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E596
COMPUTATIONAL INTELLIGENCE ALGORITHMS FOR SEIZURE PREDICTION

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Purpose: To develop computational intelligence algorithms for seizure prediction to embed in a transportable device to support refractory epileptic patients.

Method: Firstly a set of features is extracted from the EEG, measuring energy, time-frequency and nonlinear dynamic contents. These features are then used for classification of the brain state into four classes: inter-ictal, preictal, ictal, postictal. Two approaches from computational intelligence are applied: (1) artificial neural networks in the original 14 features space (several architectures are compared: feedforward, with and without memory, radial basis function, Elman), (2) multidimensional scaling to reduce the 14th dimensional space to 3-dimensional space where classification may be done in an easier way.

Results: The used data is from the Freiburg University Database (Germany) and from the Coimbra University Hospital Database (Portugal). It was impossible to find a solution for all cases from the point of view of both the sensitivity and the specificity criteria. If only one of these criteria is considered, then it is relatively simple to find several solutions. For each patient there exists an architecture with the potential of a good predictor, detecting the preictal period almost without false alarms, giving some optimistic perspective and leading to the concept of customization of the predictor system.

Conclusion: Seizure prediction systems must be personalized, finding a good algorithm for each patient. More extensive studies are needed but artificial neural networks and multidimensional scaling have the plasticity to support the research of such personalized systems.

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TRENDS IN MANAGING SEVERE EARLY ONSET EPILEPSIES IN SLOVENIA

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Purpose: From epidemiological data about 600 pharmacoresistant patients (0–18) with epilepsy would be expected in Slovenia. A similar number of multidisciplinary Seizure Conferences for pediatric/adolescent patients with difficult-to-treat epilepsy have been performed from 1995 to 2007 at the tertiary Epilepsy Centre for children and adolescents.

Method: To assess trends in managing difficult to treat early onset epilepsies.

Results: The number of patients discussed by the Centre's multidisciplinary team at regular Seizure Conferences has been constant at about 50 cases/year, with very rare referrals below age 3. Videotelemetry with narrow capacity is regularly available since 2004, averaging 25 evaluations/year. Weekly neuradiology staff meetings (mean 2–3 cases/week) are performed with a dedicated neuroradiologist. From Phase I investigations only ictal SPECT is not available on a regular basis. Smallness of our population has precluded development of a multidisciplinary team for surgical management of pediatric epilepsies, so 37 patients have been referred since 1988 for epilepsy surgery to various foreign epilepsy centres. 22 have had surgery (15 intracarotid Wada tests were performed in patients' mother-tongue by a neuropsychologist accompanying patients abroad), 14 were declined after Phase I and 1 was declined after Phase II. About 10 are at this time considered for referrals and/or waiting at various administrative stages of the procedure. Waiting time from the suggestion by the Epilepsy Centre to actual admission has been considered too long (months to years).

Conclusion: Favourable trends: Our multidisciplinary team has seen most of the pediatric resistant epilepsy cases. The number of surgical referrals has been increasing over time with patients referred for surgery at a younger age. Introduction of videotelemetry has contributed to an earlier age of Phase I completion. Duration of epilepsy before surgery has dropped from 16.5 to 7.5 years.

Suggestions: Though mean age at referral has dropped, many could be referred earlier. The very young are seldom referred for multidisciplinary work-ups. Referrals from some regions and specialists are rare compared to general referral patterns. International networking in managing severe epilepsies brought additional workload on the referring and on the receiving side that should be recognized and accompanied by respective increase in manpower. Waiting for surgery could be shortened by staffing in home institutions and more international facilities for severe epilepsy patients, including those referred from small countries.

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E598
FAMILIAL GENETIC LINKAGE STUDY OF MESIAL TEMPORAL LOBE EPILEPSY

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Purpose: The purpose of this study is to identify possible susceptible genes of mesial temporal lobe epilepsy.

Method: A large family with mesial temporal lobe epilepsy (MTLE) and pain syndrome was identified through epilepsy out patient clinic at the NHNN and peripheral blood samples were taken from consenting participants. DNA was extracted from whole blood and a genome wide linkage scan using 546 microsatellite markers was carried (DeCode Genetics). Linkage analysis was carried out using the FASTLINK version of MLINK to obtain LOD scores. Haplotype analysis was carried out using Cyrillic 2.1 and by visual inspection of genotypes.

Results: The initial linkage analysis parameters assumed that one gene causes both the pain syndrome and MTLE yielded a LOD score of 2.4 at 6p22.2 – 6p22.3. However, further fine mapping and haplotypes analysis excluded this region. Applying stricter criteria in the definition of the phenotype to include only 7 affected individuals generated a LOD score of 2.35 at 3p23-3p24 and 2.33 at 7q11.22 – 7q11.23.

Conclusion: Although small in sample size, a LOD score of 2.35 is the maximum that can be obtained with 7 affected individuals. Thus the region in chromosome 3 will be further investigated together with other regions not yet excluded.