Journal of
Cardiology & Cardiovascular
Surgery

Case Report

DOI: 10.51271/JCCVS-0009

A case of ventricular tachycardia after an earthquake

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Cite this article: Polat E, Dondurmacı E, Sakallı S, Karaburan Ö. A case of ventricular tachycardia after an earthquake. *J Cardiol Cardiovasc Surg.* 2023;1(2):31-32.

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Received: 04/06/2023 ◆ **Accepted**: 27/06/2023 ◆ **Published**: 28/06/2023

ABSTRACT

Severe earthquakes are a natural disaster with high morbidity and mortality. Loss of limbs, acute abdominal surgeries, infectious diseases, kidney failure, psychological illnesses are well-known health problems. Earthquakes also have negative effects on the cardiovascular system. Here, we present a patient who was stable before the earthquake but had episodes of ventricular tachycardia after the earthquake.

Keywords: Earthquake, ventricular tachycardia, arrhytmia

INTRODUCTION

On February 06, 2023, there were two very strong earthquakes in Turkey, first earthquake centered in Sofalaca, Şehitkamil, Gaziantep with Mw:7.7 ML:7.4 at 04:17 a.m. and second earthquake centered in Ekinözü, Kahramanmaraş with Mw:7.6 ML:7.4 at 13:24 p.m.[1]

In literature, it has been reported that hypertension, myocardial infarction, heart failure, arrhytmias, thromboembolism and sudden cardiac death may occur in relation to stress after previous natural disasters.[2-5]

In this case report, we present a patient with episodes of ventricular tachycardia after an earthquake.

CASE

A 69-year-old male patient was admitted to the cardiology outpatient clinic with the complaint of implantable cardioverter defibrillator (ICD) shock. The patient had coronary bypass graft operation and hypertension. His ejection fraction was 30% and he had heart failure.

The patient underwent VVIR ICD implantation in 2021 due to one episode of ventricular tachycardia. After implantation, the patient had one episode of ventricular tachycardia in February 2022 with ICD shock. There has been no other episode of ventricular tachycardia since February 2022 in the ICD records of the patient. There was no history of arrhythmia in the last one-year follow-up and the patient was stable with medical treatment. The patient was receiving medical treatment with carvedilol, lercanidipine, candesartan, clopidogrel, furosemide, eplerenone and acetylsalicylic acid.

It was learned that the patient had no orthopedic problems due to the earthquake and stayed in a tent for two weeks because his house was damaged. He stated that he was taking his medications without any interruption. There was no electrolyte or thyroid hormone abnormality in the laboratory findings (K: 4,6 (3,5-5,1) mmol/L, Ca: 9,24 (8,4-10,6) mg/dL, Mg: 2,56 (1,8-2,6) mg/dL, TSH: 1,71 (0,27-4,2) uIU/mL, FT4:1,42 (0,93-1,7) ng/dL FT3: 2,2 (2-4,4) ng/L)

When the ICD records of the patient were analyzed, ventricular tachycardia (VT) episodes were observed, which started on the day of the earthquake, occurred 2 times on the day of the earthquake and then occurred 9 times in total within a 15-day period. It was observed that 5 of the VT episodes were terminated with anti-tachycardia pacing therapy (ATP) and in 4 of them, including one on the day of the earthquake, the ICD device shocked after ATP, thus terminating the VT episode (**Figure 1-5**). After ICD controls were performed, magnesium and amiodarone were added to the medical treatment and the patient was followed up. There was no episode of ventricular tachycardia at 2 months.

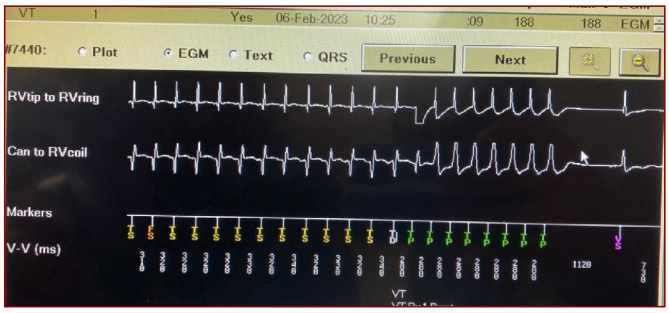

Figure 1. Ventricular tachycardia sample from the patient's ICD recordings, February 6,2023

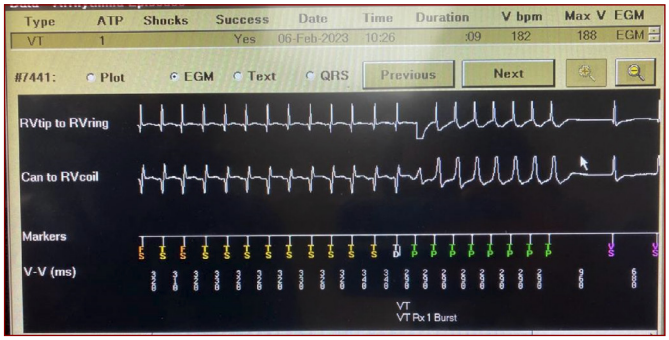

Figure 2. Ventricular tachycardia sample from the patient's ICD recordings, February 6,2023

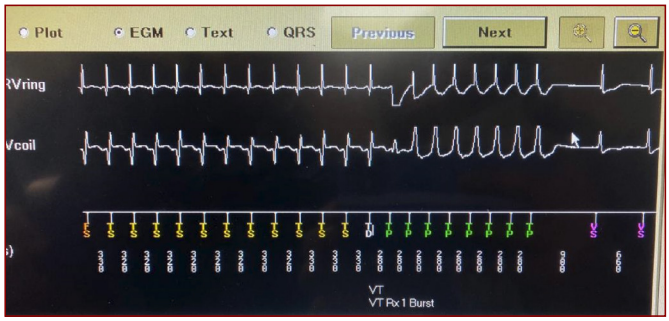

Figure 3. Ventricular tachycardia sample from the patient's ICD recordings, February 21,2023

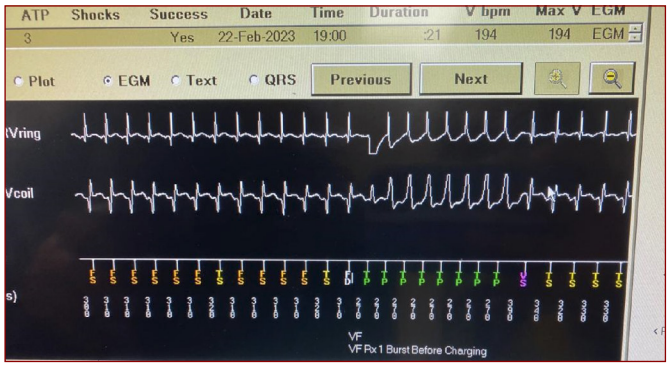

Figure 4. Ventricular tachycardia sample from the patient's ICD recordings, February 22,2023

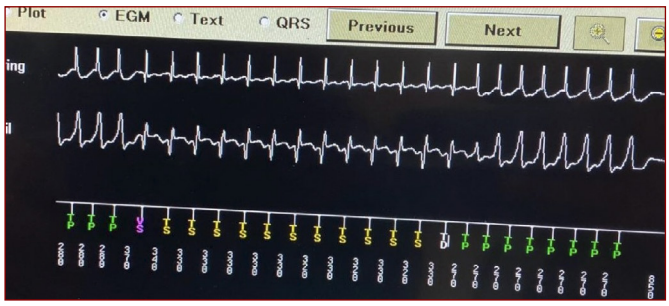

Figure 5. Ventricular tachycardia sample from the patient's ICD recordings, February 22,2023

DISCUSSION

Severe earthquakes are known to cause human deaths, loss of limbs, crush syndromes, acute renal failure, post-traumatic stress syndromes, and infectious diseases due to hygiene problems.[6,7] The cardiovascular system is another system affected by strong earthquakes, and one that doctors think of less often than others.

In the pathophysiology of cardiovascular disease, sympathetic system activation, endothelial dysfunction, platelet activation, catecholamine increase, biphasic effect of adrenaline on serum potassium by causing hyperkalemia and then hypokalemia may be involved.[8,9] It causes hypertension, stroke, arrhythmia, deep vein thrombosis, pulmonary embolism, myocardial infarction and heart failure due to increased risk factors in the acute, subacute and chronic phases.[2,8,10]

In a study conducted after the earthquake centered in Wenchuan, Sichuan, China, it was found that the number of hemodynamically unstable ventricular tachyarrhythmias was higher after the earthquake and most hemodynamically unstable ventricular tachyarrhythmias occurred during seismically stronger periods.[9] In our patient, the patient had episodes of ventricular tachyarrhythmia during the period of seismically strong activities.

There was no abnormality in any metabolic parameter in the blood tests that could be performed. Our patient did not have hypertensive episodes at the time of the attacks. Since we could not measure catecholamine levels, it is difficult to say the etiology of ventricular tachycardia in our patient.

CONCLUSION

Severe earthquakes affect the cardiovascular system. Ventricular tachyarrhythmias may occur due to increased stress, increased catecholamines and the effect of adrenaline on serum potassium. It is useful to evaluate patients for arrhythmia when they complain of palpitation after severe earthquakes and to check patients with ICD devices more frequently for arrhythmia after earthquakes.

ETHICAL DECLARATIONS

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Boğaziçi Üniversitesi Kandilli Rasathanesi ve Deprem Araştırma Enstitüsü (KRDAE) Bölgesel Deprem-Tsunami İzleme ve Değerlendirme Merkezi (BDTİM), 06 Şubat 2023 Sofalaca- Şehitkamil-Gaziantep; Ekinözü- Kahramanmaraş ve 20 Şubat 2023 Hatay Depremleri.
2. Mehdi Z. Earthquakes and cardiovascular diseases. *Int J Cardiovasc Acad.* 2023; 9:1:1-2. doi: 10.4274/ijca.23022023
3. Teng AM, Blakely T, Ivory V, Kingham S, Cameron V. Living in areas with different levels of earthquake damage and association with risk of cardiovascular disease: a cohort-linkage study. *Lancet Planetary Health*. 2017;1:e242-253. doi: 10.1016/S2542-5196(17)30101-8
4. Trichopoulos D, Katsouyanni K, Zavitsanos X, Tzonou A, Dalla-Vorgia P. Psychological stress and fatal heart attack: the Athens (1981) earthquake natural experiment. *Lancet.* 1983;1(8322):441-444. doi:10.1016/s0140-6736(83)91439-3
5. Leor J, Poole WK, Kloner RA. Sudden cardiac death triggered by an earthquake. *N Engl J Med.* 1996;334(7):413-419. doi:10.1056/NEJM 199602153340701
6. Roy N, Shah H, Patel V, Bagalkote H. Surgical and psychosocial outcomes in the rural injured--a follow-up study of the 2001 earthquake victims. *Injury.* 2005;36(8):927-934. doi:10.1016/j.injury.2005.02.017
7. Ateş S, Erdem H. The earthquake in Türkiye and infectious disease concerns. *New Microbes New Infect.* 2023;52:101127. doi:10.1016/j.nmni.2023.101127
8. Biffi M, Candelora A, Massaro G. Ventricular fibrillation triggered by earthquake during the accumoli-amatrice disaster in Italy. *Circ J.* 2017;81(5):759-760. doi:10.1253/circj.CJ-16-1135
9. Zhang XQ, Chen M, Yang Q, Yan SD, Huang de J. Effect of the Wenchuan earthquake in China on hemodynamically unstable ventricular tachyarrhythmia in hospitalized patients. *Am J Cardiol.* 2009;103(7):994-997. doi:10.1016/j.amjcard.2008.12.009
10. Kario K, McEwen BS, Pickering TG. Disasters and the heart: a review of the effects of earthquake-induced stress on cardiovascular disease. *Hypertens Res.* 2003;26(5):355-367. doi:10.1291/hypres.26.355