A home based trial on multimodal nocturnal seizure detection in children: interim results of the PROMISE study.

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Background:

Home-based seizure detection device (SDD) studies addressing the implementability and the effects of SDDs on quality of life (QoL) are still lacking. The PROMISE study aims to address this knowledge gap. In a previous study we demonstrated good performance of the NightWatch, a wearable multimodal (heart rate & accelerometry) SDD, in adults in a residential care setting.[1] We here present the interim results of the implementation of the Nightwatch in a family home setting.

Material and Methods:

This prospective multicenter intervention study included children aged 4-16 years with ≥1 major nocturnal motor seizure per week. A two-month period of nocturnal NightWatch implementation was compared to a preceding two-month baseline period using questionnaires on feasibility, caregiver's stress (Caregiver strain Index (CSI)), sleep (Pittsburgh Sleep Quality Index (PSCI)) and QoL (EQ-5D-5L). The performance of NightWatch was assessed by analyzing video tracings of all possible seizures (seizure diaries and NightWatch alarms) and 5% of all nights were screened to identify possible missed seizures. We classified tonic-clonic, generalized tonic >30 seconds, hyperkinetic and others, including clusters >30 minutes as 'major seizures'.

Results and Conclusions:

This interim analysis on ten children (median age 8 years, range 5-16) included 562 recorded nights and 272 major seizures (median number of seizures per participant: 1). NightWatch detected all major seizures (sensitivity 100%) with a median false alarm rate of 0.20 per participant per night (range 0.09-3.83). After implementation of NightWatch, the CSI indicated reduced stress levels in 67% of caregivers. Subjective health scores improved by 10% (EQ-5D-5L) while the PSQI showed no considerable changes. NightWatch scored high on implementability and was evaluated as an easy-to-use device.

1. Arends J et al. Multimodal nocturnal seizure detection in a residential care setting: A long-term prospective trial. Neurology. 2018;91(21):e2010-e2019.