127. Prognostic Factor For Cardiac Dysfunction in Patients With Heat Stroke

Moon-Seung Soh, Jin-Sun Park, Joon-Han Shin, Department of Cardiology, Ajou University School of Medicine, Suwon, Republic of Korea

Body

Background: Heat stroke is defined by failure of thermoregulation and central nervous abnormalities as a result of high core body temperature. The cardiovascular system is also a vital target organ of heat stroke, and the prediction for cardiovascular dysfunction is very important. We aimed to find out the prognostic value of numerous factors and scoring system for predicting cardiac function in patients with heat stroke.

Methods: We analyzed the data and clinical outcomes of the patients with heat stroke who were admitted through the emergency room from 2017 to 2021. APACHE (Acute Physiology and Chronic Health Evaluation) score was calculated by PaO2, body temperature, mean arterial pressure, blood pH, heart rate, respiratory rate, serum sodium, potassium, creatinine, hematocrit, white blood cell count, and Glasgow Coma Scale on admission.

Results: We enrolled 36 patients (64 ± 20 year-old, 27 males). The median of APACHE score was 15.5 and patients were classified into a high-APACHE score group and low-APACHE score group by median. Left ventricle (LV) fractional shortening was lower in the high-APACHE score group and LV ejection fraction also showed lower tendency in the high-APACHE score group (table 1, p=0.039; 0.057). The rate of patients treated with mechanical ventilation was higher in high-APACHE score group.

Conclusion: Echocardiography should be recommended for evaluating LV function in heat stroke patients with high APCHE score.

Table 1. Comparison of echocardiographic characteristics and clinical demographics between low-APACHE score and high-APACHE score group

	Characteristics	All patients (n=36)	Low-APACHE II (n=18)	High-APACHE II (n=18)	P value
Clinical characteristic	Male (n(%))	27(75.0%)	13(72.2%)	14(77.8%)	1.000
	Age (year-old)	64±20	63.7±23.8	64.4±17.6	0.624
	BMI (kg/m^2)	23.1±3.5	22.1±3.6	24.1±3.3	0.086
Medical history	Hypertension n(%)	17(47.2%)	7(38.9%)	10(55.6%)	0.317
	Diabetes Mellitus n(%)	8(22.2%)	2(11.1%)	6(33.3%)	0.228
	Previous CVA n(%)	5(13.9%)	3(16.7%)	2(11.1%)	1.000
	Familial history n(%)	5(13.9%)	2(11.1%)	3(16.7%)	1.000
	Smoking n(%)	7(19.4%)	4(22.2%)	3(16.7%)	1.000
	Alcohol n(%)	9(25.0%)	5(27.8%)	4(22.2%)	1.000
Vital Sign	Initial BT (℃)	40.0±0.5	39.7±2.2	40.3±1.0	0.657
	Systolic BP (mmHg)	120.4±33.0	124.7±28.1	116.2±37.4	0.449
	Diastolic BP (mmHg)	69.3±19.1	72.7±14.7	65.9±22.7	0.295
	Heart rate	113.7±28.2	104.8±22.7	122.6±29.1	0.057
	GCS	9.6±3.6	11.8±2.1	7.4±3.6	<0.001
	APACHE II score	16.2±7.1	10.9±3.7	21.9±4.8	<0.001
EKG	EKG abnormality n(%)	18(50.0%)	9(50.0%)	9(50.0%)	1.000
	Corrected QT	463.0±50.6	454.3±58.8	471.7±40.6	0.307
Echocardiographic findings	LV ejection fraction (%)	59.9±13.4	63.2±14.6	56.6±11.5	0.057
	WMSI	1.13±0.30	1.08±0.25	1.18±0.33	0.225
	RWMAs n(%)	8(22.2%)	3(16.7%)	5(27.8%)	0.691
	LV fractional shortening (%)	34.7±9.2	37.2±9.2	32.3±8.7	0.039
	LV EDD (mm)	48.3±7.9	48.3±8.3	48.2±7.8	0.739
	LV ESD (mm)	32.0±9.9	30.8±10.8	33.1±9.0	0.117
	Left atrium diameter (mm)	39.2±7.0	39.4±5.8	38.9±8.2	0.815
	Aorta diameter (mm)	34.2±4.3	32.7±4.8	35.7±3.4	0.036
	IVS diastole (mm)	10.1±1.7	10.2±2.3	9.9±1.1	0.793
	IVS systole (mm)	13.8±2.2	13.8±2.3	13.7±2.1	0.859
	PW diastole (mm)	9.7±1.5	10.0±1.9	9.4±1.0	0.357
	PW systole (mm)	14.3±1.9	14.6±2.0	14.1±1.9	0.395
	LV mass (g)	172.2±62.8	180.0±81.8	164.4±35.8	0.752
	Pericardial effusion, n(%)	4(11.1%)	2(11.1%)	2(11.1%)	1.000
	Global strain (%)	-15.7±5.5	-16.1±5.5	-14.8±6.4	0.720
Lab	Cr	1.5±0.5	1.3±0.4	1.6±0.5	0.046
	CK	622.5±986.3	561.4±855.9	683.6±1123.5	0.448
	CK-MB	6.3±11.1	6.5±7.8	6.0±13.9	0.071
	Troponin I	2.2±6.2	3.2±8.5	1.1±2.1	0.825
	CRP	0.50±0.81	0.53±0.82	0.46±0.82	0.692
	Lactate	2.95±1.73	2.2±1.2	3.7±1.9	0.007
	WBC	11.8±7.1	14.0±6.7	9.6±7.1	0.010
	Hb	13.0±1.8	13.0±1.8	13.0±1.8	0.956
	Platelet	178.4±55.3	189.1±61.4	167.7±47.7	0.457
	ESR	9.8±10.0	11.4±11.2	8.2±8.7	0.563
	pH	7.41±0.08	7.41±0.05	7.41±0.10	0.580
	Base excess	-4.7±3.5	-4.0±3.3	-5.5±3.6	0.190
Clinical outcome	Ventilator, n(%)	15(41.7%)	3(16.7%)	12(66.7%)	0.002
	CRRT, n(%)	4(11.1%)	0(0.0%)	4(11.1%)	0.104

BMI, body mass index; CVA, cerebrovascular accident; BT, body temperature; BP, blood pressure; GCS, Glasgow Coma Scale; EKG, electrocardiogram; WMSI, wall motion score index; RWMAs, regional wall motion abnormalities; EDD, end-diastolic diameter; ESD, end-systolic diameter; IVS, interventricular septum; PW, posterior wall

Clinical Implications: My study will help enable cardiovascular clinicians to know about the prognostic factor for cardiac dysfunction in patients with heat stroke.