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Letter to the Editor

‘Reply to: It was not true under therapeutic hypothermia’[☆]

We acknowledge that, as the colleagues point out, targeted temperature management (TTM) and concomitant sedation may alter the electroencephalogram (EEG) in comatose patients after cardiac arrest. In particular, sedation can diminish the EEG amplitude and modify the EEG component frequencies.¹ In addition, TTM and sedation may of course interfere with patients’ neurological examination, especially so during neuromuscular blocker agents regime.

Yet, we feel it is important to point out that these considerations do not affect the reliability of EEG-based prognostic prediction during TTM and sedation. First, in our study the average spectral power in theta and alpha frequency was highly specific in patients with persistent unfavorable outcome, irrespective of the sedative medication dosage (table 2 in²). Second, our work adds to previous evidence that early EEG during TTM and sedation is a robust predictor of patients’ outcome, with possibly even higher accuracy than at later stages,^{3–5} and that sedative medications do not adversely affect the EEG’s predictive value.^{1,6} In addition, to our knowledge neuromuscular blockade does not exert any meaningful effect on the EEG signal and – if anything – would decrease the impact of muscle-related artifacts and thus increase the signal-to-noise ratio.

An in-depth neurophysiological explanation of these experimental findings requires further research aimed at disentangling the effect of time from that of the medical intervention during the first day of coma, and at uncovering the degree of interaction between effect of sedation and patients’ outcome. In the context of our study, the inclusion of patients from multiple hospitals with potentially different treatment protocols reduces the risk of confounding factors modulating the alpha band activity in relation to one specific regimen. One possible neurophysiological explanation for the high specificity of low power spectra values for unfavorable outcome could be based on the sedative effect on neural activity of corticothalamic networks underlying the generation of EEG in the alpha band. If this interpretation would prove correct, the sedative medication would act as a probe of this network, whose preservation may represent a possible minimal condition for patients to survive. In clinical practice,

implementation of early quantitative prognostic markers can be highly relevant, as they may guide and encourage timely and personalized clinical interventions to increase chances of awakening and early recovery.

Conflict of interest statement

The authors declare no conflict of interest.

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