CASE REPORT

Case Report: My lung broke my heart! Takotsubo cardiomyopathy due to pneumonia [version 1; peer review: 1 approved, 2 approved with reservations]

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Abstract

Takotsubo cardiomyopathy (TTC), also known as stress-induced cardiomyopathy, is a cardiac syndrome that often mimics acute myocardial infarction. TTC is commonly triggered by physical or emotional stress; however, acute infection is a rarer etiology. This report concerns the case of an 82-year-old female who presented with non-positional and non-pleuritic chest pain, with an associated fever and cough and chest x-ray findings consistent with pneumonia. Cardiac enzymes and ECG findings were consistent with acute coronary syndrome (ACS); however, during coronary angiography, no coronary artery disease could explain the patient's ACS. A post-catheterization echocardiogram revealed an ejection fraction of 25%, with apical akinesis. A repeat echocardiogram 4 weeks after presentation showed a normal EF and normal wall motion, confirming a diagnosis of TTC.

Keywords

Takotsubo cardiomyopathy, Heart failure, Sepsis, Geriatrics, Cardiology, Pneumonia

Open Peer Review

Approval Status ✔ ? ?

	1	2	3
version 1 30 Apr 2018	✔ view	? view	? view

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2. **Nicola Marziliano**, Università degli Studi del Molise, Campobasso, Italy
3. **Mohammad Ullah Firoze**, Dhaka Medical College, Dhaka, Bangladesh

Any reports and responses or comments on the article can be found at the end of the article.

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Author roles: Ahmed N: Conceptualization, Investigation, Writing – Original Draft Preparation, Writing – Review & Editing; **Gandhi H**: Investigation, Writing – Original Draft Preparation, Writing – Review & Editing; **Sims DB**: Conceptualization, Supervision

Competing interests: No competing interests were disclosed.

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Introduction

Takotsubo cardiomyopathy (TTC) is an etiology of chest pain that often mimics acute myocardial infarction. However, TTC presents with transient systolic dysfunction, which normalizes over time. Patients who typically present with TTC have an inciting physical or emotional stress event that is pinpointed as the etiology[2].

TTC is typically not associated with an infectious etiology as the inciting stressor; however, it has been rarely reported in previous case reports[1]. Acute infection should be increasingly recognized as a possible trigger of TTC in a patient with chest pain.

Case presentation

An 82-year-old female from a nursing home, with a history of dementia, hypertension, hyperlipidemia and coronary artery disease (CAD), and a drug-eluting stent placed in the left circumflex artery, presented from nursing home with recurrent non-positional and non-pleuritic chest pain, along with associated fever and cough. Further medical history could not be obtained from the patient owing to underlying dementia. Of note, the patient had a normal echocardiogram 10 days prior to presentation, with an ejection fraction (EF) of 60%. On presentation, her blood pressure was 113/78 mm Hg, and she had a pulse of 137 beats/min and a temperature of 101°F (38.3°C).

An electrocardiogram (ECG) showed ST elevations in I, avL, and V3–V6 (Figure 1). A chest x-ray revealed pneumonia in the right middle and right lower lobes. The patient's initial creatinine phosphokinase and troponin T were elevated at 330 U/l and 0.86 ng/ml, respectively, and ultimately peaked 6 h after presentation at 470 U/l and 1.39 ng/mll, respectively (normal creatinine phosphokinase < 200 U/l, normal Troponin T < 0.10 ng/ml.)

The patient was taken for an emergency cardiac catheterization after verification of goals of care. Left ventriculogram showed a hypercontractile base and apical akinesis, with an EF of 20% (Figure 2). There was no CAD, which explained the patient's ECG or wall motion abnormalities, so no revascularization was performed.

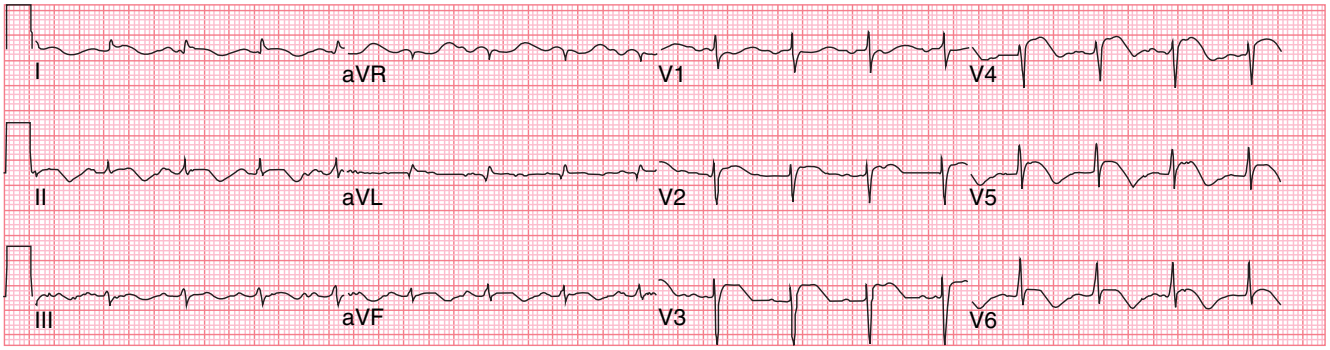

Figure 1. Electrocardiogram showing ST elevations in I, avL and V3–V6.

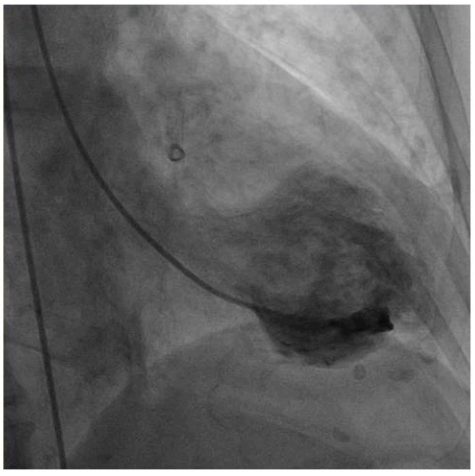

Figure 2. Left ventriculogram with a hypercontractile base and apical akinesis, typical in TTC.

The patient was placed on vancomycin (1 g every 12 h) and piperacillin–tazobactam (0.375 g every 6 h) for the treatment of pneumonia for a 7-day course, with an improvement in symptoms observed. She was continued on daily 81 mg aspirin, 50 mg metoprolol and 40 mg simvastatin, and started on 5 mg lisinopril. A repeat echocardiogram 4 weeks later revealed a normal EF and normal wall motion, confirming a diagnosis of TTC.

Discussion

TTC, also known as stress-induced cardiomyopathy, is a cardiac syndrome that often mimics acute myocardial infarction and presents with transient systolic dysfunction of the apical segment of the left ventricle (LV), without the presence of obstructive coronary artery disease[1]. The syndrome has a higher incidence in women than men[1].

Patients typically present with chest pain and dyspnea; however, cases have been reported of syncope, palpitations, hypotension and shock as the initial manifestation of TTC. Typically, TTC is preceded by a stressful event, such as tragic personal news, assaults, arguments or accidents[2]. However, acute infection has been described as an uncommon etiology[1,3–5]. Typical ECG findings include ST segment elevations and T-wave inversions. Coronary angiography typically does not reveal a culprit lesion and LV angiography shows LV apical ballooning.

The pathophysiological basis of TTC is still unknown, although potential mechanisms include multi-vessel coronary vasospasm, coronary microvascular dysfunction and catecholamine cardiotoxicity[1,2,6]. TTC is commonly triggered by physical or emotional stress; however, rare cases of stress cardiomyopathy from acute infection have been reported[1–3]. A systematic review of sepsis and TTC hypothesized that inflammatory markers, such as tumor necrosis factor-α and interleukin-1β, along with other cytokines, act as a trigger for cardiac sympathetic nerve discharge, leading to an elevated norepinephrine state and then myocardial dysfunction[2]. Another possible mechanism of TTC is myocardial ischemia due to inadequate coronary blood flow during sepsis[3]. The patient in the present report presented with a baseline altered mental status secondary to dementia; no trigger for her episode of TTC other than her infection could be found.

TTC is a reversible cardiomyopathy that is typically associated with emotional stress; however, other inciting factors can trigger TTC. Infection is an uncommon inciting event for TTC. In patients who present with signs and symptoms of acute infection and chest pain, TTC should be considered in the differential diagnosis during the evaluation and workup of the patient.

Consent

Written informed consent for publication of clinical details and images was obtained from a relative of the patient owing to the underlying dementia of the patient.

Competing interests

No competing interests were disclosed.

Grant information

The author(s) declared that no grants were involved in supporting this work.

References

1. Ding H, Huang R, Shi X, *et al.*: **Stress-induced cardiomyopathy following infection of the upper respiratory tract in an elderly female patient: A case report.** *Exp Ther Med.* 2016; **12**(5): 3083–3086.
PubMed Abstract | Publisher Full Text | Free Full Text

2. Pilgrim TM, Wyss TR: **Takotsubo cardiomyopathy or transient left ventricular apical ballooning syndrome: A systematic review.** *Int J Cardiol.* 2008; **124**(3): 283–292.
PubMed Abstract | Publisher Full Text

3. Y-Hassan S, Settergren M, Henareh L: **Sepsis-induced myocardial depression and takotsubo syndrome.** *Acute Card Care.* 2014; [cited April 1, 2017]; **16**(3): 102–109.
PubMed Abstract | Publisher Full Text

4. Clemente G, Tuttolomondo A, Colomba D, *et al.*: **When sepsis affects the heart: A case report and literature review.** *World J Clin Cases.* 2015; **3**(8): 743–750.
PubMed Abstract | Publisher Full Text | Free Full Text

5. Krishnagopalan S, Kumar A, Parrillo JE, *et al.*: **Myocardial dysfunction in the patient with sepsis.** *Current Opinion In Critical Care.* 2002; **8**(5): 376–388.
PubMed Abstract | Publisher Full Text

6. Cappelletti S, Ciallella C, Aromatario M, *et al.*: **Takotsubo Cardiomyopathy and Sepsis.** *Angiology.* 2017; **68**(4): 288–303.
PubMed Abstract | Publisher Full Text

Open Peer Review

Current Peer Review Status: ✔ ? ?

Version 1

Reviewer Report 14 October 2022

https://doi.org/10.5256/f1000research.15833.r150419

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Mohammad Ullah Firoze
Dhaka Medical College, Dhaka, Bangladesh

This is a well-written and described case report.

TCM in during severe infectious disease is not uncommon. This was reported some authors. Overall, this is a good case report to raise awareness about TCM during severe infectious diseases also.

There are two well-recognized diagnostic criteria for TCM. Mayo Clinic criteria and InterTAK criteria could have been discussed.

Echocardiography before cardiac catheterization can give a good clue for diagnosis.

There are some ECG features, like lack of ST depression is suggestive of TCM in relation to ACS.

Myocarditis and pheochromocytoma are two important differential diagnoses, this could be mentioned. Specially myocarditis should be excluded when there is an associated infectious disease like a viral disease. Overall, this is a good case report to raise awareness about TCM during severe infectious diseases also.

Is the background of the case's history and progression described in sufficient detail?
Yes

Are enough details provided of any physical examination and diagnostic tests, treatment given and outcomes?
Partly

Is sufficient discussion included of the importance of the findings and their relevance to future understanding of disease processes, diagnosis or treatment?

Partly

Is the case presented with sufficient detail to be useful for other practitioners?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Clinical cardiology, echocardiography, Interventional cardiology.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 06 October 2022

https://doi.org/10.5256/f1000research.15833.r147688

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Nicola Marziliano
Università degli Studi del Molise, Campobasso, Italy

Taken by itself, pneumonia does not affect directly the heart, but it is a lung infection caused by either bacteria (i.e. *Klebsiella pneumoniae, Haemophilus influenzae, Moraxella catarrhalis, Pseudomonas aeruginosa,* etc) or viruses (SARS-CoV-2, RSV, HxNx, etc) or even fungi. However, heart disease complications like congestive heart failure can cause a condition similar to pneumonia. Additionally, pneumonia tends to affect individuals who are also at high cardiovascular risk.

Although acute cardiac events have been recognised as important complications in patients with pneumonia since the early 20th century, the magnitude of this problem has only recently begun to be appreciated fully. Under this light, the present work can add a further step in the disease (Takotsubo cardiomyopathy, TTC) understanding.

Although, in the case presentation it is missing the link to the pneumonia symptoms and also the investigation of the underlying pneumonia's causes (bacteria, viruses, fungi etc). I think the paper could be accepted after integrating shortly the clinical signs of the patient.

Is the background of the case's history and progression described in sufficient detail?
Partly

Are enough details provided of any physical examination and diagnostic tests, treatment given and outcomes?
Partly

Is sufficient discussion included of the importance of the findings and their relevance to future understanding of disease processes, diagnosis or treatment?
Partly

Is the case presented with sufficient detail to be useful for other practitioners?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Microbiology; Cardiomiopathies; Genetics; Inherited cardiovascular disorders; Channelopathies

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 27 January 2020

https://doi.org/10.5256/f1000research.15833.r58312

Kunal Bhatt
Department of Medicine, Division of Cardiology, School of Medicine, Emory University, Atlanta, GA, USA

Ahmed *et al.* report a concise case of an 82 year old female who developed Takotsubo cardiomyopathy (TTC) after an acute infectious bacterial Pneumonia.

While TTC is usually described in relation to an emotional or physical stressor, this case is unique and contributes to the small existing literature of an infectious precipitant to the syndrome.

The clear objective data of an existing echo 10 days prior to admission showing a normal LVEF adds to the clear development of this patient's syndrome as being induced by her multi-lobar pneumonia.

This case report is written well with a clear focus on the objective of describing a unique case of TTC precipitated by multi-lobar Pneumonia. As sepsis and Pneumonia are fairly common diagnosis, this case report adds to the growing body of literature that describes infections as being another possible etiology of TTC in addition to emotinal and physical stressors.

Is the background of the case's history and progression described in sufficient detail?
Yes

Are enough details provided of any physical examination and diagnostic tests, treatment given and outcomes?
Yes

Is sufficient discussion included of the importance of the findings and their relevance to future understanding of disease processes, diagnosis or treatment?
Yes

Is the case presented with sufficient detail to be useful for other practitioners?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Heart failure, transplant cardiology, general cardiology, TTE, Amyloid cardiomyopathy

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.