EPILEPSY

Interictal epileptic activity and clinical correlations

Research questions
Is the quantity of interictal epileptic activity (IEA) in the EEG correlated to clinical items such as seizure frequency, cognition, and (future) effects of initiated treatments?
Can quantification of interictal epileptic activity therefore be of use in the daily practice of epilepsy care and in research?
Which quantification methods can be used for which patient groups, in daily practice and in research?

Summary
For this project, different methods of quantification of IEA are explored and used in published and ongoing projects. In patients with severe childhood epilepsies and high IEA frequency a correlation between seizure frequency and IEA index (measured by a automatic spike detector) was confirmed. We also found this correlation in children with cryptogenic localisation related epilepsy, using a global category scoring of the index of IEA. In children with epilepsy, a category score of IEDs >=10 % of the time (which means occurrence of >= 1 spike(-wave) on each 10-second EEG page), was correlated with impaired central information processing speed, short-term verbal memory and visual motor integration. In children with Rolandic epilepsy, a higher category of IED index was correlated to worse reading performance. At this moment we are collecting data and analysing the first results in a prospective observational study in children with highly frequent (multifocal IEDs called “PROVIA”(Prospectief vervolgen interictale activiteit). We examine if changes in IED index correlate to changes in cognition (especially central information processing speed and attention). Furthermore we are preparing a publication on IED changes 6 weeks after the introduction of the ketogenic diet. The selection of the right quantification methods and the analysis of the IED changes (especially for a reliable comparison of serial EEGs of individual patients) is a real challenge and this subject will also be discussed in a separate chapter of the future thesis.

Expected date of thesis defence:
end of 2014

Researchers:
Other contributors:
Team “Epilepsy, child and education”: H. den Boer, EEG-technologist, A. van der Does, research nurse

SLEEP MEDICINE

Psychosocial factors in insomnia

Aim
Chronic insomnia is thought to occur from an interplay between predisposing, precipitating and perpetuating factors. The current research focus aims to elucidate the contribution of psychological factors including personality, coping strategies and psychiatric comorbidity in the perpetuation of insomnia.

Summary
This study is based on a detailed longitudinal study in insomnia patients referred to our third line sleep medicine center. Three large groups of insomniacs were included at baseline: primary insomnia and insomnia with comorbid mood and anxiety disorders. Assessments were performed at baseline and repeated after a waiting list period of three months.

In the baseline analysis, a total of 152 patients were included. Strikingly, patients with comorbid anxiety disorders showed a less severe form of insomnia when compared to patients with comorbid depressive disorders. In addition, anxious patients scored higher on self-blame and rumination, while depressed patients scored higher on catastrophizing. In the longitudinal analysis, we found that low novelty seeking is predictive for depressive symptoms in psychophysiological insomniacs. Hypothetically, in psychophysiological insomniacs, behavioural aspects such as a lack of engaging in activities associated with positive reinforcement are most important in the development of depressive feelings.

Psychosocial predictors of treatment outcome were also determined in 60 patients who underwent cognitive behavioral treatment for insomnia. We found that the presence of a comorbid psychiatric disorder strongly predicts worse treatment results. Furthermore, an active problem-focused cognitive coping strategy was predictive for worse treatment results. Theoretically, insomniacs with a greater “refocus on planning” might be more prone to consciously trying to actively solve and ‘control’ sleep problems, leading to worse sleep.

Expected date of thesis defence:
end of 2013

Researchers:
drs. M. van de Laar, prof. dr. D. Pevernagie, dr. S. Overeem
Other contributors:
P. van Mierlo, research nurse
COLLABORATION PROJECT
with Eindhoven University of Technology

Development of a multimodal seizure detection instrument to improve out-of-hospital safety and disease management of epilepsy patients

Objective
To find an optimal combination of sensors and techniques to detect major nocturnal seizures in an extramural setting with high sensitivity and specificity.

Summary
Research focuses on: a) optimizing existing techniques and algorithms, especially related to motion sensing; b) optimizing sensitivity and specificity of the combined technology of heart rate, accelerometry, audiometry and video frame analysis in a large group of in-hospital patients using the gold standard of combined video-EEG; c) evaluation of the device in the extramural setting, based on technical feasibility, compliance, user experience and baseline comparison; and d) medical-ethical and cost-effectiveness issues around implementation models.

Status of project:
This multicentre project started in 2010. The in-hospital trial will be finished this year. The extramural trial will start at the end of 2013. The project will be completed at the end of 2015.

Researchers:
J. van Andel1, J. Arends1,2, M. Bakermans1, M. van Bussel1, H. van Dijk1, P. Griep1, Th. Gutter3, S. Kalytzin3, F. Jansen1, C. Roes4, F. Tan1, G. van Thiel4, G. Visser4, B. Vledder3, A. de Weerd3

Other contributors:
M. Ballieux5, M. de Groot5

1 Kempenhaaghe Heeze, 2 Eindhoven University of Technology, 3 Stichting Epilepsie Instellingen Nederland, 4 Universitair Medisch Centrum Utrecht, 5 Epilepsie Vereniging Nederland

This project is funded by ZONMW as ‘TOP subsidie’ (programme: New Instruments in Healthcare).

Ongoing PhD-projects

| Study on working memory in adolescents with autism in the Netherlands | Evalien Barendse, psychologist |
| Anti-epileptic drugs and osteoporosis: prevalence in a long-term facility care centre for people with epilepsy and intellectual disability | Kim Beerhorst, neurologist |
| Reduced integration of language and motor areas in Rolandic epilepsy | René Besseling, physician |
| Living environment of persons with severe epilepsy and intellectual disability | Willeke van Blarikom, psychologist |
| Psychogenic non-epileptic seizures: a separate disorder or part of a continuum | Nynke Bodde, clinical psychologist/psychotherapist |
| Adaptation and standardization of the Dutch version of the Wechsler Memory Scale – IV | Zita Bouman, psychologist |
| Imaging the brain: neuronal correlates of cognitive impairment in children with frontal lobe epilepsy | Hilde Braakman, neurologist |
| Magneto-encephalography and magnetic resonance imaging in the diagnostics of epilepsy | Albert Colon, neurologist |
| Intercital epileptic activity and clinical correlations | Saskia Ebus, neurologist |
| Cognitive side effects of AED treatment | Dominique Uff, psychologist |
| The cost-effectiveness of the ketogenic diet among children and adolescents with intractable epilepsy | Reina de Kinderen, health scientist |
| Vagus Nerve Stimulation in children | Sylvia Klinkenberg, child neurologist |
| Physiological characteristics of psychogenic non-epileptic seizures | Sylvia van der Kruis, neuroscientist |
| Psychosocial factors in insomnia: from insomnia phenotypes to predictors of depressive symptoms and cognitive behavioral treatment effect | Marijn van de Laar, health care psychologist, cognitive behavioral therapist |
| Self-Management support for epilepsy patients | Loes Leenen, nurse practitioner |
| Nocturnal movements in Parkinson’s disease | Maartje Louter, medical doctor |
| Time awareness and working memory in children with neurological learning disabilities: diagnostic and therapeutic implications | Janneke Peijnenborgh, psychologist |
| Non-invasive measurements of respiratory effort in adults and children | Nele Vandenbussche, pediatrist |
| Medication regimen after successful temporal lobe resection | Louis Wagner, neurologist |
| Clinical and molecular genetic aspects of monogenic idiopathic epilepsies | Sarah Weckhuysen, neurologist |

This project was funded by ZONMW as ‘TOP subsidie’ (programme: New Instruments in Healthcare).

PhD theses defended in 2012

| Inflammation & stimulation | Marlen Aalbers, medical student |
| Simultaneous EEG and functional MRI: a noninvasive tool in the presurgical evaluation of focal epilepsy | Petra van Houdt, biomedical engineer |
| Sleep disturbances and post-traumatic stress disorder; a perpetual circle? | Saskia van Liempt, medical doctor |
| Rolandic epilepsy, unraveling benign | Geke Overvliet, medical doctor |
| The graphity of cognitive problems in epilepsy | Maarten Vaessen, physician |
• Author Mv Vanbroekhoven P, Kienkens K, Janssen JF, Carrette E, Lazeron RH, Vonck KE, Boon PA, Langereis GR, Boon PA, de Munck JC. A framework to integrate

• Hofsmans J, van Brummelen PE, Van Rijckevorsel K, de Jonghe P, Hjalgrim H, Scheffer IE, Suls A. Reduction of seizure frequency after

• Reuber M, Aldenkamp AP, de Munck JC, Hofman PA, Kornum BR, Olesen WA, Hansson P, Hjalgrim H, Scheffer IE, Suls A. Modulation of sleep
quality in inpatients with chronic idiopathic epilepsy: a randomized controlled trial. Epilepsia 2013; 54(3): 486-94.

• Rottiers W, Vles JS, Cornips EM, Hofman PA, Backes WH, Jansen JF, Aldenkamp AP. Neurophysiological correlates of daytime sleepiness in patients

• De Munck JC, von Brummelen PE, Van Rijckevorsel K, de Jonghe P, Hjalgrim H, Scheffer IE, Suls A. Reduction of seizure frequency after

• Reuber M, Aldenkamp AP, de Munck JC, Hofman PA, Kornum BR, Olesen WA, Hansson P, Hjalgrim H, Scheffer IE, Suls A. Modulation of sleep
quality in inpatients with chronic idiopathic epilepsy: a randomized controlled trial. Epilepsia 2013; 54(3): 486-94.

• Rottiers W, Vles JS, Cornips EM, Hofman PA, Backes WH, Jansen JF, Aldenkamp AP. Neurophysiological correlates of daytime sleepiness in patients

• De Munck JC, von Brummelen PE, Van Rijckevorsel K, de Jonghe P, Hjalgrim H, Scheffer IE, Suls A. Reduction of seizure frequency after