

# Association between left ventricular function and cardiac circulating biomarkers in a rat model of cardiac arrest

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Argomento: Trauma e arresto cardiaco

**Background.** After successful Cardiopulmonary resuscitation (CPR), 70% of patients die before hospital discharge mainly because of post-resuscitation myocardial and cerebral dysfunction. Scarce data from clinical and experimental studies are available regarding their evolution. In order to better characterize how acute post-resuscitation (PR) myocardial dysfunction evolves, changes in left ventricular (LV) function and in circulating cardiac biomarkers at two different time points were assessed in a rat model of cardiac arrest (CA).

**Methods.** Forty-eight rats were randomized in three study groups: GROUP I (n=8), healthy rats; GROUP II (n=15), rats studied at 3 and 72 hours PR; GROUP III (n=15), rats studied at 4 and 96 hours PR. Eight min of untreated ventricular fibrillation were followed by 8 min of CPR. Echocardiographic parameters and plasma high sensitivity-cardiac Troponin-T (hs-cTnT) and N-terminal proatrial natriuretic peptide (NT-proANP) concentrations were assessed.

**Results.** 72 and 96 hours PR survival was respectively 80% and 66.7%. Between 3 and 4 hours PR, no differences were observed in known LV dilatation, LV ejection fraction (EF) impairment and LV diastolic borderline dysfunction (Table). At 72 and 96 h PR LV dimensions and systolic function (SysF) normalized. This normalization was not observed in the peak systolic septal annular velocity ( $s'$ ); while from 3 to 72 h (GROUP II) it increased of  $3\pm 10\%$ , a  $+76\pm 24\%$  was observed at 96 h PR (GROUP III),  $p < 0.05$ . Mean  $E/e'$  increased of  $23\pm 22\%$  at 72 h, instead it decreased of  $6\pm 12\%$  at 96 h PR,  $p > 0.05$ . While from 3 to 72 h PR hs-cTnT decreased in median 95%, NT-proANP decreased in median 56% at 96 h PR.

**Conclusions.** A proposed more sensible echocardiographic parameter than LVEF,  $s'$  wave velocity, showed that the highest improvement in SysF was observed at 96 h accordingly to a reduction in the increased NT-proANP levels at the same time point.

	<b>GROUP I</b>	<b>GROUP II</b>		<b>GROUP III</b>	
	<i>n</i> =8	<i>n</i> =15		<i>n</i> =15	
		<i>PR 3 h</i>	<i>PR 72 h</i>	<i>PR 4 h</i>	<i>PR 96 h</i>
<b>LVEF, %</b>	79.2 ± 2.0	35.0 ± 3.3	74.2 ± 2.4	33.6 ± 3.6	75.1 ± 3.2
<b>s', cm/sec</b>	7.2 ± 0.4	4.2 ± 0.3	4.4 ± 0.3	3.1 ± 0.2	5.1 ± 0.6
<b>Mean E/e'</b>	11.6 ± 0.4	14.6 ± 1.2	16.8 ± 1.5	15.8 ± 1.0	14.7 ± 1.8
<b>hs-cTnT, ng/L</b>	44.0 [26.0-64.0]	5247.0 [4529.0-7049.0]	220.0 [54.1.0-704.6.0]	5995.0 [4389.0-10000]	64.0 [49.2-95.1]
<b>NT-proANP, nmol/L</b>	0.8 [0.6-1.0]	2.8 [1.7-4.6]	4.6 [1.2-6.8]	6.3 [3.3-8.1]	2.1 [1.5-5.5]