Case Report

Recurrence of Takotsubo Cardiomyopathy: Role of Multi-Detector Computed Tomography Coronary Angiography

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Abstract

Takotsubo cardiomyopathy (TCM), also known as stress-induced cardiomyopathy, is a clinical syndrome of transient left ventricular (LV) apical wall motion abnormality with relative preservation of the basal heart segments in the absence of any significant atherosclerosis. Recurrence of this condition is rare. We report a postmenopausal woman, who experienced two episodes of TCM within 4 months following emotional and physical stress. In the first episode, she was admitted due to severe dyspnea, accompanied by sudden-onset, prolonged, burning chest pain and palpitation. Transthoracic echocardiography revealed akinesia of the LV, with the exception of the basal regions. Coronary angiography demonstrated no significant coronary artery disease, and follow-up echocardiography showed normalization of the LV wall motion abnormalities. In the second episode, she experienced similar symptoms and echocardiography revealed similar changes. Multi-detector computed tomography revealed normal coronary arteries. After 9 days, she was discharged in good condition; and at 3 months' follow-up, she was symptom-free with normal echocardiography.

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Introduction

Takotsubo (stress-induced) cardiomyopathy (TCM) is also known as transient left ventricular (LV) apical ballooning or broken heart syndrome.[1] This condition mimics the signs and symptoms of acute coronary syndrome without angiographic stenosis or spasm and appears in shape as a Japanese octopus fishing pot called "Takotsubo" in the systolic phase of ventriculography.[2, 3] We report a postmenopausal woman who experienced two episodes of TCM within 4 months of her initial presentation. For the purposes of exclusion of acute coronary syndrome, she was evaluated with multi-detector computed tomography (MDCT) on her second admission.

Case Report

A 58-year-old woman with a history of TCM was admitted to the emergency department due to severe dyspnea accompanied by a sudden-onset, prolonged, burning chest pain and palpitation, similar to those she had experienced in her initial admission, while she was on β-blocker. The occurrence and recurrence of TCM were triggered by emotional and physical stress (anger and prolonged dancing at a wedding ceremony), respectively. At the time,

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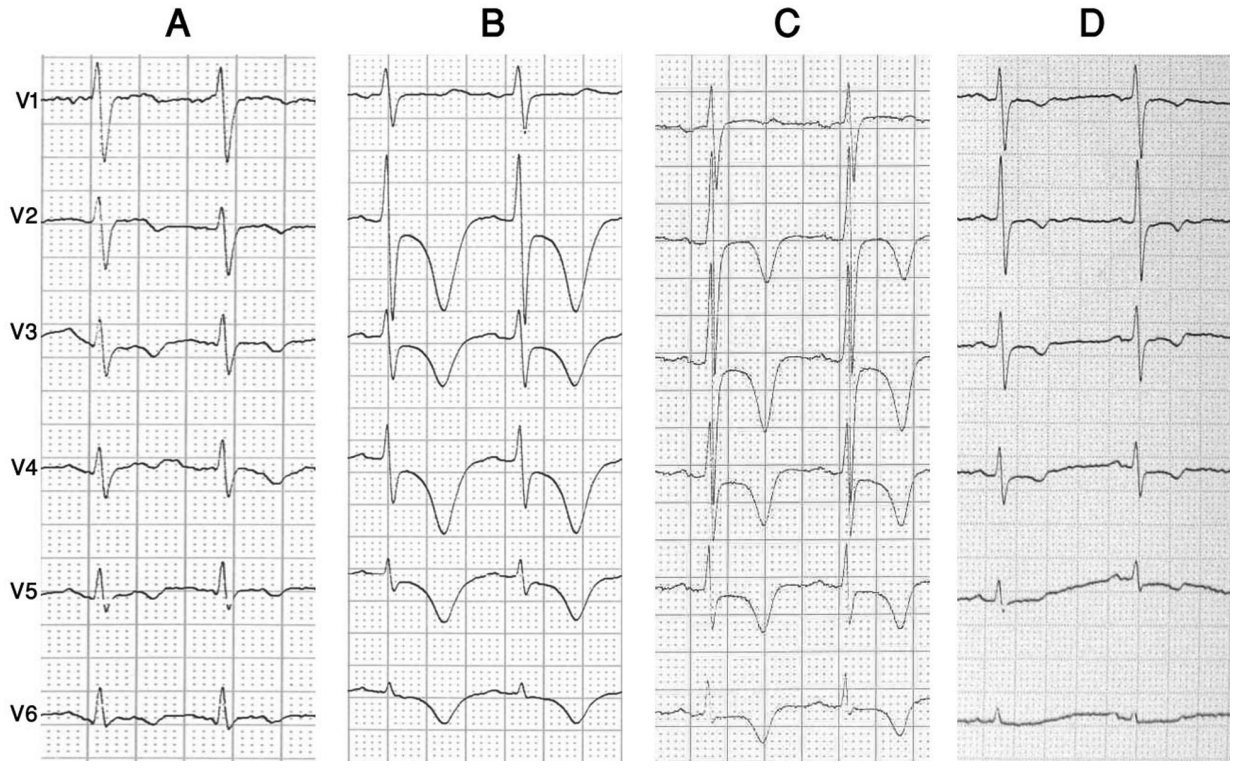

Figure 1. A) Admission electrocardiogram (ECG). B) in-hospital and C) pre-discharge ECGs, showing T-wave inversion in leads V1-V6. D) Three months' follow-up ECG

transthoracic echocardiography had revealed akinesia of the LV, with the exception of the basal regions, and in addition, cardiac catheterization had demonstrated minimal coronary artery disease and follow-up transthoracic echocardiography had shown normalization of the LV wall motion abnormalities (ejection fraction = 60%). This time on arrival, the patient had a blood pressure of 120/80 mmHg, pulse rate of 117 beats per minute, and respiratory rate of 35 breaths/minute. The only finding on physical examination was bilateral coarse crackles over both lung bases. The admission surface electrocardiogram (ECG) showed sinus tachycardia, slight ST elevation in V_1 through V_4 with shallow inverted T waves, and slow R progression (Figure 1A). Although the patient's symptoms subsided to a great extent on the first day of admission, serial ECGs showed marked dynamic changes: deeply inverted T waves were formed and QT intervals became significantly prolonged (Figures 1B and 1C).

Transthoracic echocardiography on admission revealed a normal LV size with severe LV systolic dysfunction (ejection fraction = 20-25%) and akinesia of the LV with the exception of the basal regions. The serum levels of CK-MB and high sensitive troponin T were 6.32 ng/mL (reference range for females < 3.77 ng/mL) and 213.8 ng/L (reference range < 14 ng/L).

Clinical presentation, compatible TCM past history, and paraclinical findings were all in favor of this diagnosis. Given her previous normal cardiac-catheterization, conducted five months previously, coronary arteries were evaluated via a less invasive procedure, namely MDCT, which revealed no significant findings in the epicardial coronary arteries (Figure 2).

Figure 2. Multi-detector computed tomography, showing left ventricular contraction. In Japanese, "tako-tsubo" means "fishing pot for trapping octopus"; and the left ventricle of this patient resembles that shape, confirming the diagnosis (indicated by three arrows)

The patient's hospital course was uneventful, and she was discharged in good condition on hospital day 9. On the follow-up visit, 3 months later, she was symptom free and all of the ECG (Figure 1D) and transthoracic echocardiography abnormalities were almost completely resolved.

Discussion

TCM is a clinical syndrome of transient LV apical wall motion abnormality with relative preservation of the basal heart segments in the absence of any significant atherosclerotic disease.[4, 5] Recurrent TCM has been reported from 2.7% to 11.4% of patients in case series,[1, 6] and time-to-recurrence ranges from 3 months to 13 years after the initial presentation.[6]

Because of the similarity between TCM and acute coronary syndrome, urgent cardiac catheterization is encouraged; or at least during the chronic stage, it is essential for the diagnosis of this syndrome. The prognosis of this syndrome is generally excellent, so noninvasive diagnosis is highly recommended.[7] In patients with normal vasculature, a good negative predictive value has been reported for MDCT in excluding the disease.[7]

It can be concluded that MDCT may be a safer method for confirming the presence or absence of a significant stenotic lesion.[7] On the other hand, there are studies highlighting the usefulness of cardiac magnetic resonance imaging (CMR) in evaluating myocardial viability and prognosis in TCM.[7, 8] It should be noted, however, that although CMR can be performed noninvasively, it is not recommended for urgent assessment inasmuch as it requires a long duration of scanning. Therefore, it seems that MDCT may be a valuable and safe diagnostic tool in the discrimination of TCM from acute coronary syndrome, especially in patients with suspicion of recurrent TCM who are evaluated via catheterization in their initial admission within a short period of time.

Conclusion

MDCT may be a useful noninvasive cardiac imaging technique for the exclusion of acute coronary syndrome without important complications in postmenopausal women presenting with anterior chest pain, history of recent emotional or physical stress, relatively few coronary risk factors, and with typical LV dysfunction of TCM.

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