

Case Report

An idiopathic case of precordial deep T-wave inversion

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ABSTRACT

Introduction and importance: One percent of the patients referred to cardiac intensive care unit (CICU) are presented with T-wave inversion.

Case presentation: We present a case of 78-year-old woman with chest pain and dyspnea. ECG showed precordial deep T-wave inversion.

Clinical discussion: Cardiomyopathies, ischemia and other pathologies were ruled out.

Conclusion: It is likely to be a first reported case of idiopathic deep T-wave inversion seen in the family without any cardiac or non-cardiac etiology.

1. Introduction

T-wave inversion is commonly presented in electrocardiogram (ECG) of infants. Precordial lead T-wave inversion is seen in infants aged >48 hours and can be seen in childhood period as well [1]. One percent of the patients referred to cardiac intensive care unit (CICU) are presented with T-wave inversion [2]. Inversion of T-wave in precordial lead is uncommon in adults (0.5% of the general population) and not much is known about its adverse outcomes. The inversion is pathological when it is reported in aged male patients in V₃₋₆ [3,4].

T-wave inversion has been associated with a number of diagnosis such as; cardiomyopathies [1] hemorrhagic stroke, pulmonary embolism, ischemic pulmonary edema, substance abuse, gastrointestinal pathologies [5,6]. Pathological diagnosis of inverted T-waves is made by obtaining family history of ischemia, arrhythmias, sudden cardiac death along with semi-invasive to non-invasive diagnostic methods [3,7].

1.1. Case-presentation

A 78-years old woman was referred to our cardiac clinic with atypical chest pain and dyspnea as per NYHA class II that worsened two months before her referral. She had no history of diabetes mellitus, hyperlipidemia and smoking or family history of cardiac disease. She did not have headache or neurologic problem.

She had a history of mild hypertension (up to 150/90 mmHg) and took losartan 25mg/day, intermittently. Her ECG showed deep precordial T waves inversion (Fig. 1) and the patient was suspected for apical hypertrophic cardiac myopathy (HCM). Serum troponin levels,

along with other biochemical and electrolyte exams, were normal. Patient did not report any kind of emotional stress or electrical shock, ruling out takotsubo cardiomyopathy. Additionally, transthoracic echocardiography was performed that did not show any wall motion abnormalities or significant left ventricular hypertrophy (LVH). Furthermore, inter-ventricular septal thickness was 10mm and LVEF was also good (Fig. 2). Patient had no apical hypertrophy, which ruled out HCM. Coronary angiography of the patient showed patent epicardial coronary arteries (Fig. 3).

We performed ECG and echocardiography on her sister and one of her sons. Similar ECG pattern was seen in them.

This case report has been reported in line with the SCARE 2020 criteria [8] Written informed consent was obtained from the patient for publication of this case report and accompanying images.

2. Discussion

T-wave inversion is reported in adult healthy patients, comparable to that of seen in children. Incidentally found T-wave inversion can be an indicator of underlying cardiac abnormality that can lead to sudden cardiac death. It is rarely reported in asymptomatic patients but is relatively common in women [4]

Initially, we suspected that T-inversion was due to ventricular hypertrophy, HCM or ischemia, but patent epicardial coronary arteries ruled out myocardial ischemia. Moreover, absence of LVH was surprising. Several cardiac and non-cardiac factors are associated with deep T-wave inversion [3], due to which our patient was suspected for HCM, because of the absence of signs or symptoms and wall thickness,

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magnetic resonance imaging (MRI) was not performed [9]. We could not find any pathological description for deep T-waves inversion. Similar pattern of T-wave was found in the sister and a son (34-year-old).

Familial clustering of this type of ECG was attractive. Genetic analysis of these findings can give more meaningful conclusions.

Funding

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Ethical approval

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Contributors' statement page

Dr. Amir Shakarami: conceptualized and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript. Designed the data collection instruments, collected data, carried out the initial analyses, and reviewed and revised the manuscript. Coordinated and supervised data collection, and critically reviewed the manuscript for important intellectual content.

Availability of data and material

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.



Fig. 2. Inter-ventricular septal thickness.

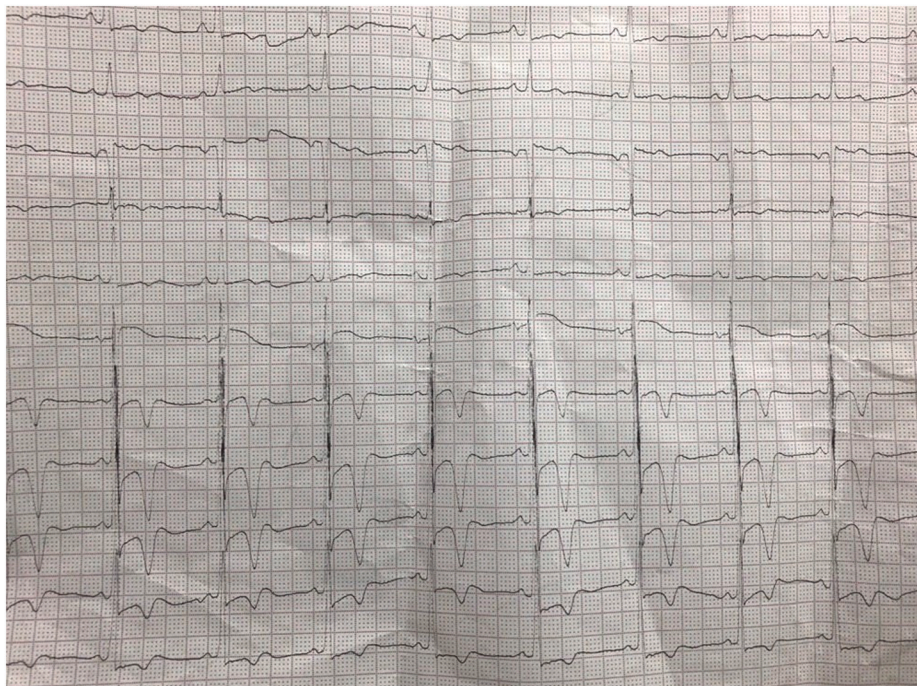


Fig. 1. Deep precordial T waves.

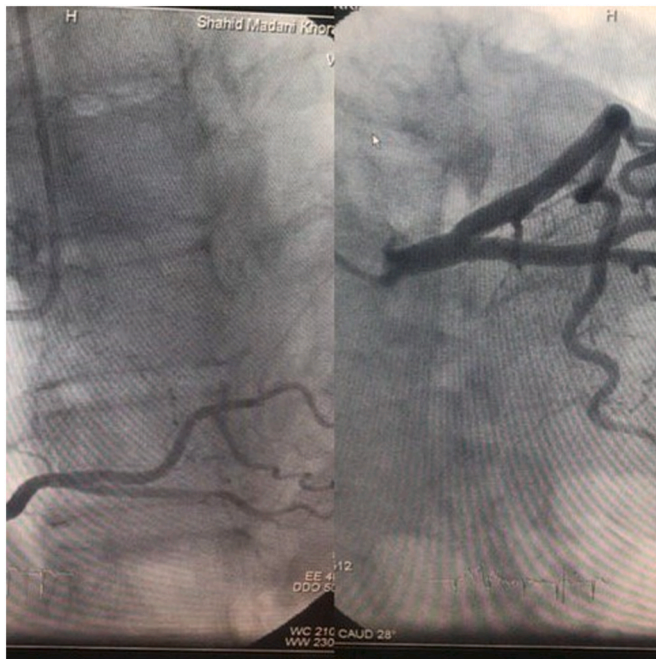


Fig. 3. Patent epicardial coronary arteries.

Research registration

N/A.

Guarantor

Amir Shakarami.

Sources of funding

No funding was secured for this study.

Ethical approval

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Consent

Not applicable.

Author contribution

Dr. Amir Shakarami: conceptualized and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript.

Designed the data collection instruments, collected data, carried out the initial analyses, and reviewed and revised the manuscript. Coordinated and supervised data collection, and critically reviewed the manuscript for important intellectual content.

Registration of research studies

1. Name of the registry: N/A.
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Provenance and peer review

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Declaration of competing interest

The authors deny any conflict of interest in any terms or by any means during the study.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2021.102959>.

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