

Assessment of the quality of chest compressions in healthcare professionals

Artem Kuzovlev^{1,2}, Viktor Moroz^{1,2}, Arkady Golubev^{1,2},
Sergey Abdusalamov², Kirill Kurznichev², Evgeny Tishkov³

¹Federal Research and Clinical Center of Intensive Care Medicine and Rehabilitation, Moscow, Russia

²Russian National Resuscitation Council, Moscow, Russia

³A.I. Evdokimov Moscow medical dental university, Moscow, Russia



HCP

НАЦИОНАЛЬНЫЙ СОВЕТ
ПО РЕАНИМАЦИИ



- **Immediate and high-quality chest compressions (CC)** make the background of in-hospital cardiopulmonary resuscitation.
- **None of the studies** on feedback or prompt devices has demonstrated improved survival to discharge with feedback [ERC guidelines 2015].
- The use of CPR feedback or prompt devices during CPR should only be considered as **part of a broader system of care** that should include comprehensive CPR quality improvement initiatives, rather than as an isolated intervention [ERC guidelines 2015].

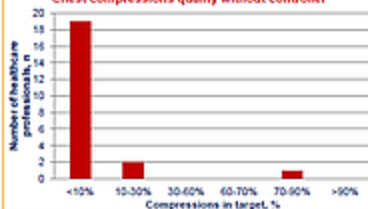
The aim of the study was to assess the quality of chest compressions in healthcare providers in the multidisciplinary hospital.

- The study was performed in a multifield hospital in Moscow, in 2016-2017.
- 42 healthcare professional were enrolled.
- Chest compressions were assessed in 2 steps by means of CPR-challenge tool: 2 mins of CC without feedback then 2 mins of CC with feedback on rate, depth and recoil
- The ERC Guidelines for Resuscitation 2015 were used as reference criteria for CC quality.
- The analysis was performed using the ZOLL RescuNet Code ReviewAR software.
- Statistical analysis was performed using the Statistica 7.0 software (Mann-Whitney U-test). The data were presented as a mean, median \pm 25–75 percentiles (25–75 IQR), minimum and maximum values. The difference was considered significant at $P < 0.05$.

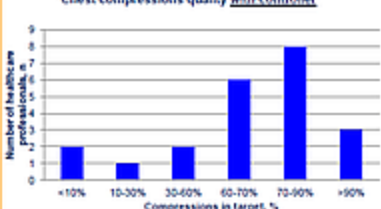


- **Without feedback device** the percentage of CC in target (with correct rate, depth and recoil) was $5,4 \pm 18,3\%$ in 86% of healthcare providers.
- **With feedback device** the percentage of CC in target was $68,3 \pm 27,4\%$ ($p = 0,000$).

Chest compressions quality without controller



Chest compressions quality with controller



Healthcare providers have low background CC skills which improve when feedback devices are used.
Regular simulation training and retraining is required.

ASSOCIATION OF BRAIN-DERIVED NEUROTROPHIC FACTOR (BDNF) PROTEIN EXPRESSION WITH THE NEURONAL DEATH IN THE POSTRESUSCITATIVE PERIOD

Avrushchenko M.Sh., Kuzovlev A.N., Ostrova I.V.

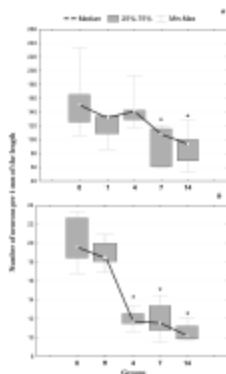
V. A. Negovsky Research Institute of General Reanimatology,

Federal Research and Clinical Center of Intensive Care Medicine and Rehabilitology, Moscow, Russia

- Endogenous neuroprotective factors play an important role in the brain recovery after ischemia-reperfusion.
- BDNF is currently considering as the key mediator of neuronal survival and recovery.

The aim of the study was to evaluate expression level of BDNF and its association with the postresuscitative neuronal death in highly hypoxia-sensitive brain regions.

Fig. 1. Dynamics of changes in the total density of pyramidal cells of the hippocampus (a) and Purkinje cells (b) postresuscitation. a: * - $P < 0,05$ versus control; b: * - $P < 0,025$ versus control.



- Cardiac arrest in adult albino male rats was evoked by intrathoracic clamping of cardiac vascular bundle for 10 min.
- The hippocampus (pyramidal neurons) and cerebellum (Purkinje cells) were analyzed.
- The expression of BDNF protein was immunohistochemically determined by peroxidase-antiperoxidase method using polyclonal antibodies to BDNF.
- The level of BDNF expression in the neuron's cytoplasm was assessed using ImageJ 1.48v.
- A number of neurons with different BDNF expression as well as a total number of neurons were evaluated on the 1, 4, 7, and 14th days after resuscitation.
- Statistical data processing was performed using Statistica 7.0. The significance of differences was assessed by Student's *t*-test, Mann-Whitney test, Kolmogorov-Smirnov test.

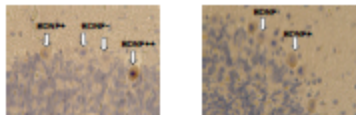
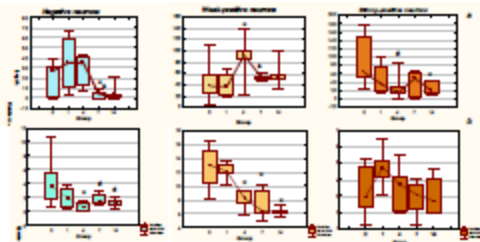


Fig. 2. The change in the number of neurons with different levels of BDNF expression in the pyramidal cells of the hippocampus (a) and Purkinje cell population (b) in postresuscitative period. * - $P < 0,05$; # - $P < 0,05$; † - $P < 0,05$ versus 4th day



- Decrease in the overall density of neurons in the hippocampus (a) - by day 7, in the cerebellum (b) - by day 4 after resuscitation

- In both neuronal populations at the stage of neuronal loss only BDNF-negative and BDNF-weak-positive neurons died.

The activation of BDNF expression contributes to preventing the postresuscitative neuronal loss. These facts confirm linking of BDNF expression and resistance of neurons to death after ischemia-reperfusion.