



# Takotsubo Cardiomyopathy and an Acute Stroke: What is the Role of Anticoagulation?

Hiten Patel<sup>1\*</sup>, Upamanyu Rampal<sup>1</sup>, Rahul Vasudev<sup>1</sup>, Suchit Bhutani<sup>2</sup> and Fayeze Shamoon<sup>1</sup>

<sup>1</sup>Department of Cardiology, New York Medical College, USA

<sup>2</sup>Department of Internal Medicine, Abington Hospital – Jefferson Health, USA

## Abstract

Takotsubo cardiomyopathy (TCM), also known as stress-induced cardiomyopathy or transient left ventricular apical ballooning syndrome, is characterized by reversible left ventricular (LV) dysfunction that is frequently precipitated by a stressful event. LV thrombus is a recognized complication of TCM; however, the clinical significance and therapy of LV thrombus in TCM remain unclear. Here we report a case of a female who presented with an acute stroke secondary to TCM with multiple LV thrombi and discuss the literature review.

**Keywords:** Takotsubo cardiomyopathy; TCM, Acute stroke; Left ventricular thrombi; Anticoagulation

## Introduction

Takotsubo cardiomyopathy (TCM), also known as stress-induced cardiomyopathy or transient left ventricular apical ballooning syndrome, is a clinical entity mimicking an acute coronary syndrome (ACS) and characterized by reversible left ventricular (LV) dysfunction that is frequently precipitated by a stressful event either physical or emotional stress [1]. LV thrombus is a recognized complication of TCM [2]; however, the clinical significance and therapy of LV thrombus in TCM remain unclear. We discuss the same by reporting a case of a female who presented with an acute stroke and later was found to have TCM with multiple LV thrombi.

## OPEN ACCESS

### \*Correspondence:

Hiten Patel, Department of Cardiology,  
New York Medical College, Saint  
Joseph Regional Medical Center,  
703 Main St, Paterson, New Jersey –  
07503, USA, Tel: +1 (917) 627-1437;  
E-mail: hiten0409@yahoo.com

Received Date: 02 May 2017

Accepted Date: 07 Jun 2017

Published Date: 15 Jun 2017

### Citation:

Patel H, Rampal U, Vasudev R,  
Bhutani S, Shamoon F. Takotsubo  
Cardiomyopathy and an Acute Stroke:  
What is the Role of Anticoagulation?. *J*  
*Heart Stroke*. 2017; 2(4): 1030.

ISSN: 2475-5702

Copyright © 2017 Hiten Patel. This is  
an open access article distributed under  
the Creative Commons Attribution  
License, which permits unrestricted  
use, distribution, and reproduction in  
any medium, provided the original work  
is properly cited.

## Case Presentation

Our patient is a 59-year-old female with past medical history of hypertension, non-insulin dependent diabetes mellitus and active smoking came in with complaint of left sided facial droop that started 2-3 days back and transient left arm weakness that started on day of admission. She also complained of intermittent left sided chest pain, radiating to left arm and associated with diaphoresis and vomiting for last 3 days. She was depressed as she lost her husband 2 weeks back but was not on any medication. Admission vitals were normal and physical examination only revealed left facial droop with normal motor function in left arm and leg. EKG showed normal sinus rhythm and T wave inversion in leads V2-V6, I and II. MRI of brain showed multiple infarcts with largest in right posterior parietal lobe and left thalamus (Figure 1). Transesophageal echocardiography (TEE)

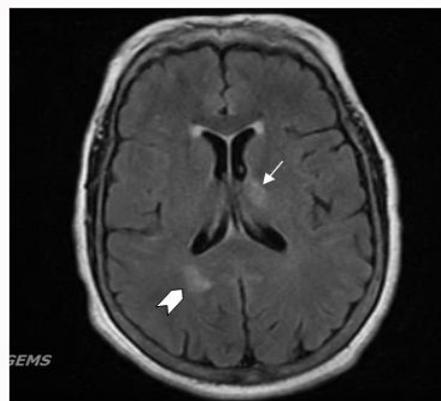
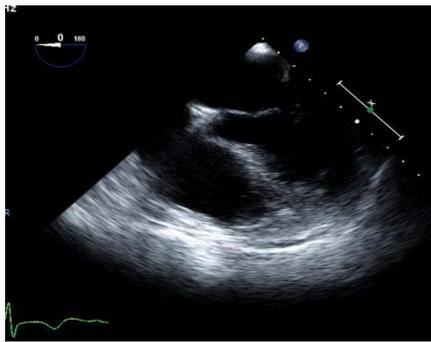


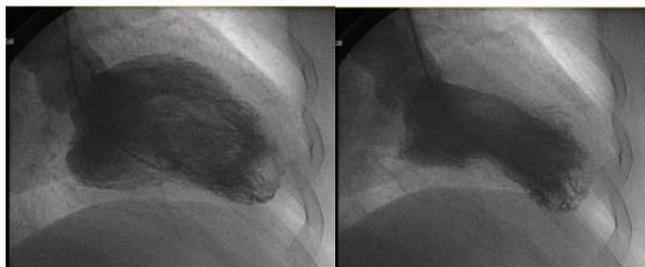
Figure 1: MRI of brain showing right parietal lobe (arrow head) and left thalamic (arrow) acute infarct.



**Figure 2:** Transesophageal echocardiography in A4-C view showing no clot in left ventricle (lower right chamber). A4-C: Apical 4 Chamber.



**Figure 4:** Transthoracic echocardiography with contrast in A4-C view showing multiple left ventricular (upper right chamber) thrombi in apex with apical ballooning. A4-C: Apical 4 Chamber.



**Figure 3:** Left ventriculography in right anterior oblique projection showing basal hyperkinesis and akintec apex (apical ballooning) with multiple apical thrombi (left panel: end diastolic frame and right panel: end systolic frame).



**Figure 5:** Transthoracic echocardiography after 6 weeks of warfarin treatment showing normal left ventricle (upper right chamber) with no apical clot.

showed mildly reduced left ventricular (LV) systolic function, no LV or left atrial appendage clot and no patent foramen ovale (Figure 2). Patient was initially started on aspirin, clopidogrel and statin. Troponin-I levels increased to a maximum of 6.5 ng/ml, so heparin drip was added about 36 h after presentation for non-ST elevation myocardial infarction. Coronary angiography after 5 days showed non obstructive coronary artery disease and left ventriculography revealed hyperkinetic base and an akintec apex with multiple LV apical thrombi (Figure 3). Transthoracic echocardiography (TTE) with contrast confirmed multiple LV thrombi in akinetic apex (Figure 4). Patient was started on beta-blocker and angiotensin ogen converting enzyme inhibitor for TCM and also warfarin for LV thrombi. A follow up TTE after 6 weeks of treatment showed normal LV systolic function and complete resolution of LV thrombi (Figure 5).

**Discussion**

Pathophysiologic basis of TCM is catecholamine excess that is frequently precipitated by either a stressful event (physical or emotional) or secondary to an antidepressant use [1]. Our patient was depressed but was not on any antidepressant. Thrombus formation in TCM is due to relative stasis of blood in akinetic apex and catecholamine induced alteration in the coagulation cascade [2]. Our patient had stroke within 24 h of onset of ACS symptoms; however, the classic LV apical ballooning and LV thrombus formation occurred late after the stroke which suggests that stroke may have made the cardiomyopathy worse and precipitated a vicious cycle resulting in multiple LV thrombi [3]. Other explanation is that the LV thrombi may have been missed on initial TEE and that the use of contrast early on would have improved its sensitivity to detect the clot.

The incidence of LV thrombus is about 10% to 15% without

anticoagulation post anteroapical myocardial infarction (MI) patients, esp. if LV ejection fraction is <30% [4]. To date, the true incidence and clinical significance of LV thrombus and the related embolic outcomes in patients with TCM have not been fully established. LV thrombus was found in 8% of patient with TCM in the study population reported by Haghi et al. [2]. de Gregorio et al. [5] in their systematic review, estimated that LV thrombus approximately complicates 2.5% of all the patients with Takotsubo-like syndrome with cardioembolic complications in about 0.8% of the cases [4]. However, the risk factors for LV thrombus formation with consequent embolic events after TCM remain elusive. Furthermore, LV thrombus can occur at the initial presentation or any time during the disease [5]. Our case emphasize the need to consider short-term anticoagulation in all patients with TCM, after evaluating the risk of bleeding, to reduce the complications of thromboembolism even in the absence of LV thrombus until akinesia or dyskinesia has resolved. The duration of anticoagulation may be modified based on the rate of recovery of cardiac function and resolution of the thrombus. Indirect data from observational and randomized studies in patients after acute MI support the use of anticoagulation to prevent LV thrombus and to prevent embolization in patients with known LV thrombus [6].

So far the only anticoagulant used for treating TCM patients with LV thrombus is warfarin. Although warfarin therapy reduces the incidence of embolization, it may not promote thrombus resolution. Other factors that might contribute to the warfarin benefit are prevention of thrombus extension and promotion of thrombus endothelialization. To our knowledge, there are no data on the use of oral thrombin inhibitors or factor Xa inhibitors in patients with an

acute stroke. Our patient presented with LV thrombus and an acute stroke, so we chose warfarin for anticoagulation. However, newer oral anticoagulants may have a role in patients with TCM in absence of stroke due to lower risk of major bleeding compared with warfarin.

Further studies are required to determine the exact incidence of thromboembolic complications of LV thrombus and the role of anticoagulant therapy (i.e., the duration and type) in patients with TCM with or without LV thrombus. And, though not yet studied, the newer oral anticoagulants may have a role in patients with TCM in absence of stroke due to lower risk of major bleeding compared with warfarin [7].

## Conclusion

Although no specific data exist regarding the role of anticoagulation in TCM, short-term anticoagulation therapy should be considered in all patients with or without LV thrombus until akinesia or dyskinesia is resolved with a close echocardiographic follow up.

## References

1. Vasudev R, Rampal U, Patel H, Patel K, Bikkina M, Shamoan F. Selective serotonin-norepinephrine reuptake inhibitors-induced Takotsubo cardiomyopathy. *N Am J Med Sci.* 2016;8(7):312-5.
2. Haghi D, Papavassiliou T, Heggemann F, Kaden JJ, Borggrefe M, Suselbeck T. Incidence and clinical significance of left ventricular thrombus in tako-tsubo cardiomyopathy assessed with echocardiography. *QJM.* 2008;101(5):381-6.
3. Finsterer J, Wahbi K. CNS disease triggering Takotsubo stress cardiomyopathy. *Int J Cardiol.* 2014;177(2):322-9.
4. Weinreich DJ, Burke JF, Pauletto FJ. Left ventricular mural thrombi complicating acute myocardial infarction. Long-term follow-up with serial echocardiography. *Ann Intern Med.* 1984;100(6):789-94.
5. de Gregorio C, Grimaldi P, Lentini C. Left ventricular thrombus formation and cardioembolic complications in patients with Takotsubo-like syndrome: a systematic review. *Int J Cardiol.* 2008;131(1):18-24.
6. Vaitkus PT, Barnathan ES. Embolic potential, prevention and management of mural thrombus complicating anterior myocardial infarction: a meta-analysis. *J Am Coll Cardiol.* 1993;22(4):1004-9.
7. Chai-Adisaksopha C, Crowther M, Isayama T, Lim W. The impact of bleeding complications in patients receiving target-specific oral anticoagulants: a systematic review and meta-analysis. *Blood.* 2014;124(15):2450-8.