More than the eye can see: Left ventricular global longitudinal strain assessment in patient with Takotsubo Cardiomyopathy within a 9-month follow-up

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Article type: Clinical vignette
Received: April 28, 2021
Accepted: May 23, 2021
Published online: May 24, 2021
More than the eye can see: Left ventricular global longitudinal strain assessment in patient with Takotsubo Cardiomyopathy within a 9-month follow-up

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Conflict of interest: None declared.

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Takotsubo cardiomyopathy (TTC) is a cardiac condition characterized by acute but reversible left ventricular (LV) dysfunction, in the absence of obstructive coronary artery disease [1–3]. Two-dimensional (2D) speckle-tracking echocardiography (STE) is a useful method for evaluating global and regional left ventricular function, and consistently more sensitive than conventional echocardiography in detecting minor myocardial abnormalities [1]. The utility of STE in TTC patients has been described in a few short-term reports [1–4], however there is limited understanding around the time course of functional recovery in TTC patients [1]. In this article, we present a case of a 30-year-old female with sequential evaluation of global longitudinal strain (GLS) during a 9 month follow-up.

The patient, with a medical history of supraventricular tachycardia was admitted to hospital with chest pain spreading to the left arm. An electrocardiogram showed a sinus rhythm with T wave inversion and QT prolongation. High-sensitivity troponin T and the concentration of N-terminal brain natriuretic propeptide were moderately elevated. The transthoracic echocardiography (TTE) revealed new apical segments and apex hypokinesis/akinesis. Compared to a routine TTE performed 4 months before the admission to the hospital, LV ejection fraction (LVEF) decreased from 70% to 50%. 2D STE analysis revealed a severe
decline in longitudinal strain (LS) within all apical segments and the apex, as well as a mild decline within mid-cavity segments, with reduced GLS from 26.9% to 18.7% (Figure 1A and B). Coronary angiography showed no abnormalities. Based on the patient’s clinical features and electrocardiogram and echocardiographic abnormalities in the absence of coronary lesions, typical apical ballooning TTC was diagnosed. The patient was treated with zofenopril, propranolol, spironolactone, atorvastatin for 9 months. Subsequent control TTEs were performed on the 5th and 15th day of hospitalization (Figure 1C and D), as well as one, 5 (Figure 1E) and 9 months after admission to the hospital (Figure 1F), revealing progressive improvement to LV contractile function. LVEF returned to the normal range of 70% within 5 months (Supplementary material, Video S1) and a GLS of 25.9% within 9 months. Interestingly, the control 2D STE assessment revealed that although LS in apical segments had been impaired for just a short time (LS drop from 28.2% to 10%), mid-cavity and basal segments were also affected — however to a lesser extent, but for a prolonged duration (LS drop from 28% to 19.2% and from 25.7% to 21.2%, respectively) (Figure 1A). Not all changes were easily noticeable in conventional 2D echocardiography and suggest a slow, gradually spreading process.

In our report, we describe a case of Takotsubo cardiomyopathy with changing LV systolic function assessed by LVEF and GLS throughout the acute and subacute phases (lasting approximately 1 month) and gradual recovery to baseline over the following 8 months. Our work is consistent with other studies reporting the presence of subtle LV dysfunction, even after the normalization of LVEF [1, 3]. We believe this is the first case reported in the literature showing the long-term sequential evaluation of GLS in TTC patient. Further analysis of correlation of segmental myocardial deformation using strain-encoded cardiac magnetic resonance imaging (SENC) and STE could be useful [5].

REFERENCES


Figure 1. GLS assessment. **A.** Sequential evaluation of GLS from baseline (4 months prior to diagnosis of TTC) through and during 9 months follow-up; **B.** The day of hospital admission — severe segmental decline in longitudinal strain within all apical segments and apex, with concomitant mild decline within mid-cavity segments; **C.** 5th day of hospitalization — progressive segmental decline of longitudinal strain within mid-cavity and basal segments of the infero-lateral wall with slight improvement in all apical segments and apex; **D.** 15th day of hospitalization — improvement in longitudinal strain within the apical segments, apex and mid-cavity segments, excluding mid-cavity segments of the antero-lateral and infero-lateral wall; **E.** 5 months after hospital admission — continuous slight improvement in longitudinal strain within all previously impaired segments; **F.** 9 months after admission to the hospital — full improvement in longitudinal strain within all segments compared to baseline.