



EEG mapping in patients with social phobia

Gabriele Sachs*, Peter Anderer, Karl Dantendorfer, Bernd Saletu

Department of Psychiatry, Medical University of Vienna, Währinger Gürtel 18–20, Wien 1090, Austria

Received 8 January 2003; received in revised form 20 August 2004; accepted 30 August 2004

Abstract

Recent studies have suggested an information-processing bias in social phobia (SP). Little is known about the electrophysiological correlates of anxiety in SP. The aim of the present study was to investigate the quantitative electroencephalogram (EEG) in 25 drug-free patients with SP as compared with age- and sex-matched normal controls and to correlate anxiety and depressive symptoms with EEG data. EEG was recorded under vigilance-controlled and resting conditions. The Spielberger State and Trait Anxiety Scale (STAI) and the Beck Depression Inventory (BDI) were administered to assess anxiety and depression levels. Multivariate analysis of variance revealed significant differences between patients and controls, specifically frontopolarly and right centrally. Statistical analysis demonstrated a decrease in absolute and relative delta, theta power, alpha-adjacent slow-beta and fast beta power and an increase in absolute and relative intermediate beta power, as well as an acceleration of the total centroid and a slowing in beta centroid and its variability. Trait anxiety and depression scores correlated positively with the dominant alpha frequency and the alpha centroid, and negatively with absolute theta and slow alpha power as well as with the centroid of the delta/theta frequency band. In conclusion, EEG mapping in patients with SP revealed significant differences from normal controls suggesting a hyperarousal as a pathogenetic factor of anxiety.

© 2004 Elsevier Ireland Ltd. All rights reserved.

Keywords: Social phobia; Quantitative EEG; Electrophysiological brain function; Beta power; Frontal pole; Anxiety; Depression

1. Introduction

Various studies have demonstrated that clinically defined psychiatric populations show electrophysiological patterns that differ statistically both from each other and from normal controls (John et al., 1988, 1994; Saletu et al., 1990).

Applying standardized recording and analytic procedures, distinct differences were described between

psychiatric populations and normal controls in standardized electroencephalogram (EEG) descriptors, such as absolute and relative power as well as the centroid of delta/theta, alpha and beta activity (Herman et al., 1989; Saletu et al., 1991, 1996).

In social phobia (SP), only a few investigations have been carried out with EEG mapping (Davidson et al., 2000). While speaking in public, social phobics showed a marked increase in right-sided activation in the anterior temporal prefrontal scalp regions. Generalized anxiety disorder (GAD) patients showed an increase in total power, absolute delta/theta and alpha power and relative alpha power and a decrease in

* Corresponding author. Tel.: +43-140-400/3594; fax: +43-140-400/3605.

E-mail address: gabriele.sachs@meduniwien.ac.at (G. Sachs).

relative beta power, neurophysiologically reflecting hypervigilance (Saletu-Zyhlarz et al., 1997). These changes partly correspond to those observed in another anxiety disorder, agoraphobia (with and without panic disorder), which, however, in contrast to GAD, also exhibited an augmentation of beta activity and an acceleration of the delta/theta and alpha centroids (Saletu, 2002).

During hypnotically induced anxiety and relaxation, normal brain electric activity revealed the strongest difference between EEG source gravity center locations during the two emotional states in the excitatory beta-2 EEG frequency band (18.5–21 Hz). Post-hoc tests showed that the sources were located more to the right during anxiety than during relaxation. Studies using various analytic approaches of brain electric measurements repeatedly suggested that positive emotions are implemented by more left-hemispheric activation, whereas negative emotions involve more right-hemispheric activation (Isotani et al., 2001).

A large number of publications has reported on correlations between EEG frequency bands and behavioural measurements. Slow frequencies are known to be associated with behavioural inhibitory functions during sleep, brain lesion, general anaesthesia and intoxication. Frequencies in the high theta and alpha bands are related to attentional states, automated routine behaviour, and cognitive and memory performance—alpha reduction occurs during activation (interruption for resting) of the recorded brain area. Faster EEG wave frequencies (beta bands, gamma band), reflecting neuronal synchronizations at higher frequencies, are associated with activation/excitation, increased vigilance, perceptual and emotional information processing, and effects of psychostimulants (Itil, 1983; Ray and Cole, 1985; Lopez da Silva, 1991;). Frontal theta activity are correlated with anxiety levels (Mizuki et al., 1992). High state anxiety is associated with reduced frontal theta (Nakashima and Sato, 1992).

Thus, the aim of the present study was to investigate differences between SP patients and normal controls in EEG mapping, and to relate EEG findings to anxiety and depression levels. We wanted to specify the beta EEG frequencies; we hypothesized significant differences in beta-power between SP patients and healthy controls (HC).

2. Methods

2.1. Subjects

Twenty-five patients with SP (SP group) were consecutively recruited through the SP outpatient unit of the Department of Psychiatry, University of Vienna. All patients underwent a diagnostic interview by an experienced clinician with the Structured Clinical Interview for DSM-IV (SCID-P; First et al., 1995a). All patients met DSM-IV criteria for SP and were unmedicated. Patients with a significant somatic or neurological disorder or with an abnormal EEG in the sense of increased paroxysmal activities and/or epileptiform activity in the EEG were excluded. None of the suitable patients had an abnormal EEG, so non-patients were excluded from the study on this basis. Further exclusion criteria were a history of drug or alcohol abuse and a lifetime history of any other axis I diagnosis. IQ was assessed for all patients with the short form of the Wechsler Adult Intelligence Scale-Revised (WAIS-R; Wechsler, 1981). The patients had not been in other studies or clinical trials for the past 6 months and no other studies were performed on them during the study period.

The healthy control (HC) group consisted of 25 age- and gender-equivalent volunteers recruited by a local advertisement. All HC subjects were assessed with the SCID-NP (First et al., 1995b) for DSM-IV to rule out any psychiatric diagnosis, and had a clinical routine check for somatic and neurological disorders including baseline EEGs with exclusion of paroxysmal activities and/or epileptiform activity in the EEG.

Daily consumption level of alcohol, caffeine and drug intake were ascertained. SP patients and HC subjects were required to abstain from alcohol, caffeine and drug use 12 h prior to testing but were allowed neutral beverages like milk and mineral water. Smoking was not allowed prior to testing.

The study was approved by the appropriate local ethics committee, and written informed consent was obtained from all participants after a complete description of the study.

2.2. Evaluation of brain function (EEG mapping)

A 3-min vigilance-controlled EEG (V-EEG) and a 4-min resting EEG (R-EEG) were recorded, by means

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات