Takotsubo Cardiomyopathy: Which Role for Serial Electrocardiogram Changes?

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Abstract

Takotsubo cardiomyopathy (TTC) is a cardiac syndrome characterized by acute regional-reversible systolic dysfunction of the left ventricle (LV) and related to psycho-physical acute stress. Recently, physicians and researchers have directed their attention on the time course of ECG changes in TTC. Knowledge of ECG changes in TTC could be useful for the clinical management of this disease. Among all TTC deaths, 38% of cases are directly related to in-hospital complications. Serial ECG assessment could be a first line defence in reducing mortality and in-hospital complications in patients with TTC.

Keywords: Takotsubo cardiomyopathy; electrocardiogram; ECG changes

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Takotsubo cardiomyopathy (TTC) is a recently recognized cardiac syndrome characterized by acute, regional-reversible systolic dysfunction of the left ventricle (LV) and related to psycho-physical acute stress. Generally, female gender is more involved, with the highest incidence between the seventh and eighth decade of life. TTC could be easily confused with acute coronary syndrome (ACS); indeed, chest pain, dyspnoea and electrocardiographic changes, as ST-segment elevation (STE) or T-wave inversion, are common aspects to both diseases. For these reasons, especially in the acute phase, differential diagnosis is essential for selecting the most appropriate treatment strategy. In several studies, the ECG presentation have been studied only in the early stage of TTC. In fact, the most frequent ECG abnormalities described are STE, T-wave inversion and QT interval prolongation.

Recently, physicians and researchers have directed their attention to the time course of ECG changes in TTC. Obviously, the aim of these studies was not to confirm or exclude TTC with ECG, but to better understand the pathophysiologic process and compare the LV dysfunction with that observed in acute myocardial infarction (AMI). Currently, TTC diagnosis is based on different clinical criteria, which take into account also ECG abnormalities. The lack of knowledge about the time course of the ECG changes is in part due to the low incidence of the disease. However, Kurisu et coll. demonstrated that T wave inversion was deeper and QTc interval longer in patients with TTC than in subjects with minimal AMI. Moreover, they described a similar time-course of the ECG changes between the two conditions. Conversely, Mitsuma et coll. demonstrated that TTC consisted in 4 ECG phases. Phase 1 showed STE; in phase 2 T-wave inversion appears after ST-segment elevation; phase 3 was described as a transient improvement in T-wave inversion while phase 4 showed a second, deeper T-wave inversion in the long term. Despite the interesting findings of the study, only nine patients were enrolled, so these results must be confirmed on larger sample. However, some case reports have confirmed this time course.

A partial agreement (phase 1 and 2), was observed by Inoko and coll. which described a TTC after subarachnoidal hemorrhage (SAH), but the patient died after 5 days and ECG time course could not be completely confirmed. Thakar and coll. evaluate daily ECG changes during the first week of hospitalization in patients with TTC. They described absence of STE elevation in V1, pathological Q waves in about half of the patients, QTc interval prolongation in 90% of cases and T wave inversion in all subjects. Looi and coll described ECG changes observed in TTC within two days of presentation. The aim of their study was to describe the evolution of ECG in TTC compared with those observed in AMI. They reported STE in 35% of patients at admission and, compared to STEMI, they observed a less prominent STE in TTC. Moreover, on second day, all STEMI patients had pathological Q-waves but none of the TTC patients developed it. As evidenced by the reported literature, there are scant information about the ECG evolution in TTC. Why to study this topic? Because ECG is a fast, simple, painless and relatively inexpensive test, performable in all medical department. Knowledge of ECG changes in TTC could be useful for the clinical management of the disease. A similar daily evaluation is already performed in patients with AMI. Obviously the mortality rate is higher in AMI than in TTC, but a recent analysis showed that among all deaths, 38% of cases were directly related to in-hospital complications. In conclusion, serial ECG assessment could be a first line defence in reducing mortality in TTC. There is a need for further and larger studies on the serial ECG modification in TTC, to better characterise the electrocardiographic phases of this disease.
Declarations of Interest

The authors declare no conflicts of interest.

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