

Superdominant Left Anterior Descending Coronary Artery

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ABSTRACT

Posterior descending artery (PDA) supplies posterior one third of interventricular septum and usually arises from either the right coronary artery or the circumflex artery. PDA arising from left anterior descending artery (LAD) is extremely rare. We herein report an unusual type of left dominant circulation in which a large LAD continues as PDA after wrapping around the apex in presence of diminutive right coronary artery.

KEYWORDS

Coronary dominance; Superdominant LAD

INTRODUCTION

Concept of coronary artery dominance was proposed by Schlesinger [1]. Right dominance is found in 85% of population. Posterior descending artery (PDA), AV nodal artery and all posterolateral branches (PLB) arise from right coronary artery (RCA) in right dominant circulation. Left dominance is seen in 8% of population, where PDA, AV nodal artery and all PLB arise from left circumflex artery. Circulation is said to be co-dominant when PDA arises from LCx and PLB from RCA [2].

The PDA runs along the posterior interventricular sulcus, to the apex of the heart where it meets the left anterior descending artery that is coursing anterior interventricular groove. Supply of the posteroinferior septum by a hyperdominant left anterior descending artery (LAD) continuing as PDA is rare and sporadically reported in the literature [3-5].

CASE REPORT

A 46-year-old reformed smoker, a known case of hypertension and dyslipidemia, presented with atypical chest pain. His cardiac enzymes, electrocardiogram and transthoracic echocardiography was normal. He underwent treadmill test which was positive at moderate work load. Patient was taken up for coronary angiography which revealed normal left main coronary artery giving off large left anterior descending (LAD) and left circumflex (LCX) arteries.

The LCx was a non-dominant. The LAD continued in the anterior interventricular groove and reached crux after wrapping around the apex and coursing the posterior interventricular groove (Figure 1). LAD had non obstructive plaquing. The right coronary artery was a non-dominant, diminutive vessel arising from the right coronary sinus, ended in the right anterior atrioventricular groove, and had non obstructive plaque. Both RCA and LCx were non-dominant as PDA was arising from LAD.

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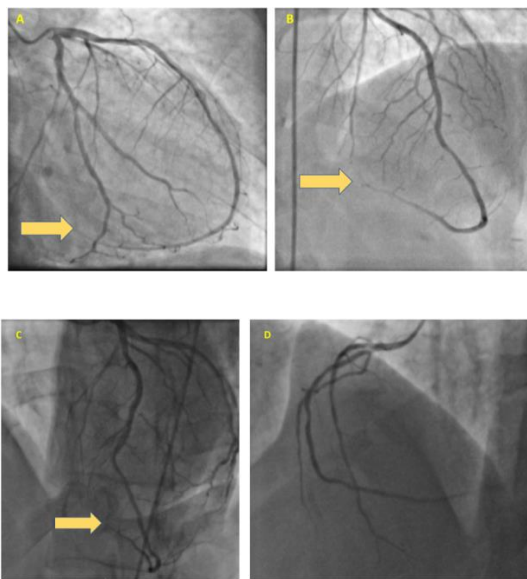


Figure 1: (A) Right anterior oblique caudal view, (B) Antero posterior cranial view, (C) Left anterior oblique cranial view showing LAD (left anterior descending artery) wrapping around apex and continuing as posterior descending artery (PDA) in posterior interventricular groove (arrows), (D) Diminutive right coronary artery ending in posterior atrioventricular groove.

DISCUSSION

Incidence of coronary anomalies is about 1.5% and majority are detected incidentally [1]. Anomalies can be benign or malignant depending upon potential to cause myocardial ischemia. There are three main benign anomalies; separate origin of LCx from left coronary sinus, origin of LCx from right sinus and ectopic origin of RCA.

Left coronary artery anomalies have been described by Lipton. In L1 pattern, RCA is absent and LCx is

dominant. In L2 subtype RCA arises from left main or proximal LAD.

Javangula et al. [6] described the first patient in world literature with LAD continuing as PDA across the left ventricular apex in the presence of a normally situated right coronary ostium with an atretic small RCA. It is rare for LAD to continue as PDA in posterior interventricular groove after wrapping around left ventricular apex.

However “Wrap around LAD” wherein LAD wraps around the apex and supplies one-fourth of inferior wall of left ventricle is seen commonly [7]. However it’s rare for PDA to arise from LAD and supply posteroinferior aspect of IVS. Clark et al. [4] described 3 patients whose PDA originated from the LAD and in all, the PDA terminated before the crux.

In addition several unusual variations in the origin of PDA have been reported such as double PDA, early origin of the PDA from the RCA, PDA from an obtuse marginal or septal perforator artery, perfusion of the inferior septum by right ventricular branches or acute marginal artery and other variations including PDA arising from a vascular ring connecting RCA and LCX [8-10].

Hyperdominant LAD if occluded, causes an extensive infarct affecting the anterior wall, septum, and inferior wall and can lead to cardiogenic shock with high morbidity and mortality.

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