Clinical Image

ECG after near-drowning mimicking acute coronary syndrome with left main coronary artery involvement

Alfredo Vidal García, Javier Lacunza Ruiz, José María López Ayala, Mariano Valdés

Department of Cardiology, Hospital Virgen Arrixaca, Ctra, Murcia-Cartagena s/n, El Palmar (Murcia), 30120, Spain

Corresponding Author: Alfredo Vidal García, Email: alfredo373@hotmail.com

World J Emerg Med 2013;4(1):75–76

DOI: 10.5847/wjem.j.issn.1920-8642.2013.01.015

We present the case of a 74-year-old man with diabetes and hypertension who had to be rescued owing to a near-drowning syndrome at sea. When he was rescued, he complained of dyspnea and chest pain. An electrocardiogram (ECG) suggested acute coronary syndrome (ACS) affecting the left main coronary artery. Therefore, he was referred to our hospital for urgent coronary angiography.

Arriving at our hospital, the patient was asymptomatic, but his blood pressure and saturation were normal. The ECG (Figure 1) showed normalization of previous anomalies. Besides, an echocardiogram showed nothing abnormal, and a blood sample was normal and served as a cardiac marker. Angiogram showed normal coronary arteries. After the procedure, the patient remained asymptomatic without an increase of cardiac enzymes, and he was discharged from the hospital after three days.

The initial response to immersion is apnea and aspiration of water, provoking a syndrome of respiratory failure and changes in serum electrolytes. This is frequently associated with hypothermia, which can lead to cardiac damages, mainly, conduction disturbance and ventricular arrhythmia.^[1]

A study^[2] showed that the appearance of ECG changes in dogs subjected to experimental aspiration of fresh or sea water provoked bradycardia, tall T waves and ventricular fibrillation or ventricular asystole as the cause of death. Another study found^[3] ECG changes in 37 patients who suffered from a near-drowning syndrome at the Dead Sea in addition to important changes in electrolyte levels, namely, hypercalcemia and hypermagnesemia. The most common findings were sinus tachycardia, prolongation of PR interval, widening of QRS complex and inversion of T waves. Nearly 35% of the 37 patients presented with ST segment depression. Besides, cases of Tako-Tsubo cardiomyopathy and

corresponding ECG changes after near-drowning have also been reported.^[4]

Our case illustrates the importance of differential diagnosis in cases of near-drowning, since the associated symptoms can easily be mistaken with those of ACS.

Figure 1. First ECG, with the patient complaining of chest pain and dyspnea, showing ST depression in inferior and left precordial leads and elevation in V1 and VR (A). Second ECG, during the transfer to the hospital, showing minimal changes in ST segment (B). Third ECG, before the angiogram, with complete normalization of the repolarization changes (C). The difference in voltage and axis in limbs leads between the first ECG and the rest, probably due to a decrease in impedance secondary to the presence of liquid in the thorax during the immediate phase after near-drowning.

ECG changes could be confusing, leading to the mismanagement of the patient. In our case, clinical evolution and coronary angiogram of the patient were conducive to the correct diagnosis and treatment of the condition.

In conclusion, the ECG findings of patients suffering from near-drowning may be similar to those of the patients affected by ACS with left coronary artery involvement. Hence, the patients should be managed with caution and a differential diagnosis should be made. An accurate medical history and additional examinations such as coronary angiogram are also necessary so as to make a final diagnosis and choose an appropriate treatment.

Funding: None.

Ethical approval: Not needed.

Conflicts of interest: The authors have no commercial associations

or sources of support that might pose a conflict of interest.

Contributors: All authors have made substantive contributions to the study, and all authors endorse the data and conclusions.

REFERENCES

- 1 Salomez F, Vincent JL. Drowning: a review of epidemiology, pathophysiology, treatment and prevention. *Resuscitation* 2004; 63: 261–268.
- 2 Bhardwaj PK, Mohan M, Rai UC. Electrocardiographic changes in experimental drowning. *Indian J Physiol Pharmacol* 1982; 26: 85–90.
- 3 Mosseri M, Porath A, Ovsyshcher I, Stone D. Electrocardiographic manifestations of combined hypercalcemia and hypermagnesemia. *J Electrocardiol* 1990; 23: 235–2341.
- 4 Citro R, Patella MM, Bossone E, Maione A, Provenza G, Gregorio G. Near-drowning syndrome: a possible trigger of takotsubo cardiomyopathy. *J Cardiovasc Med (Hagerstown)* 2008; 9: 501–505.

Received September 16, 2012

Accepted after revision December 27, 2012