Cardiac emergencies in the emergency department after the 2020 earthquake – Croatian experiences

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Introduction: In 2020 Croatia was stuck with two major earthquakes: on March 22nd with epicenter 7 km north of Zagreb city centre and on 29th December with epicenter 5 km south of city of Petrinja (5.5 and 6.2 degrees on the Richter scale respectively). The authors sought to investigate whether these events had an influence on characteristics and number of patients with cardiac chief complaints examined in the Emergency Departments (ED)[1,2].

Patients and Methods: Data on all emergency visits of patients with cardiac chief complaint examined in two University Hospital Centres (UHC) (Sestre Milosrdnice UHC, Zagreb and Zagreb UHC, Zagreb), two University Hospitals (UH) ("Sveti Duh UH, Zagreb and "Merkur" UH, Zagreb) and two regional hospitals (Sisak General Hospital, Sisak and Karlovac General Hospital, Karlovac) examined 7 days prior to earthquake, on the day of each earthquake, and during subsequent 6 days were collected.

Results: In the examined period, there were 5575 ED visits (average age 66 years, female gender 45%), out of which in 1251 (22.4%) cases the chief complaint was cardiac. While in all patients seen after the earthquake only more often primary cardiac diagnosis found was non-anginal chest discomfort (28.8% vs 18.0%; p<0.001), when narrowed down the patients group to only the ones who were located within the 20 kilometers from the epicenter we found that there was significantly more patients with acute myocardial infarction (14.5% vs 22.8%; p= 0.028), acute elevation of blood pressure (10% vs 21.8%, p= 0.001), as well as more paroxysmal arrhythmias treated with electrocardioversion (0.9% vs 4.5%, p=0.022) (**Table 1**).

Conclusion: In this study, increment in the frequency of cardiac emergencies was detected after a moderate earthquake in patients who were within 20 kilometers of the epicenter. They had significantly more often acute myocardial infarction, acute elevation of blood pressure, as well as paroxysmal arrhythmias treated with electrocardioversion. The health system should be prepared to treat a larger number of cardiac patients in difficult conditions after the earthquake.

LITERATURE

1. Bazoukis G, Tse G, Naka KK, Kalfakakou V, Vlachos K, Saplaouras A, et al. Impact of major earthquakes on the incidence of acute coronary syndromes - A systematic review of the literature. Hellenic J Cardiol. 2018 Sep-Oct;59(5):262-267. https://doi.org/10.1016/j.hjc.2018.05.005
2. Seizmološka služba pri geofizičkom odsjeku PMF-a. Izvješća o potresima. [Internet]. Available from: https://www.pmf.unizg.hr/geof/seizmoloska_sluzba/izvjesca_o_potresima

TABLE 1. Comparison of patients examined at the emergency department prior to the earthquake and on the day or on days following the earthquake.

	Total population			Within 20 km of epicentre		
	prior to EQ	on the day or after the EQ	P	prior to EQ	on the day or after the EQ	P
	Count (%)	Count (%)		Count (%)	Count (%)	
Age	72 (65-80)	68 (59-79)	<0.001	71 (59-80)	66 (57-76)	0.004
Female gender	283 (46.9%)	277 (42.9%)	0.158	108 (48.9%)	76 (37.6%)	0.020
Medical history:						
- Hypertension	475 (78.9%)	407 (63.4%)	<0.001	182 (82.4%)	147 (72.8%)	0.018
- Dyslipiedmia	247 (41.2%)	210 (32.9%)	0.002	97 (43.9%)	87 (43.1%)	0.865
- Diabetes	120 (20.0%)	109 (17.1%)	0.182	48 (21.8%)	44 (21.9%)	0.986
- Active smoking	125 (23.4%)	148 (25.9%)	0.333	46 (23.0%)	58 (32.6%)	0.037
- Previous CAD	258 (42.8%)	210 (32.9%)	<0.001	110 (49.8%)	78 (38.6%)	0.021
Admission	251 (41.7%)	223 (34.6%)	0.010	89 (40.5%)	83 (41.1%)	0.895
Time in ED	4 (2-7.25)	4 (1.5-8)	0.066	4 (2-6)	4 (2.15-8)	0.099
Hospital stay	5 (3-9)	5 (3-7)	0.195	4 (2-6)	4 (2-7)	0.448
Non-anginal chest discomfort	109 (18.0%)	186 (28.8%)	<0.001	27 (12.2%)	19. (9.4%)	0.354
Main diagnosis						
- Myocardial infarction	100 (16.6%)	89 (13.8%)	0.170	32 (14.5%)	46 (22.8%)	0.028
- Unstable angina	32 (5.3%)	12 (1.9%)	0.001	14 (6.3%)	5 (2.5%)	0.056
- Decompensated HF	117 (19.4%)	60 (9.3%)	<0.001	53 (24.0%)	22 (10.9%)	<0.001
- Arrhythmia	114 (18.9%)	95 (14.7%)	0.048	47 (21.3%)	34 (16.8%)	0.247
- Hypertension	117 (19.4%)	90 (13.9%)	0.010	22 (10.0%)	44 (21.8%)	0.001
Coronary angiography only	5 (0.8%)	9 (1.4%)	0.341	1 (0.5%)	2 (1.0%)	0.510
PCI	80 (13.2%)	74 (11.5%)	0.341	28 (12.7%)	35 (17.3%)	0.179
Electrical cardioversion	10 (1.7%)	13 (2.0%)	0.636	2 (0.9%)	9 (4.5%)	0.022
Mechanical ventilation	12 (2.0%)	9 (1.4%)	0.417	5 (2.3%)	2 (1.0%)	0.306
CPR	11 (1.8%)	9 (1.4%)	0.549	4 (1.8%)	3 (1.5%)	0.794
Inhospital mortality	19 (3.2%)	13 (2.0%)	0.201	6 (2.7%)	5 (2.5%)	0.877

EQ = earthquake; CAD = coronary artery disease; ED = emergency department; HF = heart failure; PCI = percutaneous coronary intervention; CPR = cardiopulmonary resuscitation