

JOURNAL ABSTRACTS

Topographic Brain Mapping of EEG and Evoked Potentials in Psychiatry and Neurology

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INTRODUCTION

Imaging procedures are becoming increasingly important in medicine owing to the extensive diagnostic information they provide. The methods used for CNS diagnostics are referred to by the generic term "neuroimaging" and include procedures for investigating cerebral morphology and cerebral function. Electrical brain mapping is also included among the functional procedures, it permits topographic imaging of the frequencies in the EEG and of the amplitudes of evoked potentials.

The advantages of EEG mapping are obvious ; their limits to visual interpretation of encephalograms particularly with respect to evaluating local frequency changes. The evoked potential mapping process requires EP activity to be measured at a minimum of 16 points. This applies particularly to late EP and so called cognitive waves, whose predominantly cortical origin results in precisely defined electrical fields. For waves of short latency (e.g. early auditory evoked potentials) the diagnostic value is still unclear since the subcortical genesis of waves I - V causes an approximately uniform distribution of positive and negative potential fields on the surface of the skull.

METHOD

The procedure corresponds to an EEG recording, 16 - 20 electrodes were applied to the skull in accordance with the 10 - 20 system. The ear electrodes are used as reference. For EEG mapping, frequency spectra were calculated

from the 16 - 20 electrode values. For the EP, positive and negative voltages were determined in relation to the baseline.

TEST PROCEDURES

In EEG mapping, there is particular interest in the passive EEG at rest and while relaxing, and also in the active EEG after sensory stimulation and general preparatory activation.

In the evoked potentials, VEP, AEP, SEP mapping are distinguished according to the 3 sensory modes : seeing, hearing, and feeling. The very late waves include the so called cognitive waves (e.g. P300 and Contingent Negative Variant : CNV) these are a group of potentials that can only be produced with a special stimulatory context. P 300 and CNV mapping are gaining increasing importance for evaluating cognitive functions in dementia and psychosis

CLINICAL EXAMPLES

EEG mapping in cases with local frequency and amplitude differences. Principally this concerns clinical pictures such as brain tumours, vascular processes, inflammatory disorders and traumatic injuries.

EEG mapping of spike - wave discharges:

In epilepsy, the conventional EEG may be superior to topographic mapping. However, if spike - wave discharges occur, mapping of raw EEG amplitudes permit the identification of the site where signs of increased excitability e.g. spike first occur and their maximums appear.

EEG mapping after administration of drugs :

The computer controlled EEG plays a particular by important role in psychopharmacology. Brain mapping provides the possibility of localization of drug - dependent EEG changes. The topographic pharmaco - EEG can therefore be used for estimating the bioavailability of a CNS - active drug.

EP in psychosis:

Mapping may be used to assess changes in the late AEP and the auditory P300. In schizophrenia, a reduced P 300 amplitude has been described. Since a reduction also appeared in dementia, the evidence is unspecific. The mapping process was used to discover whether psychosis and their subgroups have a topographically characteristic distribution pattern.

P 300 topograms in a disorganized schizophrenia show a significant frontal bilateral decrease in amplitude. The paranoid form showed a distinct lateralization of the P 300 distribution with signs of right hypofunction (reduced amplitude in the mid - temporal region) and left maintenance or hyperfunction. Similar results were demonstrated in the residual form.

EEG mapping in dementia :

In dementia, the main alpha frequency is often retarded beyond the extent due to age. Since the P 300 amplitudes are reduced both in psychosis and in dementia, the question arose as to whether a different kind of localization occurs in the dementia process. This was shown by Maurer et al. (1988) who found in dementia of Alzheimer type a displacement of P 300 with an elevated field bifrontally and an amplitude decay temporally and parietally.

SUMMARY:

Brain mapping of EEG and EP is a new kind of diagnostic process in clinical neurophysiology which follows the general trend toward imaging of the brain. For neurological and psychiatric diagnostic purposes, the suspected diagnosis should be used to select a mapping design comprising EEG and EP cartography in accordance with the problem.

By Dr. Mona Raafat

Magnetic Resonance Brain Images in Schizophrenia : Influence of Diagnosis and Education

By : M. Demyer, R.R. Gilmor, Hendrie, W. Demyer, G. Augustyn and R. Jackson. *Schizoph. Bull.*, 14 : 21 - 37, 1988.

Observed abnormalities of the brain in schizophrenic patients by CT brain images include ventricular enlargement, sulcal widening, cerebellar atrophy, abnormal cerebral asymmetries, and differences in brain tissue density. Nevertheless CT has some important limitations and other brain imaging techniques that promise to rival or even largely supplant CT in brain imaging is magnetic resonance imaging (MRI). It is safer, of better quality, delineates tissue differences and can provide several indices of biochemical and physiological activities.

The main goal of this study was to determine if schizophrenic patients could be differentiated from normal control on the basis of TI (The time taken for 63 percent of complete relaxation in the longitudinal direction) .A secondary goal was to determine if the schizophrenic and normal groups could be differentiated on the basis of size of the brain and the skull. The third goal was to determine if there is a relationship between the various MRI measures and performance neuropsychological tests and findings from the neurological examination .

Research subjects were 25 schizophrenic patients and 25 normal subjects interviewed using the schedule for Affective Disorders and Schizophrenia, Life Time Version, diagnosed according to DSM - III criteria for schizophrenia, tested with Halstead Battery of neuropsychological tests, and screened by a teslacon 0.15 Telsa scanner.

Results revealed that schizophrenic patients have smaller frontal areas and smaller right hemispheres than normal subjects. The brain size, directly measured, was also positively related to years of education. Brain size correlation with educational level were strongest when both diagnostic groups

were analyzed together rather than separately. When education was taken into account, only the left frontal areas were smaller in schizophrenia than in normal subjects. Brain size was related to several cognitive measures and larger brain areas were associated with better cognitive test score and fewer neurological signs. The author suggested and recommended exploring MRI estimation of brain size, both focal and general to refine these techniques.

M.H.D.

Methylphenidate in Treating Poststroke Depression

By : V. L.Lazarus, L. Groves, and S. Oh. *J. Clin.Psychiat.*, 49 : 151 - 153,1988.

Depression after stroke has recently received increased attention. About 26% to 60% of poststroke patients have clinically significant depression. Biological treatments including tricyclic antidepressants and electroconvulsion therapy are not without hazards. Patients with brain injury are sensitive to the anticholinergic side effects of tricyclic antidepressants and most patients usually have cardiac or other serious medical problems.

In this retrospective study, the authors reviewed charts of 25 patients (mean $\pm$ SD age was 74.0 ± 7.8 years) referred to the psychiatric consultation - liaison service within a 2 - years period at a Health Center for the Elderly. Inclusion criteria were 1-a history of cerebrovascular accident and a DSM - III diagnosis of major depression, 2 - onset of depression after the stroke and within two years after their most recent stroke, and 3 - they had been given an adequate trial of methylphenidate i.e. at least 20 mg/ day for 5 consecutive days.

Results showed that of 25 depressed stroke patients treated with methylphenidate, 13 (52%) responded completely and rapidly usually within 48 hours. Seven of the 12 nonresponders showed partial response to methylphenidate and subsequently required additional treatments. Only 3 (12%) patients had side effects in the form of cardiac arrhythmias and visual hallucinations. None of the 25 patients had a significant increase in blood pressure. Maximum dose was 26.0 ± 7.9 mg/ day.

The authors discussed the mechanism of action and suggested prospective, double - blind studies comparing the safety and efficacy of methylphenidate with antidepressants.

M.H.D.

Excess Mortality Among Formerly Hospitalized Child Psychiatric Patients

By : S. Kuperman, D. Black, and T. Burns. *Arch. Gen. Psychiat.* 45 : 277- 282, 1988.

There is a consensus agreement among researches of adult psychiatric population that they have higher than expected mortality in comparison with control population. However, conclusions from similar studies of child psychiatric patients are less clear. In the present study the authors investigated mortality in 881 male and 450 female formerly hospitalized child psychiatric patients in a 4 - to 15- years follow - up from 1970 to 1985. Diagnoses derived from the International Classification of Diseases, Ninth Revision (ICD - 9) which were collapsed into eight categories to increase statistical power. These categories were attention, emotion, adjustment, behavior, eating, autistic, and mental reasoning (combining organic mental disorder, schizophrenia, and mental retardation) and miscellaneous.

Results showed that death from natural causes was not increased, but death from unnatural causes occurred at a rate more than twice as high as based on age and sex matched comparisons with the general population. Only four patients (0.3%) died of natural causes and 23 deaths (1.7%) from unnatural causes. Of the 23 unnatural deaths, 11 (47.8%) were accidental, ten (43.5%) were suicidal, and two (8.7%) were homicides. When the unnatural deaths were subdivided into specific causes, and observed numbers of deaths compared with expected, both suicide and homicide were elevated, but only the number of suicides emerged as being significantly greater than expected. Increased risk of unnatural death was found in five of eight diagnostic categories but was significant only for Mental Reasoning. The highest rates of unnatural death occurred in patients who had a seizure disorder, those who had a previous psychiatric hospitalization, those who had an index admission geater in length than 30 days, those with a single psychiatric diagnosis, and those who were older than 14 years at index admission.

The authors critically discussed their findings.

M.H.D.

Neuroleptic - Induced Supersensitivity Psychosis: Retrospective Study of Schizophrenic Inpatients

*By : J. Hunt, H. Singh, and G. Simpson. J. Clin. Psychat., 49 :
258 - 261, 1988*

Just as tardive dyskinesia could result from neuroleptic-induced postsynaptic dopaminergic supersensitivity fraction in the nigrostriata region, there could be a similar neuroleptic induced supersensitivity in the mesolimbic region which manifests as a worsening in psychosis when neuroleptics are either withdrawn or reduced. The prevalence rate of this disorder is estimated to be 20% among schizophrenic outpatients.

This retrospective chart review study of 265 schizophrenic and schizoaffective patients for up to 3 years before rating was carried out to identify the existence of such a disorder according to Chouinard's, criteria. These, briefly, are: neuroleptic for 6 months, psychosis worsened upon reduction or discontinuation, tolerance to antipsychotics, presence of tardive dyskinesia, new or severe exacerbation of symptoms with stress, rapid improvement after dose increase, greater frequency of relapse and if treated with depot, psychotic symptoms appear only at the end of injection interval. Approximately 1 year after the initial screening, a second review of records of those patients meeting the criteria for probable supersensitivity psychosis.

Based on these criteria, 12 of the 265 patients were found to have clinical evidence of probable supersensitivity psychosis. Six of the 12 patients were rediagnosed as schizoaffective and 4 patients had tardive dyskinesia. The length of illness varied from 7 to 30 years and the period of hospitalization was, on average, 6 years.

In this sample, the authors reported that the natural course of illness in the 12 patients was not altered over a 3 - years period, and that they relapsed 5 days to 6 weeks after neuroleptic decrease or discontinuation. To the contrary

of their expectations, tardive dyskinesia was negatively associated with the supposedly supersensitivity psychosis.

The authors argued and provided clinical evidence against the concept of supersensitivity psychosis and recommended further systematic studies.

M.H.D.

OBSTETRIC COMPLICATIONS AND SCHIZOPHRENIA: A COMPUTED TOMOGRAPHIC STUDY

By: M. Owens, S. Lewis, and R. Murray. *Psycholog. Medicine*, 18: 331 - 339, 1988.

The idea that birth injuries and perinatal adverse events or obstetric complications (OCs) might play a part in the etiology of neuropsychiatric disorders, and has a continuum of reproductive causality has been suggested and research evidence supports the findings that schizophrenic patients whose mothers reported severe paranatal complications were younger at first hospitalization and showed poorer outcome than those without such backgrounds. Furthermore, recent findings suggest that computerized tomography (CT) was abnormal in those with definite OC compared with those with an equivocal OC and those with no known OC.

The authors examined the following questions:

- 1-- What is the relationship between OCs and the neuroradiological abnormalities found in schizophrenia?
- 2 - Does schizophrenia have an earlier age of onset in those who have a history of OCs?

In a retrospective study, the case records of sixty -one patients aged 16 - 50 years who had been discharged between 1981 and 1984 with a diagnosis of schizophrenia by Research Diagnostic Criteria Following their First admission to the Maudsley Hospital were assessed and rated blindly and independently with good reliability. Clinical variables included obstetric complications (antepartum, intrapartum and postpartum) scale indicating definite or equivocal events, early cerebral damage and age at first contact with the psychiatric services. CT brain scanning was done as part of the clinical assessment and the ventricular - brain ratios (VBRs) and a cortical score rating the widening of the cortical sulci and fissures were used .

Results showed that schizophrenic patients with a history of OCs were more likely than those with apparently normal births to show a combination of ventricular enlargement and widening of the cortical sulci and fissures. Those with a definite history of OCs presented at an earlier age. In this group widening of cortical sulci and fissures was more strongly correlated with VBR than in subjects without OCs.

Moreover, large VBRs when accompanied by widened cortical sulci and fissures occurred more commonly in subjects with OCs than those without. The authors discussed the mechanisms and the implications of their findings in view of the methodological issues and the complex interplay between brain damage and environmental influences.

Life Events, Difficulties and Recovery from Chronic Depression

G.W. BROWN, Z.ADLER and A.BIFULCO

British Journal of Psychiatry (1988), 152, 487 - 498

Reductions in an overall score of ongoing difficulties and the occurrence of a "fresh start" event often preceded the recovery or improvement of women in a general-population survey suffering from chronic depression, i.e. with episodes lasting 12 months or more. In addition, overall levels of difficulties and presence of social support were independently related to recovery or improvement. Some of the lifechanges preceding recovery were threatening, but all promised some hope of a better future. Evidence is presented that the results as a whole are unlikely to be due to incipient changes in clinical condition leading the women to make changes in their environment, but some bias of this kind cannot be entirely ruled out.

Neurotic Depression: Delineation of Symptom Profiles and Their Relation to Outcome

GORDON PARKER, ILSE BLIGNAULT and VIJAYA MANICAVASAGAR

British Journal of Psychiatry (1988), 152, 15 - 23

Ninety-one subjects diagnosed clinically as having a "neurotic depression" were interviewed and then re - assessed at 6 weeks and 20 weeks. Four symptom profiles of clinical features were derived : "negative cognition" , "lack of drive", "anxiety", and "arousal", the last being independent of the other three dimensions and of the severity of depression. Symptom profile scores were then examined against antecedent risk variables and outcome. Links between profile scores and personality variables suggest that personality may colour the clinical presentation of neurotic/reactive depressions, and challenge the assumption that a typology of these depressive disorders based on clinical features is achievable. The break - up of an intimate relationship in the preceding 12 months was a strong predictor of a good outcome. Further analyses suggested, firstly, that there was a distinct subgroup delineated by this life event, with features weighted to the "arousal" symptom profile, including many symptoms often associated with diagnosis of "endogenous depression"; and, secondly, that this life event and a good outcome were directly linked, being uninfluenced by personality or other mediating variables.

General Practice Patients on Long - Term Psychotropic Drugs:A Controlled Investigation

J. CATALAN, D.H.GATH, A.BOND, G.EDMONDS,P.MARTIN and J. ENNIS

British Journal of Psychiatry (1988), 152, 399 - 405

In a health centre, 3.6% of the registered patients were found to have received at least one prescription for psychotropic drugs in each quarter of a year. These patients were mainly elderly and female. Psychiatric interviews were held with randomly selected index patients, and with matched controls. Most index patients reported taking psychotropic drugs for several years, mainly anxiolytics, antidepressants and non - barbiturate hypnotics, and mainly in low dosage. Index patients had much higher levels of psychiatric morbidity, as shown by the Present State Examination, history of specialist psychiatric treatment, and previous drug overdoses. In index patients, the main diagnoses were neurotic depression and phobic disorder. Index patients reported more problems with finances and with social isolation.

Carbamazepine vs Lithium in the Treatment and Prophylaxis of Mania

R.M. LUSZNAT, D.P. MURPHY and C. M. H. NUNN

British Journal of Psychiatry (1988), 1523 198 - 704

Fifty - four acutely manic patients were allocated to treatment on a double-blind basis with either carbamazepine or lithium carbonate .The short - term effects of treatment were studied over a period of six weeks and the longer term, prophylactic effects over a period of up to a year. Additional "rescue" medication was allowed when clinically indicated .There was a high drop - out rate from the trial. Despite this, it appeared that valid comparisons between the two treatments could be made. No statistically significant differences were found, but carbamazepine appeared slightly less effective as a treatment for acute mania and more effective as a prophylactic treatment in this group of patients.Possible predictors of individual responsiveness to each treatment are discussed.