Brain Electrical Activity Mapping (BEAM) in Patients who Commit Violent Crimes: Are Bitemporal Abnormalities a Characteristic?

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Recently a federal judge,[3] Judge Kenneth Ripple of the 7th U.S. District Court of Appeals in Chicago, considered the case of whether or not to continue anti-psychotic drugs or injectable Prolixin for a federal prisoner who was sentenced to 10 years in prison after being convicted of shooting his ex-wife in 1984. He was paroled in 1990 and drug treatment was mandatory, in part because the probation agent said the man threatened to kill her. The relationship between neuropsychiatric disease and crime has become obvious and the issue of illness as a factor of every prison situation. We have seen blunted Prolactin responses to D-Fenfluramine in patients with a history of murder and sociopathic personalities.[4] A recent review in the *Archives of Neurology* shows that violence has a neurological contribution, and that aggression has a neuroanatomic and biochemical basis.[5-6] Developmental and acquired brain disorders are contributing to the nation's problem of recurrent violence. Notable is a recent study in a forensic science journal developed in Japan which shows severe decreases in amplitude P300 brain waves and abnormal evoked potentials in individuals with violent crime.[2] It appears that it is relatively easy to identify individuals at risk for violent crime, and that at its roots violent crime is indeed an organic psychiatric problem. There are certain tests during a Brain Electrical Activity Map (BEAM) such as alcohol and amphetamine-loading that can evoke even more dramatic abnormalities in violent crime subjects.

In this study we are going to present four individuals seen at our clinic who were being tested for organic brain disease. All had committed crimes: one had cut his father in pieces and boiled parts of him; one shot two of his best friends and killed one; one shot his girlfriend and she lived; one for no apparent reason whatsoever stabbed a woman to death while she was shopping.

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Case 1

This 39 year old black male with a history of substance abuse, episodic violence and anti-social behavior had stabbed his father to death and boiled parts of his body, possibly with intention to eat him.

BEAM Report

EEG: Normal

Spectral Analysis:

Eyes Closed: Normal *Eyes Open:*

Percent Spectral Average: Occipital increases in delta to 2.0 SD. *VER:*

100-116 msec: Frontal increased excess positive to 3.41 SD, possibly due to eye blink. 368-384 msec: Left temporal excess negative to 2.78 SD.

388-404 msec: Bitemporal and parietal excess negative to 3.47 SD.

480-496 msec: Bitemporal excess negative to 4.09 SD.

AER: Normal

P300: 280 msec at 9.14 dV

Notable in this BEAM are bitemporal abnormalities which are typical in Episodic Dyscontrol and more so of violent crime. The P300 voltage of 9.14 is low in that normal is 10-16.

Case 2

This is a 34 year old black alcoholic with a history of episodic violence who shot his best friends, killing one while hallucinating during a drinking episode on Christmas day.

BEAM Report

EEG: Normal

Spectral Analysis: Normal for eyes closed and eyes open.

P300: 336 msec, 5.35 dV, indicative of low voltage.

VER: Visual evoked response (VER) was

grossly abnormal with frontal, central, and temporal excess positive and negative up to 4.8 standard deviations, with a bitemporal focus of left greater than right. *AER:* Auditory evoked response (AER) was normal.
Conclusion: In conclusion, the BEAM is abnormal. The low amplitude P300 is characteristic of alcoholics and drug abusers. The VER is grossly abnormal, particularly with a bitemporal focus. Bitemporal focuses occur in individuals who have had lead poisoning histories, and episodic dyscontrol patients with intermittent explosive disorder frequently have bitemporal electrical abnormality.

Case 3

A 28 year old male, ivy league college graduate, who played football and had multiple head traumas, shot his girlfriend, who survived, and he spent three years in prison. He has an I.Q. of 122, with some neuropsychological abnormalities.

BEAM Report

EEG: Normal
Spectral Analysis: spectral average he had increased alpha, frequently characteristic of obsessive-compulsive disorder.
P300: 8.18 at 312 milliseconds.
VER: Normal
AER: He had an abnormal epoch of 92 to 108 milliseconds with bitemporal elevations to 2.87 standard deviations.
Summary: He has bitemporal abnormalities characteristic of violent individuals.

Case 4

A 34 year old male with a history of grand mal seizure, multiple head traumas, a long history of child abuse, suicide attempts, an adjustment disorder, and a question of paranoia and schizophrenia, had a normal EEG and a diagnosis of Hyperactivity and Behavioral Disorder. Testing in 1984 yielded a Verbal I.Q. of 84 and a Performance I.Q. of 104. In the past he has been diagnosed as having bipolar disorder and adjustment disorder with depressed features. In 1987 he was treated with Lithium and Navane and was identified at that time as a non-compliant individual. A low dose of injectable Prolixin was not tried. He had been seeing cameras in the walls and showing other signs of paranoid behavior. He recently stabbed a shopper to death.

BEAM Report

EEG: was normal, although it is notable that this patient came to us on Dilantin and Pheno-barbital.
Eyes closed
Spectral Average: He had increased theta to 2.84 standard deviations, maximum at the right temporal region of the brain, and increased alpha to 2.21 standard deviations, maximum at the right temporal region of the brain.
Spectral Symmetry: showed asymmetry in alpha with right temporal increased positive to 3.3 standard deviations and right mid-central increase in theta to 2.47 standard deviations.
Eyes open
Spectral Average: Showed increased theta to 3.1 standard deviations, maximal in the left frontal and right mid-central area, and increased alpha, primarily parietal, frontal, central, and right temporal to 4.42 standard deviations, maximum at the right temporal area.
Percent Spectral Average: Showed an increase in alpha to 2.64 SD.
VER: Normal.
AER: Normal.
P300: 320 ms at 3.85.

Summary

It is likely that the increased alpha and theta are due to medication, although the asymmetry is probably not a medication effect and represents right temporal slowing consistent with organic brain disease. The medication may be masking more underlying disease. Visual evoked response and auditory evoked response were completely normal. These evoked potentials often indicate organic brain disease, and they can also be masked by medication and the individual can appear completely normal as he did. P300 was 320 milliseconds at a voltage of 3.85 at the PZ electrode with a maximum of 5.09. P300 is *dramatically abnormal*, although the time is completely normal for age at 320 milliseconds. The PZ electrode of 3.85 and the maximum voltage of 5.09 is indicative of dramatic attention abnormalities and is common in organic brain diseases. The absence of bitemporal focus was probably due to the anticonvulsants. Again, neurological abnormalities are associated with violent crimes.

In conclusion, it seems apparent that temporal lobe abnormalities and low P300 amplitudes are generally found in violent criminals as indicated in this population and other studies. When are we as a country going to be testing children so that we might earlier and earlier identify who is at risk for violent crime? Instead of waiting for neuropsychiatric patients to kill, we need to treat them before they kill with injectable Prolixin and seizure medications such as Dilantin, Tegretol, Depakote, etc. Brain Electrical Activity Mapping (BEAM) must become like the cholesterol of the brain. Pediatricians throughout the country are now dealing with children's risk for heart disease, and they must also deal with the risk for brain disease. Let us hope and pray that this is done soon so that we all might have a safer country with fewer people killing and then being released because our prisons are overcrowded with untreated neuropsychiatric patients. It is notable that focal abnormalities on evoked potentials correlate to successful treatment with anticonvulsants, as the results have been documented in violent crime by numerous studies.[10] Anticonvulsants can have remarkable effects on violent criminals.[6,,9] Isn't it time to start the treatment of patients with these abnormalities or their equivalent?

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