

guage and visuo-perceptual function. Structural neuroimaging was typically normal, but SPECT scanning revealed a high frequency of abnormalities; in all cases these affected temporal and frontal regions and sometimes they were marked enough to raise the possibility of organic brain disease (which was, however, never substantiated).

- [1] Stone, AA et al. *Am J Psychiatry*, 1968, 125, 305–312.
 [2] Black, DW, Boffeli, TJ. *Am J Psychiatry*, 1989, 146, 1267–1273.

QUANTITATIVE EEG IN MEDICATED AND UNMEDICATED SCHIZOPHRENICS: EVIDENCE FOR HYPER-STABILIZED BRAIN FUNCTION

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The scalp EEGs of 32 medicated chronic schizophrenic patients, 12 unmedicated chronic schizophrenics and 35 matched healthy controls were analyzed by adaptive segmentation. This is an automated procedure which determines the sequence and duration of topographical defined brain electric fields in continuous EEG. EEG segments, during which one characteristic field prevails are thought to represent "microstates" of brain functioning. Data were acquired during a rest condition, a mental arithmetic task, and a CNV paradigm. Results indicate prolonged duration of brain microstates in both unmedicated and medicated schizophrenics. Topographic variability, when compared across the different tasks, was also significantly reduced in both schizophrenics groups. Increased microstate duration remained a constant feature of the schizophrenics EEGs, independent of the task. From task to task, schizophrenics as well as normal controls showed consistent changes of electric field topography and of EEG microstate duration. However, the topography of the microstates during the tasks was significantly different in both schizophrenic groups from that of controls. Neuroleptic medication correlated negatively with microstate duration in a dose-dependent way. There was an inverse relationship between topographic variability and negative symptoms as well as BPRS scores. It is concluded that the temporal-spatial characteristics of brain electric activity indicate a reduced array of functional modes and enhanced stability of brain electrical microstates in schizophrenia.

REGIONAL CEREBRAL ACTIVATION DURING WORD PRODUCTION IN NEGATIVE SCHIZOPHRENIA

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In schizophrenics, frontal activation deficits have been observed during cognitive paradigms requiring the patients to generate responses restricted by the task instructions, thus diminishing spontaneous "free-wheeling" thought associations. In order to investigate the capacity of schizophrenic patients to increase their regional cerebral blood flow during controlled, and more spontaneous mental states, we used two word production tasks. The first one was the verbal fluency, which activates left hemisphere and particularly frontal regions in right-handed controls, and is generally impaired in negative schizophrenics. The second one was the continuous free word association, allowing more spontaneous changes in the course of word associations.

Subjects and Methods: Normalized regional cerebral blood flow (NrcBF) was measured using a positron tomograph with H₂¹⁵O.

Ten DSM-III-R schizophrenics with marked negative symptoms, and twelve controls (all subjects were right-handed men with similar age and verbal level), were compared in 2 runs of 3 conditions: rest, verbal fluency, and continuous free word association. NrcBF and individual 3D magnetic resonance images (MRI) were aligned, allowing definition of volumes of interest having anatomical boundaries. NrcBF were compared using MANOVA with a two level Group factor (patients and controls) and a three level within-group Task factor.

Results: In patients, lower NrcBF values were found at rest and in both tasks, in right frontal regions (Brodmann's areas 8 and 6), right anterior cingulate, whereas higher NrcBF values were present in both striata.

In both groups, a NrcBF increase in most left prefrontal regions was detected during both word production tasks.

During both word production tasks, the NrcBF increase was greater in controls in regions involved in verbalization: left primary motor, right cerebellum. These differences will be compared to the subjects' performances. A NrcBF decrease in the right supra marginalis gyrus of controls was not observed in schizophrenics. During continuous free word association, the pars opercularis of the right frontal gyrus and the adjacent part of the right middle frontal gyrus were activated in patients but not in controls.

Conclusion: The pattern of regional activation in negative schizophrenics differs partially from that of controls, involving a higher magnitude of activation in circumscribed right frontal regions homologous to Broca's area during spontaneous word production, and no deactivation of the right supra marginal gyrus in both word production tasks. However the capacity to activate left dorsolateral prefrontal regions persists in negative schizophrenia. Thus, in this disorder, there is no general activation defect across all cognitive tasks challenging the prefrontal regions. Lastly, striata perfusion appears abnormally increased at rest and during word production tasks.

NR2. Neuroimaging and neuropsychiatry

Chairmen: P McGuire, M Ron

LIMBIC SYSTEM DYSFUNCTIONS IN MANIA AND SCHIZOPHRENIA USING ¹⁸F-FLUORODEOXYGLUCOSE AND POSITRON EMISSION TOMOGRAPHY

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Positron emission tomography (PET) with ¹⁸F-labelled fluorodeoxyglucose (FDG) was used to examine the regional cerebral metabolism of glucose in the limbic regions in 15 patients with mania (Catego Class M*) and 17 patients with schizophrenia (14, Catego Class S* & 3, Catego Class P* and. Also, 6 patients with psychotic depression (Catego Class D+), 4 with non-psychotic depression (Catego Class R*) and 10 healthy volunteers were imaged for comparison. Subjects were all right handed and were imaged at rest with the eyes closed and ears unplugged.

Four sections at 63 mm, 76 mm, 83 and 89 mm from the brain vertex, based on the atlas of Aquilonius and Eckernäs (1980), were imaged. FDG region specific uptake relative to the uptake in all