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Letter to the Editor

The "Neglected aVR Lead": Kounis Syndrome of MINOCA Type, Severe Left Main or 3-Vessel Disease and Type A Dissecting Ascending Aortic Aneurysm

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A recent report in the *Kansas Journal of Medicine* described a case involving a 55-year-old man with a history of hypertension, hyperlipidemia, obesity class III, and tobacco use disorder.[1] He presented to the hospital with acute onset shortness of breath and left-sided chest discomfort, accompanied by diffuse skin redness and swelling of his hands and feet. Despite normal left ventricular ejection fraction and coronary angiography showing normal coronary arteries, his tryptase levels were elevated. The initial electrocardiogram showed diffuse ST segment depression with isolated ST segment elevation in augmented vector right (aVR) lead. The authors correctly diagnosed him with myocardial infarction with nonobstructive coronary arteries (MINOCA) of Kounis syndrome type I based on clinical and laboratory findings.[2]

The following should be taken into account in light of this case report:

1. In the described case,[1] the patient's ECG showed ST elevation in lead aVR, while most other leads displayed reciprocal ST depression. These findings are novel electrocardiographic expressions of Kounis syndrome, as reported by Kounis et al.[3] Lead aVR provides detailed information about the basal region of the septum and the right ventricle outflow tract, although it is often overlooked due to its location and the redundancy of information it provides compared to other leads.
2. Studies have shown that identifying severe left main or 3-vessel disease with 80% sensitivity and 93% specificity can be achieved by observing ST-segment elevation of more than 1.0 mm in lead aVR along with widespread ST-segment depression in inferolateral leads, as seen in this patient.[1,2,4] Urgent coronary angiography was performed, confirming normal coronary arteries associated with Type I Kounis syndrome. Type I Kounis syndrome is similar to MINOCA and describes the syndrome in patients with normal or nearly normal coronary arteries and no risk factors for coronary artery disease. It was initially described as coronary artery spasm.[5] This type is different from Type II or III, which are high-risk conditions requiring anti-platelet, aspirin, and heparin medication, along with immediate revascularization.
3. Conversely, a Type A dissecting aortic aneurysm, affecting the ascending aorta and compressing the left main artery and coronary ostia, can mimic myocardial infarction on an ECG but requires different treatment, including emergency surgery and avoidance of anti-platelets, aspirin, and heparin.[6] Transthoracic echocardiography can be used to detect the aortic aneurysm and resolve this diagnostic challenge.

To ensure the correct treatment for patients with chest pain and specific electrocardiographic changes, such as ST elevation in the aVR lead and reciprocal ST depression in other leads, as seen in the described case, it is important to consider diagnoses such as MINOCA, acute myocardial infarction, Kounis type I infarction, and aortic aneurysm.

REFERENCES

1 Helberg J, Acosta E. Kounis syndrome as a cause of myocardial infarction with nonobstructive coronary arteries. Kans J Med 2024; 17:34-35. PMID: 38694179.
2 Kazemi E, Mansoursamaei A, Bijan M, et al. The prognostic effect of ST-elevation in lead aVR on coronary artery disease, and outcome in acute coronary syndrome patients: A systematic review and meta-analysis. Eur J Med Res 2022; 27(1):302. PMID: 36539835.
3 Kounis NG, Koniari I, Soufras GD, et al. The humble relation of Kounis syndrome, MINOCA (Myocardial Infarction With Nonobstructive Coronary Arteries) and MACE (Major Adverse Cardiac Events). Can J Cardiol 2018; 34(8):1089.e7. PMID: 30049360.
4 Kounis NG, Koniari I, Soufras GD, et al. Sugammadex-induced atropine-resistant bradycardia: Clinical, pathophysiologic, and electrocardiographic considerations. JA Clin Rep 2020; 6(1):31. PMID: 32383018.
5 Ching S, Ting SM. The forgotten lead: aVR in left main disease. Am J Med 2015; 128(12):e11-3. PMID: 26239096.
6 Kounis NG, Koniari I, Velissaris D, Tzanis G, Hahalis G. Kounis syndrome - not a single-organ arterial disorder but a multisystem and multidisciplinary disease. Balkan Med J 2019; 36(4):212-221. PMID: 31198019.
7 Kosuge M, Uchida K, Imoto K, et al. Prognostic value of ST-segment elevation in lead aVR in patients with type A acute aortic dissection. J Am Coll Cardiol 2015; 65(23):2570-2571. PMID: 26065996.

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Author Response

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We thank Nicholas G. Kounis, M.D., Ph.D. for his comment on our case report. While we largely agree with the outlined commentary, we believe the first point requires revision. The initial point may suggest that augmented vector right (aVR) elevation is specific to Kounis syndrome, which is not entirely accurate. Instead, isolated elevation in aVR with reciprocal changes should raise concern for left main or severe three-vessel disease pathology. The differential diagnosis could include acute coronary syndrome, aortic dissection, or other coronary pathology (such as Kounis syndrome), as well as global hypoperfusion (e.g., profound gastrointestinal bleed, pulmonary embolism, etc.), underlying cardiomyopathy, or underlying conduction abnormalities. Due to the potentially life-threatening nature of isolated aVR ST segment elevation, emergent evaluation is warranted.