6 subtypes based on the origin, course, and termination of the short and long LAD (Table 1) [Maroney J, Klein LW. *Catheter Cardiovasc Interv*, 2012; 80: 626–629]. Because of its influence on surgical or angiographic intervention strategies, recognition of this anomaly is important. In dual LAD, there are a short and a long LAD segments within the AIVG. The short LAD typically arises from the LMCA and terminates high in the AIVG. The long LAD may have a more variable origin, course around the short segment, and return to the AIVG distally [Spindola Franco H et al. *Am Heart J*, 1983; 105: 445–455; Agarwal PP, Kazerooni EA. *Am J Roentgenol*, 2008; 191: 1698–1701]. We present a novel type of dual LAD — type VII — which does not fit within the traditional classification system.

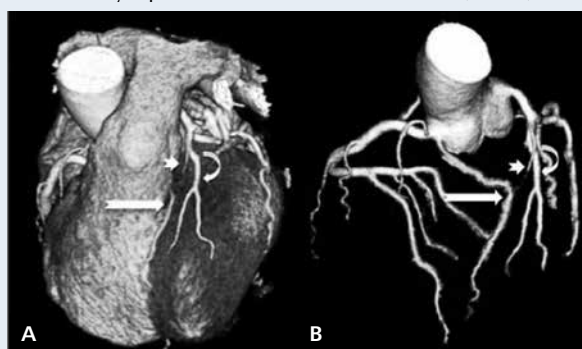


Figure 1. Volume-rendered (A) and coronary tree (B) images demonstrate the proximal take off of the long LAD and its distal course within the AIVG (long arrow). The short LAD terminates within the proximal AIVG (short arrow). A dominant diagonal branch of the short LAD coursing to the lateral wall of the left ventricle can also be seen (curved arrow).



Figure 2. Axial thick-slab (A) and curved planar-reformatted (B) images of the long LAD reveal its origin (arrow) from the right coronary sinus. The proximal intramyocardial course of the long LAD (curved arrow) and a septal perforator (arrowhead) are well depicted.

Table 1. Classification of dual left anterior descending artery

Type of dual LAD	Origin		Course of long LAD
	Short LAD	Long LAD	
Type I	Proximal LAD	Proximal LAD	Epicardial course on the LV side of the proximal AIVG, re-entering the distal AIVG
Type II	Proximal LAD	Proximal LAD	Epicardial course on the RV side of the proximal AIVG, re-entering the distal AIVG
Type III	Proximal LAD	Proximal LAD	Intramyocardial course in the proximal septum, then either emerging epicardially in distal AIVG or terminating intramyocardially as septal branches
Type IV	LMCA	RCA	1. Epicardial course anterior to the RVOT continuing to the distal AIVG 2. Intramyocardial course within septal crest emerging epicardially in the distal AIVG
Type V	LCS	RCS	Intramyocardial course within the septal crest emerging epicardially in the distal AIVG
Type VI	LMCA	RCA	Epicardial course between the RVOT and the aortic root, continuing to the mid or distal AIVG
Type VII (Current case)	LMCA	RCS	Intramyocardial course within the septal crest emerging epicardially in the distal AIVG

LAD — left anterior descending artery; LMCA — left main coronary artery; RCA — right coronary artery; LCS — left coronary sinus; RCS — right coronary sinus; AIVG — anterior interventricular groove; LV — left ventricular; RV — right ventricular; RVOT — right ventricular outflow tract

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