

BRAIN ELECTRICAL ACTIVITY MAPPING IN SCHIZOPHRENIA

(ABSTRACT)

T.J. PANG, W. DING & C. MA

Brain electrical activity mapping (BEAM) is computer based analysis and display of EEG. After the electrical signals from the scalp have been collected and processed, the amplitude-time relation in traditional EEG is transformed into power-frequency relation in BEAM. The result of BEAM is expressed in power spectrum at each electrode site and power distribution of each frequency band in dimensional head model (the map), where the power values can be represented by a series of colours.

METHOD

SUBJECT:

The schizophrenic group (S group) consisted of 15 inpatients (6 males, 9 females, with the mean age of 26.9 ± 5.7 years), the range of disease duration was 1-7 years, with an average of 2.5 years. They still showed obvious psychotic symptom and had not taken neuroleptics for at least 2 weeks. The normal group (N group) consisted of 15 hospital staffs (6 males, 9 females, with the mean age of 28.1 ± 4.1 years), who had no past history of neuropsychiatric disorders. All members of both groups were right-handed.

Using Cartovar 3E equipment, we took the monopolar recording with Wilson's common averaged reference. Sixteen scalp electrodes were placed according to the international system. The time it took for each sampling sequence was 20 seconds. The power values on the map that expressed in millivolt represented the values in 2 seconds averaged. The whole frequency band of 1-30 Hz was divided into 4 bands, i.e., δ , θ , α and β band.

RESULT

The features in N group were: (1) the α power was the highest of all bands; (2) there was a predominance of α power over bilateral occipital areas; (3) over occipital and parietal areas the α power in the right side was higher than that in the left side ($p < 0.05$), while over other areas the α power was basically bilaterally symmetrical; (4) the α power concentrated in 1-2 Hz range; (5) the α power attenuated with eyes opening.

The features of the power distribution in S group were mostly as in N group except that the θ power over left middle temporal area (T5) was lower than that of N group ($p < 0.05$). The α relative power values (the ratio of power of α band to 1-30 Hz expressed in percentage) was lower than that of N group over all areas and the differences over left frontal area (F3) and right rear temporal area (T6) were of statistic significance ($p < 0.05$). The coefficient of variation (CV) of α relative power in S group was larger than that in N group. In S group the δ and θ relative power were higher over most areas and β relative power higher over all areas as compared with N group. The attenuation of α power with eyes opening was less in S group.

Our result was in agreement with that of the literatures. The power of brain electrical activity for schizophrenics was higher in δ , θ and β band and lower in α band. This feature was more significant in relative power values. Since there was considerable variation in individual patient, the use of BEAM for each patient was still not unanimous. At present BEAM should be viewed as an adjunctive method to traditional EEG.

Pang Tian Jian, Ding Wing & Ma Cui. *Guangzhou Psychiatric Hospital*