

SSEP N20 amplitude as an early predictor of neurological outcome in cardiac arrest survivors treated with therapeutic hypothermia

Erik Roman-Pognuz^{1,2}, Barbara Penolazzi², Walter Gerbino², Paolo Manganotti³, Fabrizio Monti³ and Giorgio Berlot¹

¹Intensive care Unit, University Hospital of Trieste, Italy; ²Psychology Unit “Gaetano Kanizsa”, Department of Life Sciences, University of Trieste, Italy; ³Department of Neurology, university Hospital of Trieste, Italy.

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Prognostication after cardiac arrest and target temperature management (TTM) is challenging. A multimodal approach including somatosensory evoked potentials (SSEPs) has been proposed. Early positive predictors of neurological recovery are lacking. The aim of the study was to determine the association between N20 waveform amplitude of SSEPs and good neurological outcome in comatose cardiac arrest survivors.

We retrospectively investigated patients admitted to the intensive care after in-hospital or out-of-hospital cardiac arrest between January 2007 and January 2015 and treated with therapeutic hypothermia (TH). SSEPs were recorded at restoration of normothermia after TH treatment. SSEP N20 amplitude was defined pragmatically as the highest short-latency amplitude of 6 cortical recordings (3 per side, CP3/CP4 vs Fz) at least 4.5 ms after the spinal SSEP. Neurological outcome, assessed by the Cerebral Performance Category (CPC), was evaluated at 6 months. CPC 1–2 was defined as good, CPC 3–5 as poor outcome.

A total of 108 consecutive cardiac arrest patients were included. Recordings were incomplete in 16 patients (14.8%). Cervical SSEPs were not reproducible in 2 patients (1.85%). Noise level of 0.25 mV impeded reliable amplitude determination in 3 patients (2.7%). Thus, SSEPs were determined in 92 patients. Of these, 56 patients (52%) had a good and 52 (48%) a poor outcome. N20 waveform was bilaterally present in 43 (100%) and monilaterally in 31 (65%) patients with respectively good and poor neurological outcomes. Median amplitude was 1.12 μ V (IQR 0.7-2.1) in patients with good recovery versus 0.28 μ V (IQR 0.0-0.7) in those with poor neurological outcome ($p < 0.01$). The N20 amplitude was significantly associated with neurological outcome after univariate logistic regression analysis (OR 2.73 (95% CI 1.54-4.83), $p < 0.01$) and multivariate analysis (OR 2.05 (1.08-3.86), $p < 0.05$).

The N20 waveform amplitude may hold potential in predicting the neurological outcome in comatose patients resuscitated from cardiac arrest and treated with TTM