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of the American Academy of Forensic Sciences 75th Anniversary Scientific Conference

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I51 Congenital Absence of the Left Circumflex Artery in Multiple Myocardial Ischemia: A Case Report

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Learning Objective: After attending this presentation, attendees will have a better understanding of a rare coronary artery anomaly that may cause myocardial infarction, particularly in patients with multiple cardiovascular risk factors.

Impact Statement: This presentation will impact the forensic community by presenting clinicopathologic, autoptic, and histological findings in a case of multiple myocardial ischemia events due to a Congenital Absence of Left Circumflex Artery (CALCx). The case will provide an important contribution to the differential diagnosis of myocardial infarction.

A 64-year-old man with a medical history of hypertension, diabetes, and obesity was admitted to the ER with an episode of oppressive retrosternal chest pain that started 30 hours before. He had a history of angina associated with palpitations in the previous two weeks.

On admission, he was conscious and reported a remission of the accused symptoms. An EKG showed sinus rhythm with a right bundle branch block, moderate ST elevation on inferior leads, and depression in right ventricular lead with associated Q and R waves, respectively. The findings were consistent with a subacute inferoposterior myocardial infarction. A transthoracic echocardiogram revealed a left ventricular ejection fraction of 40%, with akinesis of the septum and the inferior left ventricular wall. Laboratory tests showed high levels of troponin, with TnI value of 2336.4ng/l on admission (n.v.< 34,0ng/ml). The coronary angiography showed a dominant right coronary artery (RCA), several irregularities at the proximal end of the left main CA, and an occlusion at the middle end of the posterolateral branch. After ruling out anomalous origins of the LCx artery, a hypoplasia of the vessel was hypothesized by the cardiologist. Percutaneous coronary intervention was performed, obtaining a successful revascularization of the posterior interventricular artery. The PO course proceeded without complications and antiplatelet and lipid-lowering agents therapy was initiated. The patient was discharged with no symptoms and the indication for a regular cardiology follow-up. Three days after discharge, he was found suffering from severe dyspnea, loss of consciousness, and cyanotic. Despite resuscitation attempts, the patient died, and an autopsy was requested by a local prosecutor to determine the cause of death and to evaluate medical malpractice's hypothesis.

At autopsy, the heart weighed 650g in the fresh state. On the macroscopic examination, a widespread tissue discoloration with recent hemorrhagic infiltrates was observed on the posterior to the inferior wall of the left ventricle as well as on the adjacent papillary muscle.

Macroscopic view of the heart after formalin fixation showed degenerative atherosclerotic wall changes of the RCA and its main branches. Although narrowed by wall thickening in some sections, the arterial lumens were patent. The congenital absence of the LCx artery was confirmed after excluding anomalous vessel origins, thus supporting the angiographic findings.

Tissue specimens were prepared for microscopic examination and then studied using Hematoxylin and Eosin staining, CD15 and CD68 immunostaining methods, and Masson's trichrome staining. Histological investigations confirmed the exclusive presence of venous vascular components at the normal anatomical site of the LCx. In addition, a large transmural ischemic area with a heterogeneous morphology was observed in the left ventricle posterior wall and papillary muscle. Microscopic examination concluded for multiple and polychronous ischemic insults. The autoptic and histological findings, integrated with the clinical records data, allowed reconduction of the cause of death to an acute cardiac ischemia in a patient with multiple comorbidities and a CALCx. CALCx is a rare coronary anomaly with an incidence of 0.0067%. The diagnosis requires the following criteria: absence of an anomalous LCx artery origin from the left coronary sinus or left coronary artery; absence of anomalous origin from the right coronary sinus, non-coronary sinus, RCA, or pulmonary artery; dominant (or superdominant) RCA. Although it is generally asymptomatic, CALCx may result in transient ischemia of the left ventricle posterolateral segments vascularized by the RCA. Circulating disorders of the RCA may indeed lead to more serious consequences when a collateral circulation normally provided by the Cx is absent. A better understanding of the natural history and clinical implications of CALCx may help improve the diagnosis, treatment, and hospital management of patients with this anomaly admitted for ACS.

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Coronary Artery Anomaly; Congenital Absence of the Left Circumflex Artery; Myocardial Ischemia