Case Report: a 13 year-old female with anger and mood disturbances

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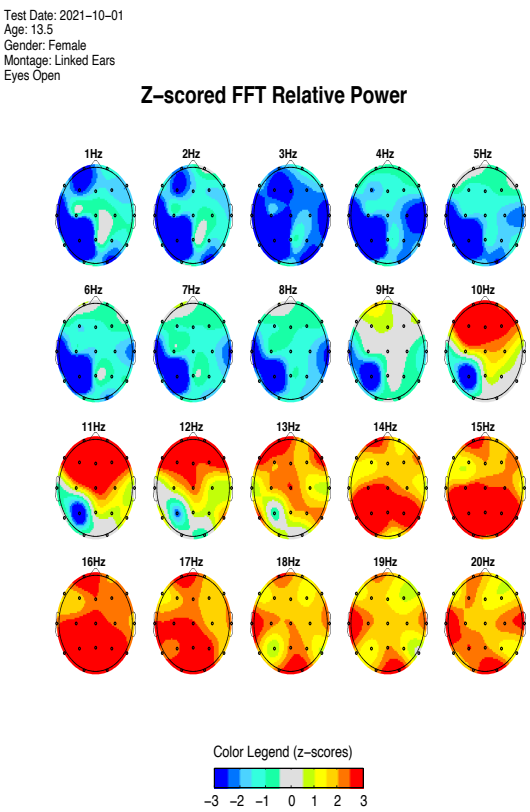
Introduction

There is common agreement among neuropsychologists that anger is an approach-related negative emotion that is usually associated with the attempt to counter the challenges to our wellbeing if appropriately regulated. However, anger can significantly contribute to trigger aggressive behavior when its intensity is particularly high, which overrides coping mechanisms. Persons with high trait anger often have poor social relationships and are more likely to engage in confrontation, aggressive behavior and domestic violence. Given the negative effects that chronic and persistent anger can have on an individual's life, including the risk of being punished by society, people are usually motivated to regulate and control anger states.

Clinical assessment

A 12-year-old female of white Americian origin, who had been living with her biological parents, presented to the medical center for evaluation of psychiatric symptoms. Her symptoms have been present for about 5 years and worsen for 3 months, increasing over the preceding 2 weeks. She had a history of anxiety, racing thoughts and obsessive-compulsive tendencies. Previous evaluations diagnosed her with ADHD, and OCD and was given medication to treat her symptoms. Her parents reported that medications were not effective, and several treatments aggravated her symptoms. She was struggling with low motivation coupled with overwhelming anger. The patient also complained of daily sleep challenges and anxiety which was confirmed with her parent's observations. Her goals were to be more present in life and increase motivation for daily activities.

Table 1. EEG Eyes-closed Relative Power



Investigations

Initial Investigation

The EEG was digitally recorded utilizing 19 electrodes with the international 10/20 system of electrode placement. EEG was recorded using Brainmaster Discovery amplifier on Brain Avatar software for a total of 20 minutes. Electrode impedances were reduced to below 5Kohms. The EEG was recorded continuously in the awake state with the eyes closed and eyes open. The EEG was visually inspected and artifact rejection utilizing S.A.R.A automated artifact rejection system. The absolute and normative spectral analysis was computed for each task. The clients data was compared to a normative database consisting of 2713 age-matched individuals. Output of magnitude, power, ratio and coherence were included. Standardized Low Resolution Electromagnetic Tomography was computed, and images included. Shared variance analysis and comparison to normative samples were completed.

EEG Findings

The quantitative EEG spectral analysis indicates atypical frequency maxima distribution due to the presence of excess beta in the posterior cortex [Table 1]. The posterior dominant rhythm in the eyes-closed condition is within the expected range for age 10.9. The theta/beta power ratio is slightly elevated at 3.0. The alpha/beta power ratio is low at 2.7. Normative database comparison demonstrated excess beta and high beta at multiple sites. The relative power comparison confirmed supported absolute and normative findings as well as demonstrated relative excess beta and high beta. There is a clinically significant alpha asymmetry noted where alpha is greater at F3 compared to F4 [Table2].

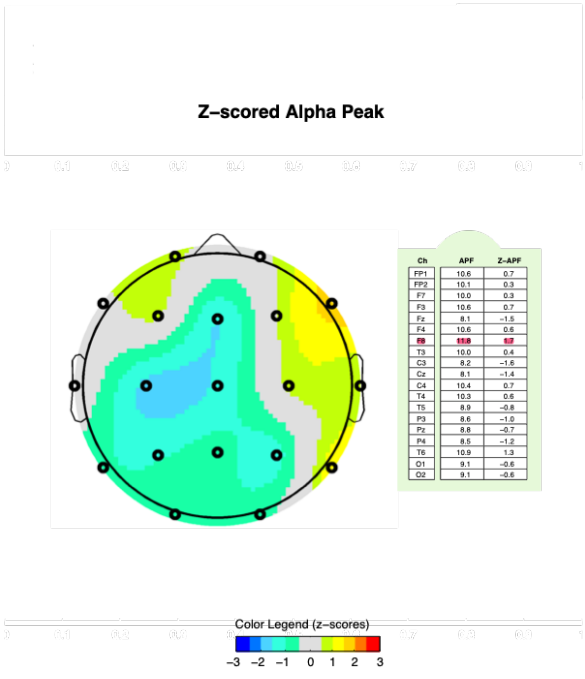
Interpretation of EEG Findings

Individuals with excess beta and high beta will often report anxiety spectrum concerns and sleep disturbances. These patterns are commonly observed in individuals who report anger and mood disturbances. Given low relative slow activity present, there is not an equivocal balance of slow and fast EEG resulting in an on-going cortical excitation which is interpreted and manifest by the patient as agitation and irritability. There are several patterns in the qEEG that may result in mood disturbances and difficulty with regulation.

Table 2. Summary of Findings

1. **Impression:**
   a. **Eyes-closed:** low amplitude slow activity, mild excess right-sided beta
   b. **Eyes-opened:** excess posterior beta and high beta (artifact @P3)
2. **Posterior Dominant Rhythm (expected 9-11):** 10.9 @T6
3. **Theta/beta ratio:**
   a. **Eyes Closed (exp. < 3.0**): 3.0
   b. **Eyes- Opened (exp. = or < EC):** 2.4
4. **Alpha/beta ratio (expected 8-12):**
   a. **Eyes-closed**: 2.7
5. **Relative power:**
   a. **Eyes-closed:** low relative slowing, excess beta and high beta
   b. **Eyes-opened:** low relative slowing, excess frontal alpha, excess posterior beta and high beta
6. **Alpha asymmetry present:**
   a. **Eyes-closed:** Yes
   b. **Eyes-opened:** Yes
7. **Notes:** atypical peak alpha in right frontal sites (F8)

Table 3. Eyes-Closed Peak Alpha Measured at Frontal Site



This EEG demonstrates multiple patterns that have been reportedly present in individuals with depressed mood [Table 3]. In children however, we tend to see this manifest earlier as negative mood and negative self-talk before manifesting as clinical depression later in adulthood. However, the patterns still appear the same independent of age and are highly predictive of symptoms along with clinical response. All present patterns in clinical context will give the presentation of over arousal, anxiety, and agitation in combination with negative mood states often resulting in negative emotional outbursts. The combination of depressed mood states and heightened arousal levels will make individuals frustrated and difficult to regulate emotions particularly with the presence of low amounts of relative slow activity.

Treatments

Although tempting in an individual presenting with OCD and depressed mood, a prescribing provider may consider the class of SSRI medications such as fluoxetine first line. Based on the qEEG profile we may justify this clinical decision in certain instances. However, given know effects on the EEG with alpha supression, this class of medications will likely aggravate this patient given relative profile values, elevated high beta, and low alpha/beta ratio. Trials of antipsychotic class medications have proven helpful in some instances with similar EEG profiles. However, these medicines can be quite sedating which may aggravate this patient's already low motivation and depressed mood. A combination of conventional psychiatric medication and alternative therapies may be better tolerated. Over the counter *Hypericum* (St. John's Wort) can be helpful for mood symptoms when given in age-appropriate doses while monitoring for interactions with other medications. Anxiolytics at this point could work in combination to provide relief for this patient while working on lifestyle strategies. These may include specific meditations, exercise routines, and gratitude journaling all while carefully avoiding areas of friction within the individuals environment. In states where cannabis is available for recreational use, one may be tempted to self-administer various forms of CBD/THC products for symptom relief. However, as was discussed with the above mentioned medications, these patterns may improve at the expense of aggravating the aberrant mood EEG patterns and is not advised.

Clinical Discussion

Initial approach with individuals presenting with a combination of depressed mood patterns and over arousal or anxiety patterns in the same individual can pose quite a challenge in clinical care. Co-morbid depression and anxiety is quite common in clinical practice of course. However, single medication treatment options can sometimes accompany unexpected results without the objective aid of qEEG. After numerous qEEG studies, it is this author's observation that many of the treatments to target over arousal symptoms, including low alpha/beta ratios, or high beta presentations will often inadvertently aggravate the presence of peak alpha in the frontal sites or alpha asymmetry observed when present in individuals with depressed mood. These patterns in other words, are inversely related making treatment homeostasis challenging for both the patient and provider. These patients will often seek multi-modality care plans which usually require lifestyle, supplemental and even nutritional interventions to compliment. Neurofeedback therapy demonstrates promise allowing prescribers to target the most pressing symptoms while using the neurofeedback interventions to modulate the brain patterns, and thus making single intervention options much more feasible. Follow up qEEG studies should be completed to observe measurable pre and post changes related to clinical reports. This can be an invaluable tool when it becomes appropriate to taper medications and make other clinical decisions with the aid of clear objective individualized data. Thus, improving the patients clinical care with precision and clarity rather than the standard trial and error approaches so often implemented in standard psychiatric practices.

Final Thoughts

With careful consideration of the unique qEEG phenotypes with relationship to symptom presentation, comprehensive treatment plans can be implemented while exploring both biological and external influences that can either help or hinder patients presentation with the aid of clear objective data. Patients tend to find this approach very logical and informative particularly in cases with failed medications responses or reluctance to start treatment. Rather than blaming for treatment failures and non-compliance, the qEEG data will often provide the level of insight to explain individual's strengths and symptom presentation in a way that empowers and encourages a relationship of mutual respect and validation.