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Influence of radiofrequency electromagnetic fields exposure on sleep patterns in preterm neonates

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Abstract

Purpose

The study objective was to assess the influence of radiofrequency electromagnetic fields (RF-EMF) exposure on sleep patterns in preterm newborns. We hypothesized that an increase in RF-EMF exposure levels would alter infants' sleep structure parameters.

Materials and methods

Individual, continuous measurements of RF-EMF levels were performed in 29 hospitalized preterm newborns throughout the first 21 days after birth. The last day, overnight sleep structure was recorded by polysomnography. Relationships between both chronic (three-week period) and acute (polysomnographic period) RF-EMF levels with sleep parameters were computed.

Results

At median levels, the main chronic effect was an increase in indeterminate sleep with RF-EMF exposure. At the highest exposure levels found in our study, an increase in RF-EMF levels increased sleep fragmentation. No significant relationship was found between acute RF-EMF levels and sleep parameters.

Conclusions

Despite no consolidated disruption in sleep structure, this study is the first to show that some sleep parameters seem to have a certain sensitivity to chronic – but not acute – RF-EMF exposure in preterm newborns. Further studies are needed to confirm our results and examine possible mid- to long-term, sleep-related cardiorespiratory and neurodevelopmental outcomes.

Keywords:

Pediatric **polysomnography** **electrophysiological recordings**

radiofrequencies **new-born**

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Author contributions

Dimitri Besset: methodology, software, formal analysis, investigation, and writing – original draft; Brahim Selmaoui: methodology, validation, and writing – review and editing; Stéphane Delanaud: methodology, software

resources, and writing – review and editing; Lisa Bessarion: investigation; Karen Chardon: methodology, validation, data curation, and writing; René de Seze: methodology, software, validation, and writing – review and editing; André Leke: methodology and writing – review and editing; Erwan Stephan-Blanchard: conceptualization, methodology, validation, data curation – writing – review and editing, and project administration.

Ethical approval

The study was approved by an independent institutional review board (*CPP Sud-Est III*; reference: RCB18.10.12.31915) and was performed in accordance with the principles of the Declaration of Helsinki Participation of human subjects and did not occur until informed consent was obtained.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Additional information

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Stéphane Delanaud is experimental techniques engineer in the peritox UMR-I-01 laboratory. He brings his expertise in the implementation of material resources for research protocols in the fields of measuring physical parameters (electromagnetic field) and human physiology (electroencephalogram, respiratory, cardiac).

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