Impact of the 2023 Türkiye Earthquake on the Incidence of Hospitalized Atrial Fibrillation and Ventricular Tachycardia

Abdullah Yildirim[1], Mukremin Coskun[1], Elif Tunc[1], Hazar Harbalioglu[1], Abdullah Eren Cetin[2], Ahmet Taha Sahin[3], Abdullah Orhan Demirtas[1]

1 University of Health Sciences, Adana City Training and Research Hospital, Department of Cardiology, Adana, Türkiye
2 25 Aralık State Hospital, Department of Cardiology, Gaziantep, Türkiye
3 Kahta State Hospital, Adıyaman, Türkiye

Abstract

Aim: Previous earthquakes worldwide have been linked to increased cardiovascular morbidity and mortality. This study aimed to evaluate the impact of the 2023 Türkiye Earthquake on the incidence and characteristics of hospitalized acute atrial fibrillation (AF) and ventricular tachycardia (VT).

Methods: We performed a single-center retrospective analysis at a tertiary referral hospital that served as a major regional care center after the earthquake. Hospital admissions for acute AF and VT were compared across two consecutive two-month periods: pre-earthquake (December 6, 2022–February 6, 2023) and post-earthquake (February 6–April 6, 2023). Adult patients (≥18 years) with electrocardiographically confirmed AF or VT requiring hospitalization were included.

Results: A significant increase was observed in AF hospitalizations post-earthquake (0.62% vs. 1.46%; RR:2.35, 95% CI:1.15–4.78; p=0.015), while VT admissions showed a non-significant rise (0.62% vs. 0.85%; RR:1.37, 95% CI:0.62–3.01; p=0.431). Demographics and comorbidities were comparable between groups. Post-earthquake AF patients had shorter hospital stays (median 1 vs. 2 days, p<0.001), and VT patients also had reduced length of stay (median 1 vs. 4 days, p=0.001). Post-hoc power analysis demonstrated adequate power for AF (~65%) but limited power for VT (~12%).

Conclusions: The 2023 Türkiye Earthquake was associated with a significant increase in hospitalizations for acute AF, likely mediated by stress-induced arrhythmogenesis, while VT admissions showed only a non-significant trend. These findings underscore the importance of disaster preparedness strategies focusing on early recognition, tailored management, and healthcare system adaptations for arrhythmia-prone individuals in the aftermath of major disasters.

***Keywords**: Earthquake; atrial fibrillation; ventricular tachycardia; arrhythmia; disaster medicine*

1. Introduction

Natural disasters such as earthquakes create acute psychological and physiological stress that can act as powerful triggers for cardiac arrhythmias.[1-3] Among these, atrial fibrillation (AF) and ventricular tachycardia (VT) are of particular concern because of their strong association with increased morbidity and mortality.[4-6] Previous studies, including those conducted after the Great East Japan Earthquake and the 1994 Northridge Earthquake, reported significant increases in arrhythmic events following major seismic activity.[7-9] On February 6, 2023, two devastating earthquakes measuring 7.7 and 7.6 struck Kahramanmaraş and Hatay in southeastern Türkiye, causing more than 50,000 deaths and widespread destruction.[10] In addition to the direct physical trauma, the acute and chronic stress of such disasters can lead to autonomic imbalance, heightened sympathetic activation, and systemic inflammatory responses—all of which increase the likelihood of arrhythmic events. Furthermore, the collapse of regional hospitals and redistribution of patients to referral centers during disasters can alter healthcare-seeking patterns and amplify the number of arrhythmia-related hospitalizations.

Although the cardiovascular effects of natural disasters have been studied in different regions, evidence on arrhythmic burden after the 2023 Türkiye Earthquake is scarce. This study aimed to address this gap by examining the incidence of hospitalized acute AF and VT before and after the earthquake. We hypothesized that the

Corresponding Author: Abdullah Yıldırım, dr.yildirimabdullah@gmail.com, Received: 30.08.2025, Accepted: 26.09.2025, Available Online Date: 30.09.2025 University of Health Sciences, Adana City Training and Research Hospital, Department of Cardiology, Adana, Türkiye. https://doi.org/10.36516/jocass.1774318

emotional and physiological stress triggered by the disaster significantly increased the occurrence of acute arrhythmic events requiring hospitalization.

2. Materials and Methods

2.1. Study Design

This retrospective study was conducted at a tertiary care center located in a neighboring city to the earthquake zone. The hospital functioned as a major referral center during the disaster period due to structural damage to several hospitals within the epicenter. Hospital admissions for acute arrhythmias were analyzed over two intervals: the pre-earthquake period (December 6, 2022 – February 6, 2023) and the post-earthquake period (February 6, 2023 – April 6, 2023), based on the institutional patient tracking system. A two-month timeframe was chosen for each period to ensure balanced comparison and to minimize the confounding effect of seasonal variation. Previous disaster-related studies have shown that stress-induced arrhythmic events occur predominantly within the first weeks to months after a disaster, supporting the selection of this interval. Extending the study period further could have introduced variability related to healthcare system adaptation and population redistribution.

Each patient's medical history, comorbidities, and medication data were obtained retrospectively from national health registry systems, institutional health records, and patient interviews. Hypertension was defined as systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg, or current use of antihypertensive therapy. Diabetes mellitus was diagnosed if at least one of the following criteria was met: fasting plasma glucose ≥126 mg/dL, 2-hour post-load plasma glucose ≥200 mg/dL, HbA1c ≥6.5%, or random plasma glucose ≥200 mg/dL in symptomatic patients. Coronary artery disease (CAD) was defined as a documented history of acute coronary syndrome, prior percutaneous coronary intervention, or coronary artery bypass grafting. Antecubital venous blood samples were collected at admission. Routine biochemistry was measured using the fully automated chemistry analyzer Beckman UniCel DXC 800 Synchron (Beckman Coulter Inc., CA, USA). All transthoracic echocardiographic examinations were performed in the cardiac imaging unit. Standard parameters were measured in accordance with current guidelines of the European Association of Cardiovascular Imaging (EACVI) and the American Society of Echocardiography (ASE).[11,12]

2.2. Patient Selection

During the study intervals, 1,765 patients were admitted to the coronary intensive care unit or cardiology ward in the pre-earthquake period (December 6, 2022 – February 6, 2023), and 1,640 patients were admitted in the post-earthquake period (February 6, 2023 – April 6, 2023). Patients aged ≥18 years with a primary diagnosis of AF or VT were eligible for inclusion. All arrhythmia diagnoses were confirmed by electrocardiographic documentation at admission. Inclusion criteria were: (1) hospitalization due to new-onset or paroxysmal acute AF, and (2) sustained monomorphic or polymorphic VT. Exclusion criteria were: (1) patients not requiring hospital admission, (2) those with postoperative AF or VT, and (3) patients with supraventricular tachyarrhythmias other than AF.

Ethical approval for the study was obtained from the Ethics Committee of a tertiary care hospital (Decision No: 2436, April 6, 2023). The study was conducted in accordance with the principles of the Declaration of Helsinki.

2.3. Statistical Methods

Statistical analyses were performed using SPSS 25.0 (IBM Inc., Chicago, IL, USA). The normality of continuous variables was assessed with the Shapiro–Wilk test and visual methods. Continuous variables were expressed as mean±SD or median (IQR25–75), and categorical variables as frequency (%). Group comparisons were conducted with the independent t-test or Mann–Whitney U test for continuous data, and with Pearson's chi-square or Fisher's exact test for categorical data. Differences between two independent proportions were evaluated using z-tests. To complement hypothesis testing, relative risks (RR) with 95% confidence intervals (CI) were estimated using the Katz method. Post-hoc power analysis was performed in G*Power version 3.1.9.7, with effect sizes calculated as Cohen's h for the observed proportions, assuming a two-sided $\alpha=0.05$. The achieved power was 65% for AF and ~12% for VT. All statistical analyses used two-sided tests with a significance level (alpha) of 0.05.

3. Results

In the AF cohort, there were no significant differences between the pre- and post-earthquake groups with respect to age, sex, comorbidities (including hypertension and CAD), or valvular pathology (all $p>0.05$). The majority of patients in both groups were managed medically; however, a higher proportion of patients underwent AF ablation prior to the earthquake compared to after (45.5% vs. 16.7%, $p = 0.103$). Laboratory and echocardiographic parameters, including hemoglobin, inflammatory markers, renal function, and left atrial size, did not differ significantly between the groups (all $p>0.05$). Post-earthquake patients demonstrated shorter hospital length of stay (median 1 [1–3] vs. 2 [1–6] days, $p < 0.001$) (Table 1). The incidence of AF admissions significantly increased after the earthquake, rising from 11 cases (0.62%) to 24 cases (1.46%). The RR of AF admission was more than two-fold higher in the post-earthquake period (RR: 2.35, 95% CI: 1.15–4.78; Z = –2.43; $p = 0.015$) (Table 2 and Figure 1B). Post-hoc power analysis demonstrated adequate power for the AF comparison (~65%).

In the VT cohort, baseline demographic and clinical characteristics, including age, sex, and comorbidities such as diabetes, hypertension, and CAD, were comparable between the two periods (all $p>0.05$). The prevalence of congestive heart failure was higher in the pre-earthquake group, although this difference did not reach statistical significance (72.7% vs. 35.7%, $p = 0.066$). Laboratory and echocardiographic findings, including left ventricular ejection fraction, showed no significant differences (all $p>0.05$). Post-earthquake patients demonstrated shorter hospital length of stay (median 1 [1–4] vs. 4 [1–12] days, $p = 0.001$) (Table 3). The number of VT admissions showed a modest increase after the earthquake (14 vs. 11 cases), but this difference did not reach statistical significance (0.62% vs. 0.85%; RR: 1.37, 95% CI: 0.62–3.01; Z = –0.79; $p = 0.431$) (Table 4 and Figure 1B). As expected, post-hoc power for the VT comparison was limited (~12%), restricting the ability to detect small between-group differences. To better illustrate these findings, a time-trend analysis was performed. Figure 2 shows AF and VT admission rates per 1,000 hospitalizations in the pre- and post-earthquake period with 95% CI. AF admissions increased significantly after the earthquake, whereas VT admissions demonstrated only a modest, non-significant change.

Table 1

Comparison of qualitative variables of the patients diagnosed with AF between earthquake time (before and after).

Variable	Time		Overall	*p*-value*
	Before Earthquake *(n=11, 31.4%)*	After Earthquake *(n=24, 68.6%)*		
Age, year	55.5±16.2	54.2±14.5	54.6±14.8	0.815
Gender, female, n (%)	4 (36.36)	10 (41.67)	14 (40)	0.991
Hypertension, n (%)	4 (36.4)	5 (20.8)	9 (25.7)	0.416
Smoking, n (%)	3 (27.3)	8 (33.3)	11 (31.4)	0.992
CAD, n (%)	2 (18.2)	1 (4.2)	3 (8.6)	0.227
Valvular disease, n (%)	1 (9.1)	2 (8.3)	3 (8.6)	0.990
Medication strategies, n (%)				
Cryo-ablation	5 (45.5)	4 (16.7)	9 (25.7)	0.103
Medical	6 (54.6)	20 (83.3)	26 (74.3)	
WBC, x10^3 /μL	10.9±1.9	10.4±1.7	8.2±2.1	0.231
Hemoglobin, g/dL	13.7 (12 – 15.8)	14.2 (8.1 – 18.0)	14 (8.1 – 18.0)	0.283
Platelets, x10^3 /μL	224 (39 – 479)	236 (188 – 428)	232 (39 – 479)	0.903
ALT, IU/L	20 (10 – 48)	22 (9 – 110)	22 (9 – 110)	0.662
AST, IU/L	19 (15 – 44)	25 (13 – 97)	24 (13 – 97)	0.636
CRP, mg/dL	2.4 (1.6 – 23.1)	3 (1 – 20.7)	3 (1 – 23.1)	0.847
Urea, mg/dL	34.7±9.8	29.9±9.9	31.4±10	0.188
Creatinine, mg/dL	0.9±0.2	0.8±0.2	0.8±0.2	0.642
Sodium, mmol/L	140.5±2.3	139.1±2.4	139.5±2.4	0.119
Potassium, mEq/L	4.6 (4.0 – 5.1)	4.5 (3.8 – 5.1)	4.5 (3.9 – 5.1)	0.713
Calcium, mg/dL	9 (8 – 10)	9 (8 – 10)	9 (8 – 10)	0.390
hs-TnI, ng/L	23 (3 – 149)	25 (1 – 90)	7 (1 – 149)	0.516
CK-MB, ng/mL	1.3 (0.7 – 7)	2.3 (0.8 – 37.4)	2 (0.7 – 37.4)	0.163
LVEF, %	60 (60 – 65)	60 (25 – 60)	60 (25 – 65)	0.268
LA size, mm	43.9±10.0	42.7±5.5	43.1±7.1	0.725
Hospitalization time, day	2 (1 –6)	1 (1 – 3)	1 (1 – 6)	<0.001

Values are presented as n (%), median (interquartile range [IQR]$_{25-75}$), or mean± SD
** A p-value of <0.05 was considered statistically significant.*
Abbreviations; *AF: atrial fibrillation, ALT: alanine aminotransferase, AST: aspartate aminotransferase, CAD: coronary artery disease, CK-MB: Creatine kinase-MB, CRP: C-Reactive Protein, hs-TnI: high-sensitivity troponin I, LA: left atrium, LVEF: left ventricular ejection fraction, WBC: white blood cell.*

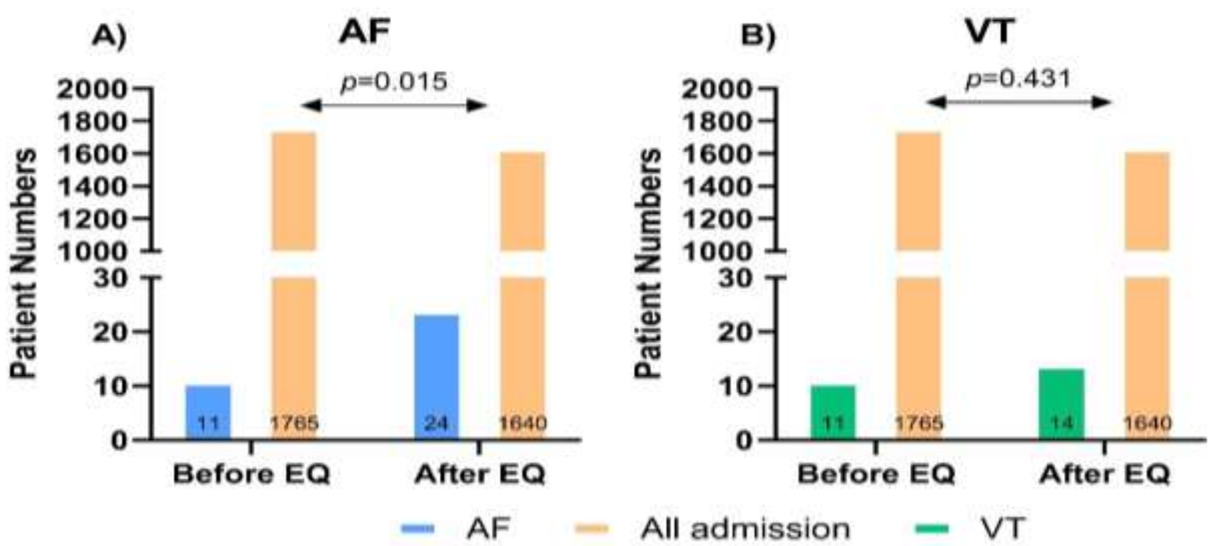
Table 2

Comparison between atrial fibrillation admission rates before and after the earthquake admissions.

	Frequency (%)	RR (95% CI)	Z score	p-value*
Before EQ	11 (0.62)	2.35 (1.15-4.78)	-2.43	0.015
After EQ	24 (1.46)			

** A p-value of <0.05 was considered statistically significant.*
Abbreviations; EQ: Earthquake.

Figure 1



Hospital admissions for atrial fibrillation (AF) and ventricular tachycardia (VT) before and after the 2023 Türkiye Earthquake. A significant increase was observed in AF admissions (p=0.015), while VT admissions showed a non-significant rise (p=0.431).

Table 3

Comparison of qualitative variables of the patients diagnosed with VT between earthquake time (before and after).

Variable	Time		Overall	p-value*
	Before Earthquake (n=11, %44)	After Earthquake (n=14, %56)		
Age, year	58.4±12.6	63.4±15.8	61.2±14.4	0.401
Gender, female, n (%)	2 (18.2)	4 (28.6)	6 (24)	0.661
Diabetes mellitus, n (%)	3 (27.3)	2 (14.3)	5 (20)	0.623
Hypertension, n (%)	4 (36.4)	7 (50.0)	11 (44)	0.689
Smoking, n (%)	2 (18.2)	1 (7.1)	3 (12)	0.565
Respiratory disease, n (%)	2 (18.2)	2 (14.3)	4 (16)	0.995
CAD, n (%)	6 (54.6)	5 (35.7)	11 (44)	0.435
Chronic HF, n (%)	8 (72.7)	5 (35.7)	13 (52)	0.066
Valvular disease, n (%)	3 (27.3)	4 (28.6)	7 (28)	0.992
WBC, x10^3 /µL	13.2±2.3	12.4±2.1	12.8±2.2	0.348
Hemoglobin, g/dL	10.1 (4.8 – 23.3)	7.6 (5.3 – 12.4)	7.6 (4.8 – 23.3)	0.217
Platelets, x10^3 /µL	213 (92 – 670)	235 (115 – 322)	216 (92 – 670)	0.460
ALT, IU/L	26 (10 – 332)	19 (6 – 50)	25 (6 – 332)	0.170
AST, IU/L	24 (12 – 60)	25 (12 – 48)	24 (12 – 60)	0.956
CRP, mg/dL	6.9 (1.9 – 81.4)	15.7 (1.3 – 114)	11 (1.3 – 114)	0.411
Urea, mg/dL	38 (20 – 92)	48 (19 – 163)	46 (19 – 163)	0.494
Creatinine, mg/dL	1.0 (0.6 – 2.2)	1.1 (0.5 – 2)	1.1 (0.5-2.2)	0.817
Sodium, mmol/L	135.9±3.7	137±3.1	136.5±3.3	0.430
Potassium, mEq/L	4 (4 – 5)	4 (4 – 5)	4 (4 – 5)	0.198
Calcium, mg/dL	9.2±0.9	9.0±1.0	9.1±0.9	0.630
hs-TnI, ng/L	60 (1 – 6669)	33 (3 – 5187)	35 (1 – 6669)	0.827
CK-MB, ng/mL	3.1 (0.8 – 7.4)	2.2 (0.9 – 10.0)	2.7 (0.8 – 10.0)	0.603
LVEF, %	32.9±12.9	35.4±13.9	34.3±13.3	0.657
Hospitalization time, day	4 (1 – 12)	1 (1 – 4)	2 (1 – 12)	0.001

*Values are presented as n (%), median (interquartile range [IQR]25-75), or mean± SD, * A p-value of <0.05 was considered statistically significant. Abbreviations; ALT: alanine aminotransferase, AST: aspartate aminotransferase, CAD: coronary artery disease, CK MB: creatine kinase-MB, CRP: C-Reactive protein, HF: heart failure, hs-TnI: high-sensitivity troponin I, LVEF: left ventricular ejection fraction, VT: ventricular tachycardia WBC: white blood cell.*

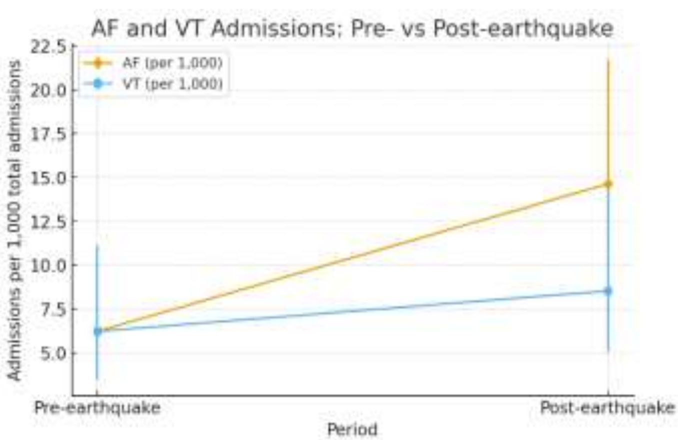
Table 4

Comparison of ventricular tachycardia rates between before and after the earthquake admissions.

	Frequency (%)	RR (95% CI)	Z score	p-value*
Before EQ	11 (0.62)	1.37 (0.62-3.01)	-0.79	0.431
After EQ	14 (0.85)			

** A p-value of <0.05 was considered statistically significant.*
Abbreviations; EQ: Earthquake.

Figure 2



Time-trend analysis of AF and VT admissions per 1,000 total hospitalizations in the pre- and post-earthquake periods. AF admissions increased significantly, whereas VT admissions remained stable.

4. Discussion

The primary finding of this retrospective, single-center study is the marked increase in hospitalizations for acute AF following the 2023 Türkiye Earthquake, whereas no statistically significant difference was observed in VT admissions. These results are in line with previous evidence demonstrating that acute emotional and physiological stress induced by natural disasters can act as a trigger for arrhythmic events, particularly AF, through mechanisms such as heightened sympathetic activation, autonomic imbalance, and neurohormonal dysregulation.[13]

In the context of AF, the post-earthquake surge in hospitalizations may be explained by a multifactorial interaction involving stress-related autonomic dysregulation, increased anxiety, sleep deprivation, systemic inflammation, and the worsening of underlying cardiovascular conditions. Similar trends were observed after the 2011 Great East Japan Earthquake, where AF incidence rose substantially during the acute post-disaster phase.[14] Ilhan et al. further supported this perspective by reporting that the prevalence of post-traumatic stress disorder following the 2023 Türkiye Earthquake was 51.4%, with female sex, loss of close relatives, and the need for urgent medical care being strongly associated factors.[15] These psychosocial determinants may have acted synergistically with physiological stress, increasing the vulnerability to AF.

Another noteworthy finding is the change in therapeutic strategies. The proportion of patients treated with medical management increased, while fewer patients underwent AF ablation after the earthquake. This shift likely reflects the resource reallocation and prioritization of life-threatening emergencies that typically occur during crisis periods, when procedural capacity is limited. In parallel, the observed reduction in hospital length of stay for AF patients may represent an institutional strategy for early discharge aimed at preserving bed availability for the expected surge of acute medical cases. Comparable adaptations in discharge and treatment strategies have been reported in prior disaster-related healthcare studies.[16] These observations highlight the necessity of incorporating arrhythmia management protocols into disaster preparedness frameworks, including early recognition, efficient triage, and streamlined treatment pathways.

In addition, evidence from recent post-earthquake studies demonstrated that mental stress may contribute to QT prolongation, thereby increasing susceptibility to malignant ventricular arrhythmias.[17] Indeed, prolonged QTc intervals have been observed with higher frequency following major disasters, likely reflecting sustained sympathetic dominance and impaired autonomic modulation.[17-19] This pathophysiological mechanism provides a potential explanation for the non-significant increase in VT admissions in our cohort, suggesting that stress-induced repolarization abnormalities could have predisposed vulnerable patients to ventricular tachyarrhythmias. This mechanism may underlie the non-significant yet numerically higher incidence of VT observed in our cohort, suggesting that stress-related repolarization abnormalities could have promoted ventricular tachyarrhythmias in predisposed patients. Although VT admissions increased numerically, the difference did not reach statistical significance. Moreover, baseline demographics and comorbidity profiles were similar between pre- and post-earthquake VT patients, further implying that the observed trend is stress-driven rather than patient-related. Importantly, the median length of hospital stay for VT patients was significantly shorter post-earthquake, likely reflecting institutional pressures to optimize patient throughput amid elevated referral volume. Similar patterns have been described in disaster literature, where healthcare systems adapt by reducing hospitalization times to accommodate surging patient numbers. Another explanation for reduced VT hospitalization durations may be a greater reliance on ambulatory and device-based follow-up, particularly among patients with implantable cardioverter-defibrillators (ICDs). Prior studies suggest that in disaster conditions, ICDs and remote telemetry can compensate for limited hospital capacity and reduce the need for prolonged admissions.[17] This adaptive mechanism could partially account for the trends observed in our patient population.

Historically, earthquakes have been associated with an increased incidence of acute coronary syndrome, cerebrovascular events, tachyarrhythmias, acute heart failure, and overall mortality.[20-23] Subsequent investigations, including those conducted after the 2023 Türkiye Earthquake, have confirmed these associations, further establishing the causal relationship between seismic stress and adverse cardiovascular outcomes.[1,17] Our findings contribute to this expanding body of evidence by demonstrating that earthquakes can act as potent triggers of acute cardiovascular morbidity, particularly AF. The post-earthquake rise in AF hospitalizations observed in our study thus represents an integral component of the broader disaster-related cardiovascular burden, underscoring the need for healthcare systems to prepare not only for traumatic injuries but also for the inevitable surge in cardiovascular emergencies.[1]

Finally, the role of the acute sympathetic surge following traumatic events should be emphasized. Sympathetic overactivation during stress shortens atrial and ventricular refractory periods, enhances triggered activity, and facilitates reentry circuits, thereby increasing susceptibility to both atrial and ventricular arrhythmias. The patterns we observed are consistent with this mechanistic framework and align with prior disaster reports, including those following earthquakes and hurricanes, which documented a transient increase in arrhythmic events. Collectively, these findings emphasize the importance of proactive surveillance, early intervention, and optimized care pathways for arrhythmia-prone individuals in the aftermath of major disasters.

4.1. Limitations

This study has several limitations that should be acknowledged. First, its retrospective and single-center design restricts the generalizability of the findings. The results may not reflect arrhythmic trends in other geographical areas, particularly those located closer to the epicenter or with different healthcare infrastructures. Second, because our data were obtained exclusively from hospitalized patients, arrhythmic episodes managed in the outpatient setting or those not leading to hospital admission could not be captured, potentially leading to underestimation of the true burden of AF and VT. Although a statistically significant increase in AF admissions was identified, the relatively small sample size of VT cases limited the statistical power, meaning that clinically important differences in VT admissions might have been overlooked. The exclusion of PVCs and non-sustained VT further restricted the scope of arrhythmic assessment. Moreover, continuous ambulatory monitoring and device-based data were not included, which might have provided additional insights into subclinical and asymptomatic arrhythmias. Other potentially influential factors—such as psychosocial stress levels, quality of sleep, medication adherence, and delays in healthcare access—were not systematically evaluated. Although patient baseline characteristics were similar, the increased AF hospitalizations may have been partly influenced by changes in healthcare-seeking behavior and referral dynamics, especially considering the collapse of several regional hospitals that altered referral flows. These factors may introduce residual confounding.

5. Conclusion

This retrospective single-center study demonstrated a significant increase in acute AF hospitalizations after the 2023 Türkiye Earthquake, while VT admissions exhibited a non-significant upward trend. These findings provide evidence that acute psychological and physiological stress during catastrophic events can substantially impact atrial arrhythmogenesis, whereas ventricular arrhythmias may be influenced to a lesser extent. In light of this vulnerability, disaster preparedness should not only address structural injuries but also integrate cardiovascular emergency strategies, including early arrhythmia detection, close monitoring, and optimization of management protocols for high-risk populations. Future multicenter studies with larger cohorts, longer follow-up, and incorporation of continuous monitoring techniques are warranted to clarify the long-term trajectory of arrhythmic risk and to guide evidence-based preventive and therapeutic interventions.

5.1. Highlights

A significant increase in acute AF hospitalizations was observed after the 2023 Türkiye Earthquake, underscoring the strong association between disaster-related stress and atrial arrhythmogenesis.

Although VT admissions showed a numerical rise, the difference did not reach statistical significance, suggesting a differential susceptibility of atrial versus ventricular arrhythmias to acute stress.

The shorter length of hospital stay and reduced use of interventional procedures post-earthquake reflect the strain on healthcare systems and the need for adaptive clinical management strategies during disaster response.

Statement of ethics

Ethical approval for this study was obtained from the Ethics Committee of a tertiary care hospital (Decision No: 2436, dated April 6, 2023). The study was conducted in accordance with the principles of the Declaration of Helsinki.

genAI

No artificial intelligence-based tools or generative AI technologies were used in this study. The entire content of the manuscript was originally prepared, reviewed, and approved by both authors.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of interest statement

The authors declare that they have no conflict of interest.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Author contributions

AY: Conceptualization, Methodology, Formal analysis, Writing, Investigation, Visualization, Project administration, Supervision. MC: Data curation, Formal analysis, Writing. ET: Methodology, Conceptualization. HH: Formal analysis, Data Curation. AEC: Methodology, Data Curation. ATS: Data Curation, Formal analysis, Conceptualization, Writing. AOD: Conceptualization, Methodology, Writing, Methodology. The corresponding author guarantees the reliability and impartiality of all data presented and their interpretations discussed. All authors read and approved the final manuscript. All authors read and approved the final manuscript.

References

1.Dakhil ZA, Farhan HA, Faraz F, Skuk MR, Al-Jorani MS, Rehman MEU, et al. Impact of earthquake on cardiovascular health: what should cardiovascular healthcare providers anticipate after the devastating earthquakes in Turkey and Syria? Current Problems in Cardiology. 2023;48(9):101800. [Crossref]
2.Kloner RA. Lessons learned about stress and the heart after major earthquakes. American Heart Journal. 2019;215:20-26. [Crossref]
3.Babaie J, Naghipour B, Faridaalaee G. Cardiovascular diseases in natural disasters; a systematic review. Archives of Academic Emergency Medicine. 2021;9(1):e36.
4.Ranjbar F, Akbarzadeh F, Kazemi B, Ranjbar A, Namin SS, Sadeghi-Bazargani H. Increased likelihood of arrhythmic events associated with increased anxiety in patients with implanted cardiac defibrillators after the Ahar-Varzegan Earthquake in East Azarbaijan, 2012. Bulletin of Emergency & Trauma. 2016;4(4):202.
5.Thorpe H. Natural disaster arrhythmia and action sports: The case of the Christchurch earthquake. International Review for the Sociology of Sport. 2015;50(3):301-325. [Crossref]

6.Chan C, Daly M, Melton I, Crozier I. Two major earthquakes in Christchurch were not associated with increased ventricular arrhythmias: Analysis of implanted defibrillator diagnostics. PLoS ONE. 2019;14(5):e0216521. [Crossref]
7.Nakano M, Kondo M, Wakayama Y, Kawana A, Hasebe Y, Shafee MA, et al. Increased incidence of tachyarrhythmias and heart failure hospitalization in patients with implanted cardiac devices after the great East Japan earthquake disaster. Circulation Journal. 2012;76(5):1283-1285. [Crossref]
8.Suzuki H, Ohira T, Takeishi Y, Hosoya M, Yasumura S, Satoh H, et al. Increased prevalence of atrial fibrillation after the Great East Japan Earthquake: results from the Fukushima Health Management Survey. International Journal of Cardiology. 2015;198:102-105. [Crossref]
9.Leor J, Poole WK, Kloner RA. Sudden cardiac death triggered by an earthquake. New England Journal of Medicine. 1996;334(7):413-419. [Crossref]
10.Akkuş O, Yasdıbaş R, Demirkıran RF, Elitaş V, Bekler Ö, Şen F, et al. Changes in acute coronary syndrome clinic after the devastating earthquake in Türkiye. Anatolian Journal of Cardiology. 2024;28(9):446. [Crossref]
11.Lang RM, Badano LP, Mor-Avi V, Afilalo J, Armstrong A, Ernande L, et al. Recommendations for cardiac chamber quantification by echocardiography in adults: an update from the American Society of Echocardiography and the European Association of Cardiovascular Imaging. European Heart Journal Cardiovascular Imaging. 2015;16(3):233-271. [Crossref]
12.Hahn RT, Saric M, Faletra FF, Garg R, Gillam LD, Horton K, et al. Recommended standards for the performance of transesophageal echocardiographic screening for structural heart intervention: from the American Society of Echocardiography. Journal of the American Society of Echocardiography. 2022;35(1):1-76. [Crossref]
13.Aoki T, Fukumoto Y, Yasuda S, Sakata Y, Ito K, Takahashi J, et al. The great East Japan earthquake disaster and cardiovascular diseases. European Heart Journal. 2012;33(22):2796-2803. [Crossref]
14.Tamaki K, Koshiyama M, Ohta M, Ohsawa M. Prevalence rates of atrial fibrillation tentatively increased during and after the Great East Japan earthquake. European Heart Journal. 2017;38(suppl_1):P4610. [Crossref]
15.İlhan B, Berikol GB, Eroğlu O, Deniz T. Prevalence and associated risk factors of post-traumatic stress disorder among survivors of the 2023 Turkey earthquake. The American Journal of Emergency Medicine. 2023;72:39-43. [Crossref]
16.Takahashi J, Satoh K, Fukuda K, Sugimura K, Matsumoto Y, Nakano M, et al. Overview of the 80th Annual Scientific Meeting of the Japanese Circulation Society–The Past, Present and Future of Cardiovascular Medicine in Japan–The 5th Anniversary of the Great East Japan Earthquake. Circulation Journal. 2016;80(8):1689-1694. [Crossref]
17.Akkuş O, Yasdıbaş R, Binokay H. Impact of the earthquake disaster in Türkiye on the use of cardiac implantable electronic devices and clinical presentation of patients. Cukurova Medical Journal. 2024;49(4):985-995. [Crossref]
18.Andrássy G, Szabo A, Ferencz G, Trummer Z, Simon E, Tahy Á. Mental stress may induce QT-interval prolongation and T-wave notching. Annals of Noninvasive Electrocardiology. 2007;12(3):251-259. [Crossref]
19.Lecca LI, Portoghese I, Mucci N, Galletta M, Meloni F, Pilia I, et al. Association between work-related stress and QT prolongation in male workers. International Journal of Environmental Research and Public Health. 2019;16(23):4781. [Crossref]
20.Tsuchida M, Kawashiri MA, Teramoto R, Takata M, Sakata K, Omi W, et al. Impact of severe earthquake on the occurrence of acute coronary syndrome and stroke in a rural area of Japan experience from the Noto Peninsula earthquake. Circulation Journal. 2009;73(7):1243-1247. [Crossref]
21.Zhang XQ, Chen M, Yang Q, Di Yan S, Huang DJ. Effect of the Wenchuan earthquake in China on hemodynamically unstable ventricular tachyarrhythmia in hospitalized patients. The American Journal of Cardiology. 2009;103(7):994-997. [Crossref]
22.Nakagawa I, Nakamura K, Oyama M, Yamazaki O, Ishigami K, Tsuchiya Y, et al. Long-term effects of the Niigata-Chuetsu earthquake in Japan on acute myocardial infarction mortality: an analysis of death certificate data. Heart. 2009;95(24). [Crossref]
23.Kitamura T, Kiyohara K, Iwami T. The great east Japan earthquake and out-of-hospital cardiac arrest. New England Journal of Medicine. 2013;369(22):2165-2166. [Crossref]