

Case Report

A Rare Scenario of Stenosed Type IV Dual LAD with Normal Myocardial Perfusion Scan

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Abstract

Dual left anterior descending artery (LAD) is a rare variation in the coronary artery anatomy having 4 different subtypes. We report a rare scenario of type IV dual LAD, with short LAD critical stenosis, compensated by a long LAD perfusing the same territory, which was missed on initial angiographic evaluation. Myocardial perfusion scan (MPS) of this patient showed preserved perfusion. A review of angiogram revealed this anomaly, indicating that a meticulous correlation of anatomic and functional modalities is necessary as it could change further management of patient.

Key words: Coronary angiography, MPS, Type IV LAD

Introduction

Presence of 2 coronary arteries in anterior interventricular septum is described as dual left anterior descending artery (LAD), 4 types of which are described in literature. Their varying course and perfusion areas can result in unusual scenarios. We report a rare situation of normal perfusion on MPS in a symptomatic patient with LAD stenosis detected on coronary angiogram, due to preserved perfusion from long LAD branch of Dual Type IV LAD.

Case Report

A 45-year-old gentleman presented to our hospital with complaints of sudden onset chest pain, which lasted for a minute, not accompanied by sweating. He was a long standing hypertensive controlled on Beta Blockers and non-diabetic with no other risk factors for coronary artery disease. Electrocardiogram (ECG) showed no significant ST-T changes. Cardiac enzymes were within normal limits and bedside screening 2-D Echocardiography (2 D Echo) showed no regional

wall motion abnormality with ejection fraction of 47%. Coronary angiography showed a normal LMCA (Left main coronary artery), with a short LAD having proximal 90% stenosis. RCA and LCx showed no stenosis. Patient was referred to our department for a 99m Tc MIBI stress rest myocardial perfusion scan (MPS) for evaluating the severity and extent of single vessel stenosis. With adequate preparations, patient underwent MPS in a 1 day stress rest protocol. Stress test showed no baseline ECG changes; however, there were significant post-stress ST depressions (2.5 mm in V1-V3), which persisted in early recovery phase, only to revert back to normal 6 minutes into recovery stage. Stress and rest MPS images revealed preserved perfusion in all territories and no evidence of inducible ischemia [Figure 1]. This prompted us to review the coronary angiogram, which to our surprise, revealed a dual LAD, a short LAD as seen previously originating from LMCA [Figure 2], and also a long LAD originating from RCA, which was initially misdiagnosed as a conus branch. The stenotic vessel was the short branch, however, major portion of anterior wall and septum was supplied by long branch, which resulted in preserved perfusion on MPS.

Discussion

Congenital anomalies of coronary artery are seen in 0.6 - 1.3% of patients undergoing Coronary Angiography.^[1] Dual LAD, is one such anomaly, which

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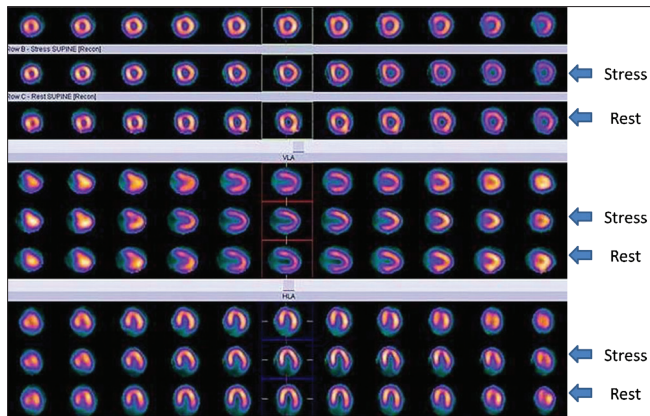


Figure 1: Stress and rest myocardial perfusion scan showing no evidence of ischemia

has been known to occur with an incidence of 1%, as described by Morettin.^[2]

Similar findings were described by Spindola Franco *et al.* in 1983, seen in about 1% of patients undergoing coronary angiography. They have proposed an angiographic classification, which is as follows:^[3]

Type I: Short LAD runs in the anterior interventricular sulcus (AIVS), long LAD also runs in AIVS, descends on the left ventricular side of AIVS, then re-entering the distal AIVS in order to reach the apex.

Type II: Short LAD is same as in Type I, long LAD runs on the right ventricular side of AIVS to re enter AIVS.

Type III: Short LAD is same as in types I and II. Long LAD travels intra-myocardially in the ventricular septum.

Type IV: Short LAD forms a very short vessel, travels in AIVS, and gives off septal perforators and diagonal branches. Long LAD arises from right coronary artery (RCA) or right sinus of valsalva (RSV), courses anteriorly to the infundibulum of right ventricle, and turns sharply down the anterior interventricular sulcus to give septal and diagonal branches.

Coronary angiography in our patient showed a Type IV Dual LAD, short branch of which showed significant stenosis. The indication of stress MPS in this scenario was risk stratification and assessment of hemodynamic

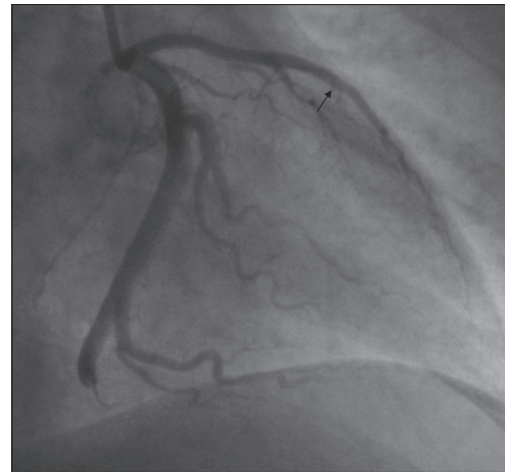


Figure 2: Coronary angiogram showing short segment of dual LAD (arrow)

significance of single vessel (short LAD) stenosis. A strongly positive stress test was due to stenotic lesion in short branch (which gives septal perforators) raised a high pre-test probability of an abnormal MPS. Therefore, a normal MPS study prompted a review of the angiogram. It showed a dual LAD, long segment of which was responsible for supplying septum. This answered the question of preserved perfusion in septum and anterior wall. Long LAD provided a collateral pathway for blood supply to the septum. Though the patient was symptomatic with positive stress test, normal MPS - ruled out an active intervention, and patient was started on medical management. Thus, a careful assessment of coronary anatomy is essential, and one should keep in mind these rare coronary artery variants while reporting both function and anatomic modalities.

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