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CLINICAL IMAGE

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Late T-wave inversion following resolution of non-ischemic acute pulmonary edema

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Key Clinical Message

Electrocardiographic (ECG) changes occurring several hours after the onset of acute cardiogenic pulmonary edema have been seldom described. The proposed explanatory mechanisms are various and not fairly established. In the absence of significant coronary artery disease, these ECG abnormalities could be attributed to mechanisms implicated in coronary microcirculatory dysfunction.

KEYWORDS

acute pulmonary edema, hypertension, myocardial ischemia, T-wave inversion

1 | CASE PRESENTATION

A 65-year-old male presented to our emergency department with extreme breathlessness and profuse diaphoresis within the last 2 hours. Physical examination revealed increased blood pressure and low oxygen saturation. Auscultation of the chest revealed bilateral basal pulmonary end-inspiratory rales.

The electrocardiography (ECG) did not demonstrate an acute myocardial injury pattern (Figure 1A). Chest radiography showed bilateral diffuse infiltrations, Kerley B lines, and flow inversion. Cardiac serum markers (Architect STAT assay, high-sensitivity troponin I; Abbott Diagnostics, Chicago, IL, USA) and D-dimer test were negative. Echocardiographic assessment disclosed mild concentric hypertrophy, mildly impaired left ventricular systolic function without regional wall motion abnormalities and moderate diastolic dysfunction with elevated filling pressure.

A diagnosis of acute pulmonary edema was established, and the patient was hospitalized under closed monitoring in the intensive care unit. The acute heart failure symptoms were successfully subsided after administration of furosemide and

Konstantinos Tampakis and Nikolaos Makris contributed equally to this work.

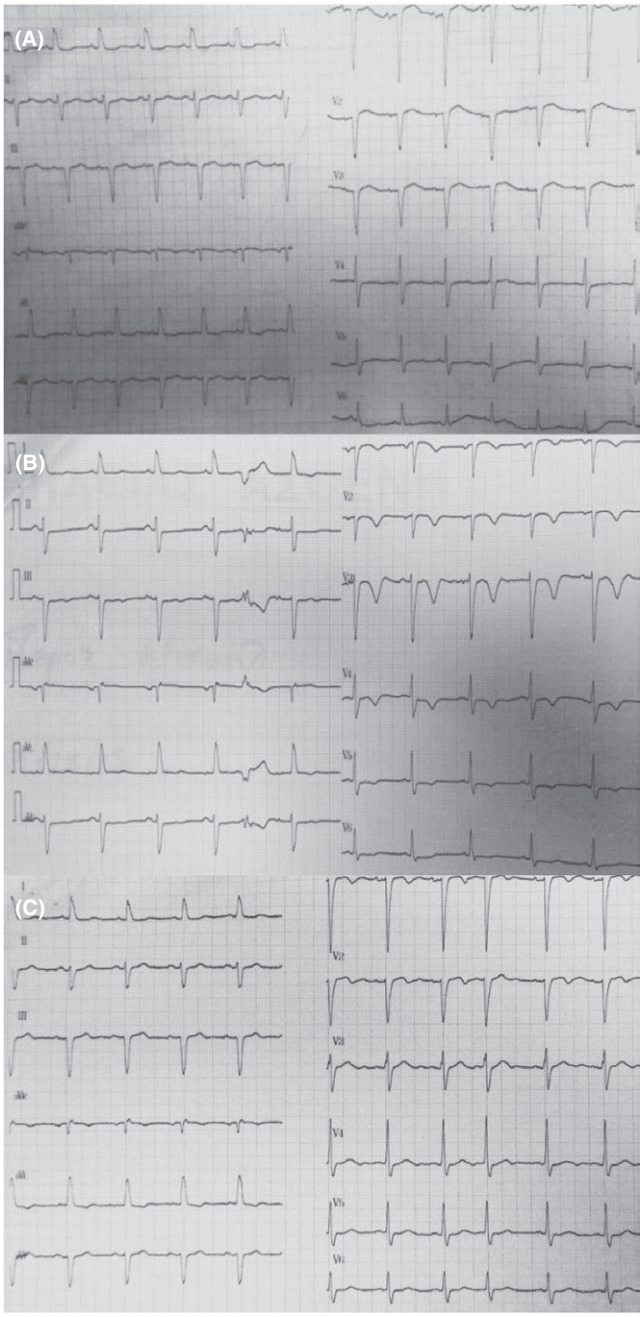

FIGURE 1 A, The 12-lead surface electrocardiography (ECG) obtained on the admission did not demonstrate an acute myocardial injury pattern (small R-waves in leads V_1-V_3, without any ST-segment elevation). B, On the second day of hospitalization, the 12-lead surface ECG showed a diffuse T-wave inversion in all precordial leads. C, On the fifth day of hospitalization, the ECG illustrates the complete resolution of T-wave inversion in leads V_3-V_6 and a partial resolution in leads V_1-V_2

glyceryl trinitrate intravenously, as well as angiotensin-converting-enzyme inhibitor orally in combination with oxygen support. Complete respiratory recovery occurred in approximately 12 hours.

During the second day of hospitalization, the ECG showed a diffuse T-wave inversion in all precordial leads (Figure 1B). The patient underwent coronary angiography, and significant coronary artery disease was ruled out (Figure 2). ECG T-wave inversion gradually resolved within one week (Figure 1C).

To the best of our knowledge, only a few cases of late large T-wave inversion after the occurrence of non-ischemic pulmonary edema have been described.[1,2] Apart from myocardial ischemia, several well-described causes may be associated with T-wave inversion, including subarachnoid hemorrhage and hemorrhagic stroke, massive pulmonary embolism, pheochromocytoma, cocaine abuse, status epilepticus, gastrointestinal emergencies (perforated ulcer, acute pancreatitis, and acute cholecystitis), cardiac sarcoidosis, electroconvulsive therapy, and cardiac memory T-wave pattern.[1,2] All the events above were excluded with regard to the patient's history and clinical manifestation.

CONFLICT OF INTEREST

None declared.

AUTHOR CONTRIBUTION

KT, NM: conception and design of the research and writing of the manuscript. CK, ES, MS: acquisition of data. ES, MS, CK, ER: analysis and interpretation of the data. HA, IP: critical revision of the manuscript for intellectual content.

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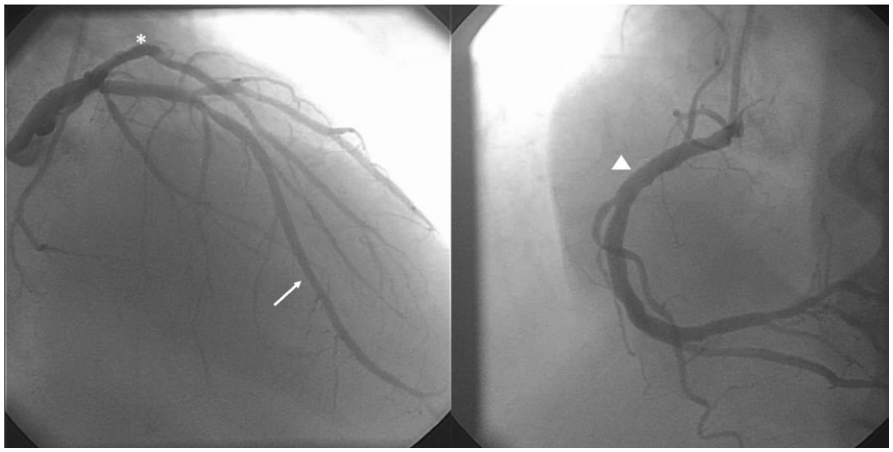

FIGURE 2 Coronary angiography revealed no significant coronary artery disease. Left anterior descending artery (arrow). Left circumflex artery (asterisk). Right coronary artery (triangle)

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