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CLINICAL IMAGE

Vieussens and Kugel Coronary Rings in a Patient with a Lesion of the Distal Left Main Coronary Artery

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Image Case Presentation:

An 87-year-old man with hypertension, dyslipidemia, diabetes, and a history of smoking presented to the emergency department with mild chest pain radiating to the left upper limb for two days. The pain occurred after unusually intense physical exertion, did not improve with rest, and had worsened in the preceding hours.

On admission, the electrocardiogram (Figure 1A) showed ischemic changes, and high-sensitivity troponin was elevated (22,000 ng/L). Transthoracic echocardiography revealed diffuse hypokinesia, apical akinesia, and a reduced left ventricular ejection fraction (35%).

Coronary angiography (Figure 1B) demonstrated a 90% distal left main coronary artery stenosis involving the left anterior descending (LAD), ramus intermedius, and circumflex (Cx) arteries. The LAD showed diffuse disease with a 90% stenosis in the mid-segment; the dominant Cx had a critical 90% proximal stenosis. The right coronary artery (RCA) was small-caliber, with a 90% proximal stenosis. Collateral circulation through the **Vieussens arterial ring** and **Kugel's interatrial ring** (Rentrop 3) was visualized (Figure 1C).

The **Vieussens arterial ring**, first described by Raymond Vieussens in the 17th century, and **Kugel's interatrial ring**, identified by Maurice Kugel in 1927, are rare anatomic variants with estimated prevalences of 3% and 6%, respectively. These structures connect the conal branch of the RCA to branches of the left main coronary artery and may be present even in the absence of coronary artery disease. However, they acquire clinical significance when providing effective collateral flow between the left and right coronary circulations in the setting of severe coronary stenosis.

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In this case, the collateral circulation supplied additional perfusion to the LAD and Cx, allowing the patient to remain asymptomatic for a prolonged period despite severe lesions. Percutaneous coronary intervention was performed on the stenotic lesions (Figure 1D), requiring **rotational atherectomy**. Due to intra-procedural hypotension, **aminergic support** was necessary.

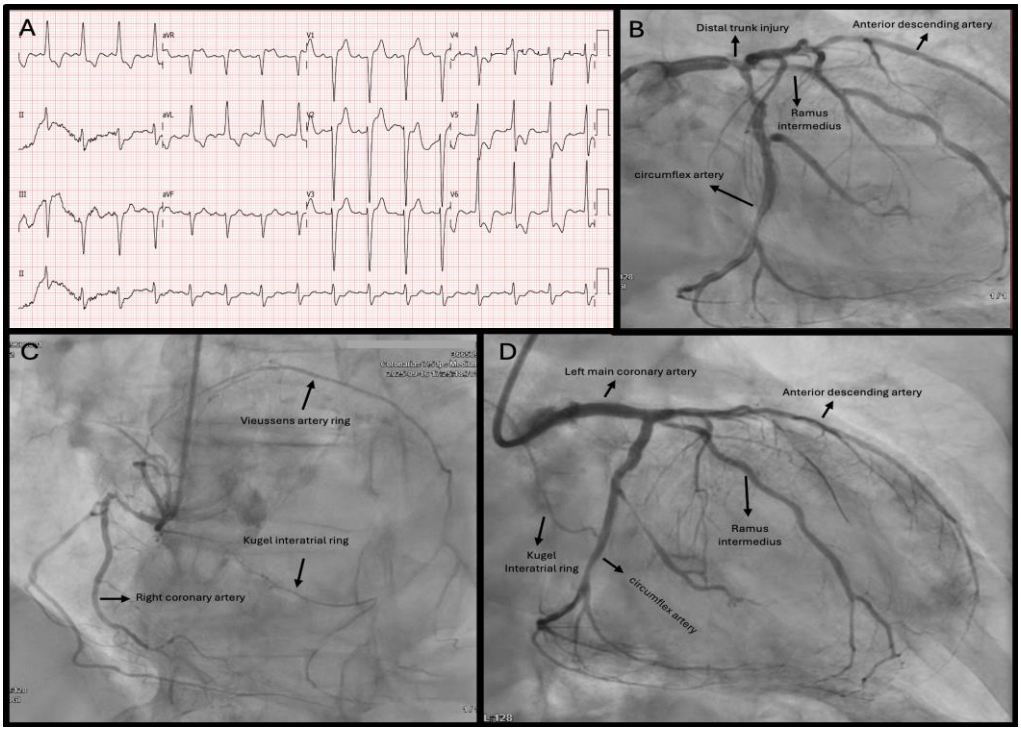

Figure: 1A) Electrocardiogram: Sinus rhythm, ST-segment elevation in aVR, and inferolateral ST-segment depression. 1B) Coronary angiography: Distal left main lesion involving the LAD and Cx. 1C) Vieussens and Kugel coronary arterial rings. 1D) Percutaneous revascularization of the distal left main coronary artery.

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