Exploring the Connection Between Epilepsy and Religion

An evidence-based analysis of longstanding speculation about a connection between seizures and spirituality.

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Since antiquity, epilepsy has been associated with the supernatural. The Greeks believed only a god could cause a seizure and Romans believed that epilepsy came from demons.[1] Arabs referred to epilepsy as the "diviner's disease,"[1] cases of epilepsy attributed to voodoo spirit possession have been reported[2] and Saint Donato in southern Italy is worshiped as a healer of epilepsy.[3] Despite the general belief at the time that was contrary to his own, in his text, "On the Sacred Disease," Hippocrates in 400 BC reasoned that epilepsy had its roots in pathology of the brain, rendering that "from the brain, and from the brain only, arise our pleasures…sorrows, pains...and by this same organ we become mad and delirious and fear and terrors assail us."[4] Despite his writings, epilepsy remained linked to magic, voodoo and witchcraft for the next two thousand years. In the Gospels of Luke, Matthew and Mark, Jesus cured a boy with epilepsy by casting the devil out of him. During the Middle Ages, a handbook on witch-hunting, *Malleus Maleficarum*, written under papal authority in 1494 identified witches as being able to induce seizures.[5]

Following the Enlightenment, and the construction of many hospitals, came the ability to more closely study those with epilepsy. Hughlings Jackson gave the first accurate diagnosis of epilepsy.[6] Peri-ictal and interictal phenomenology were better described and co-morbid psychiatric conditions were established through anecdotal case reports.

Howden, a Scottish medical superintendent in the 19th century noted a relationship between epilepsy and religious fervor. The religious delusions tended to occur postictally (*e.g.*, postictal psychosis); however, he also noted interictal hyper- religiosity as well.[5] Ictal religious experiences, a type of ecstatic seizure, occur most often in patients with temporal lobe epilepsy and tend to last seconds or minutes.[7] These experiences have been described as mystical experiences, intense emotions of God's (or another Higher Power's) presence, hallucinations of God's voice, visual hallucinations of a religious figure, and repetition of a religious phrase. Dostoyevsky described his experience: "The air was filled with a big noise, and I thought that it had engulfed me. I have really touched God. He came into me myself, yes, God exists, I cried, and I don't remember anything else."[8]

Interestingly, many mystics, prophets and religious leaders were thought to have epilepsy. Pope Pius IX (1792-1878) was known to have epilepsy,[9] and there is a question of whether such influential figures as Joan of Arc[10,11] St. Paul,[1] Mohammed[1,12] and Joseph Smith[1,9] had epilepsy. Descriptions of events which lead to their subsequent religious conversions and activism caused some to suggest that these prophets were under the influence of epilepsy, with ictal religious experiences, and not God.[1,7,11,12]

Joan of Arc had paroxysmal episodes of auditory and visual hallucinations, at times triggered by the sound of ringing bells. She would hear the "Voice of an Angel to [her] right," usually accompanied by a light, and occasionally would then see images that she later identified as Saint Catherine and Saint Michael.[10,11] When these episodes initially began as a child, she was frightened of them; however, as she became older she was no longer afraid and welcomed the experience.[10] These episodes occurred during wakefulness or sleep and would occur several times per week, though they were occurring daily around the time of her execution. It has been proposed that she had a reflex epilepsy (musicogenic epilepsy) and ecstatic auras, though a more recent hypothesis is that she had idiopathic partial epilepsy with auditory features.[10,11]

On his way to Damascus, St Paul suddenly fell to the ground and experienced visual and auditory hallucinations with photism and transient blindness. Following this episode, he converted to Christianity.[13]

The notion of Mohammed having epilepsy was first noted by the Byzantine historian Theophanes, who commented that Mohammed's wife lamented that she was "tied… to a man who was not only poor but epileptic as well."[12] Mohammed began to be visited by visions of a figure moving toward him, at times preceded by the sound of ringing bells, that told him to preach the word of God. He later became convinced that this figure was the Angel Gabriel and these were communications from God. It has been reported that "at the moment of inspiration, anxiety pressed upon the Prophet and his countenance was troubled. He fell to the ground like an inebriate or one overcome by sleep."[12] Dostoyevsky often compared his ecstatic auras to those of Mohammed.[8]

Joseph Smith had an episode where he was suddenly rendered speechless and felt afraid. At that moment, he "saw a pillar of light exactly over [his] head… which descended gradually until it fell upon [him]… [He] then say two personages, whose brightness and glory defy all description, standing above him in the air. One of them spoke unto [him]… When [he] came back to [himself] again… [he] was lying on his back looking up into heaven."[13]

Whether or not any of these prominent religious figures definitively had epilepsy is up for debate and will never be known. The idea that many of these people suffered from epilepsy, with ictal religious events, is intriguing, though there must be caution in ascribing medical diagnoses to all of these people. Moses saw a burning bush and heard voice of God and there are countless others with similar religious experiences. Surely all of religion does not boil down to epilepsy, mood disorders or schizophrenia. Pre-ictal hyper-religiosity, or religious psychosis, has also been reported with patients being moody, irritable and continually reading the Bible in the days and hours before their seizures. Following the seizure, they would return to pre-morbid functioning.[7]

Post-ictal religious psychosis can last hours to weeks. Ogata studied three patients with ictus-related religious experiences.[14] One woman had auditory hallucinations of deities during simple partial seizures, and during a week-long post-ictal psychosis following a cluster of seizures, had mystical experiences that led her to become a shaman. Another woman saw visions and heard the voice of Jesus during her post-ictal psychotic state. The third patient had a variety of religious experiences during his post-ictal psychosis, and later in life converted to four different religions. Notably, all three of these patients exhibited hyper-religious behavior interictally.

Interictal hyper-religiosity is a constant personality or behavioral trait, usually manifested by a heightened state of religious conviction. Most patients with interictal hyper-religiosity do not have ictal religious experiences. It has been noted that the hyper-religious behavior of patients is not the same as religious behavior seen in normal patients. The religions that these patients practice, are typically not "mainstream" religions.[1,14,15] Ogata's third patient joined a folk religion that worshiped the god of water, before converting to a contemporary Japanese religion, followed by a new sect of Christianity, before converting again to another folk religion. Dewhurst and Beard examined six patients with temporal lobe epilepsy (out of 26 with interictal hyper-religiosity) who underwent sudden religious conversions or became religious fanatics following seizures.[13] One patient who practiced the Jewish orthodox faith converted to Christianity and joined the Pentecostal Church before ultimately becoming Methodist. He practiced his faith fervently and was known to walk around in the streets with a banner that said "Be prepared to meet thy God." Another patient, who had postictal psychosis characterized by celestial experiences and feelings of elation, converted from Christianity to agnosticism during his second postictal celestial experience when he lost his belief in the divinity of Christ. Following their seizures, the other patients either believed they were the Son of God or God's special messengers.[13]

Waxman and Geschwind also noted that while some patients may deny religion, this denial may actually be due to deep religious convictions. They described a patient who rejected religion because the clergymen were not devout enough, another patient feared God "would strike [him] dead if [he] were to set foot in a church," and yet another patient was "beyond religion" and "a cosmic minister to the world."[16]

It has been suggested that ictal religious experiences tend to occur with a right temporal lobe seizure focus, while post-ictal religious delusions and psychosis may occur in patients with bitemporal foci, though this is not concordant with other studies.[7] Devinsky reported a case of resolution of interictal hyper-religiosity following a right temporal lobectomy and seizure control.[7] The interictal hyperreligiosity was manifested as increased interest in religious matters, preaching to those around him and occasional interruption of group activities with praying. Following a right temporal lobectomy and seizure freedom, he did not experience religious thoughts. Dewhurst and Beard reported a patient with continued religious interest following a left temporal lobectomy and seizure freedom.[13]

Psychiatric Co-morbidities

The anecdotal case reports of patients with postictal religious psychosis and interictal hyper-religiosity in the 19th century lead some to question whether there is an increased incidence of psychiatric co-morbidities in patients with epilepsy. Current studies have shown higher incidences of psychiatric disorders, including mood, psychoses and behavioral/personality disorders, in patients with epilepsy than in the general population.[17-19] Whether or not those with temporal lobe epilepsy (TLE) have a higher incidence of concomitant psychiatric disorder than those with a generalized or extra- temporal lobe epilepsy, remains up for debate. No difference in the frequency of associated psychiatric co-morbidities could be found in a study comparing TLE patients with non-temporal localization related epilepsy patients.[20] A meta-analysis of studies evaluating associated psychiatric disorders in patients with temporal lobe epilepsy and extra-TLE (partial) or generalized epilepsy was inconclusive.[6]

Studies comparing patients with epilepsy with a control group of patients with another chronic illness have not shown an increase in psychiatric co-morbidity in the epilepsy group.[6,20] However, a study by Perini comparing TLE patients with patients with JME, diabetes and normal controls found a significantly higher incidence of psychiatric co-morbidities (including mood and personality disorders) in patients with TLE (80 percent) compared to those with JME (22 percent) and diabetes (10 percent).[21] It is suspected that the chronicity of the disease, as well as dysfunction of the limbic system, are probably important factors in the development of psychiatric co-morbidities.[21] In addition, other important risk factors include age at onset, number of seizure types, severity of the epilepsy (well controlled versus intractable), and etiology.6 It is thought that some of the studies which found no difference in the frequency of psychiatric co-morbidities in patients with TLE and extra-TLE had multiple, inconsistent variables between the two patient groups;[6] however a study by Swinkels with similar patient groups also did not find an increase in associated psychiatric co-morbidities.[20]

Mood disorders are the most common psychiatric co-morbidity, particularly depression (30 percent), followed by anxiety disorders (10-25 percent), psychoses (2-7 percent) and personality disorders (1-2 percent).[18] Depression and anxiety have an 8-48 percent prevalence in patients with temporal lobe epilepsy or refractory epilepsy compared with 6-17 percent in the general population.[18]

Psychosis can be peri-ictal (pre-ictal, ictal or postictal) and

interictal. In general, interictal psychosis is not well characterized, likely related to lack of standardization of diagnostic criteria and terminology. It is generally accepted that the prevalence of interictal psychosis is higher in patients with epilepsy than the general population, though exact estimates vary amongst different studies,[19] likely due to selection bias in tertiary centers. It typically begins several years—at least 10—after the onset of epilepsy, and tends to occur in patients with localization related epilepsy compared to generalized epilepsies, with the focus usually in the temporal lobe.[19]

Most commonly, interictal psychosis is "schizophrenia-like," with less negative symptoms, preserved personalities and interpersonal relationships and a more benign course. Interictally, patients may also demonstrate forced normalization, which refers to the inverse relationship between psychosis and normalization of the EEG and seizure control. Postictal psychosis is more clearly defined, and usually occurs after a cluster of seizures, usually complex partial seizures.[19] Following the cluster, there is a lucid period for hours to days prior to onset of the psychosis. During this time, patients may experience mood changes, paranoid and religious delusions, and hallucinations.

Personality disorders also have an increased prevalence in patients with epilepsy as compared to the general population.[18,22] Certain behavioral features, such as hypergraphia, hyperreligiosity, viscosity and hyposexuality were noted to be common interictal personality features among patients with temporal lobe epilepsy. These behavioral features, known as the Gastaut-Geschwind syndrome had long been recognized in the 19th century, but it wasn't until Gastaut and Geschwind re-evaluated these features in the 20th century that a "temporal lobe personality" was named.[16] In their original article, Waxman and Geschwind presented several patient cases exemplifying the certain characteristics of the "temporal lobe personality," in addition to presenting the previously unreported finding of hypergraphia.

A meta-analysis of studies of personality disorders in patients with epilepsy compared to the general population reveal an increased prevalence in those with epilepsy (4-38 percent) compared to the general population (5.9-13.4 percent).[6] A comparison of patients with epilepsy with those with asthma also showed more personality disorders in patients with epilepsy.[6] However, there is a question as to the specificity of the personality features to epilepsy, as they are also found in patients with other neurologic and psychiatric disease.[23]

Initial attempts to study the temporal lobe personality were difficult as conventional testing (*e.g.*, Minnesota Multiphasic Personality Inventory (MMPI)) proved inadequate. Over time, various scales that evaluate more specific personality features, including hyper-religiosity, have been developed, including the Bear-Fedio scale, the Hood mysticism scale and the INSPIRIT.

Bear and Fedio sought to create a scale that could accurately capture certain behavioral characteristics of patients with temporal lobe epilepsy, as prior scales were unable to help define the "temporal lobe personality." The Bear-Fedio Inventory (BFI) tries to define the relationship of temporal lobe epilepsy with specific behaviors and personality characteristics noted in prior studies by Bear, Geschwind, Blumer and Slater.[24] This questionnaire, designed to be completed by both patient and a close observer, evaluates 18 characteristics thought to comprise the interictal personality of patients with temporal lobe epilepsy (Table 1).

Following their initial study in 1977 of patients with epilepsy, neuromuscular disorders and normal controls, they conclud-

Table 1. Characteristic Traits of Temporal Lobe Epilepsy Patients

Trait	Clinical observations
Emotionality	Intense affect, deepening of emotions
Euphoria, elation	Exhilarated mood, grandiosity
Anger	Irritability, temper
Aggression	Hostility, Rage attacks, violent crimes
Sadness	Depression, self-depreciation, tearfulness
Altered sexual interest	Hyposexualism, loss of libido, hypersexual episodes
Dependence	Helplessness
Humorlessness, sobriety	Lacking humor, excess ponderous concern
Paranoia	Suspicious
Religiosity	Mystical events, multiple conversions, deep religious beliefs
Philosophical interest	Metaphysical or moral speculations
Hypergraphia	Keep detailed notes, extensive diaries
Circumstantiality	Loquacious, pedantic
Viscosity	Stickiness
Hypermoralism	Inability to distinguish significant and minor infractions
Obsessive-Compulsive	Orderly, Ritualism
Guilt	Self-scrutiny, self-recrimination
Feeling of personal destiny	Divine guidance, events highly personalized, egocentric

Table 2. Hood Mysticism Scale

I have…

1. *had an experience which was both timeless and spaceless*
2. *never had an experience which was incapable of being expressed in words*
3. *had an experience in which something greater than myself seemed to absorb me*
4. *had an experience in which everything seemed to disappear from my mind until I was consicous of only a void*
5. *experienced profound joy*
6. *never had an experience in which I felt myself to be absorbed as one with all things*
7. *never experienced a perfectly peaceful state*
8. *never had an experience in which I felt as if all things were alive*
9. *never had an experience which seemed holy to me*
10. *never had an experience in which all things seemed to be aware*
11. *had an experience in which I had no sense of time of space*
12. *had an experience in which I realized the onseness of myself with all things*
13. *had a experience in which a new view of reality was revealed to me*
14. *never experienced anything to be divine*
15. *never had an experience in which time and space were non-existent*
16. *never experienced anything that I could call ultimate reality*
17. *had an experience in which ultimate reality was revealed to me*
18. *had an experience in which I felt everything in the world to be part of the same whole*
19. *had an experience in which I felt that all was perfection at the time*
20. *had an experience which I knew to be scared*
21. *never had an experience which I was unable to express adequately through language*
22. *had an experience which left me with a feeling of awe*
23. *had an experience that is impossible to communicate*
24. *never had an experience in which my own self see*
25. *never had an experience which left me with a feeling of wonder*
26. *never had an experience in which deeper aspects of reality were revealed to me*
27. *never had an experience in which time, place and distance were meaningless*
28. *never had an experience in which I became aware of a unity of all things*
29. *had an experience in which all things seemed to be conscious*
30. *never had an experience in which all things seemed to be unified into a single whole*
31. *had an experience in which I felt that nothing is ever really dead*
32. *had an experience that cannot be expressed in words*

Adapted from Hood (ref. 28)

ed that their scale could accurately define the personality characteristics of those with temporal lobe epilepsy, and could lateralize the ictal onset. However, this study was criticized for not including patients with non-TLE, therefore, the results merely measured nonspecific psychopathology. Their follow-up study in 1982 included non-temporal lobe epilepsy patients, and the results confirmed those of their prior study: the patients with temporal lobe epilepsy scored higher than those with other types of epilepsy.[25] A meta-analysis of all studies utilizing the BFI was conducted by Shetty and Trimble.[26] Sixteen studies were analyzed and in seven out of 10 studies that were performed on patients with TLE, the TLE-group was accurately identified. Nevertheless, disagreement still remains on the specificity of this test. The BFI does consistently discriminate epilepsy patients from normal control, but is unable to consistently discriminate epilepsy patients from psychiatric patients.[6] Also, comparisons of TLE patients and those with primary generalized epilepsy are inconclusive.[6]

The Index of Core Spiritual Experience (INSPIRIT) is a seven-item scale developed to assess two core elements: (1) an event which resulted in a personal conviction of God's (or other Higher Power's) existence and (2) the perception of an intimate relationship with God (or other Higher Power).[27] The Hood Mysticism scale, or M-scale, is a 32-item questionnaire that evaluates eight categories of mysticism, based on Stace's work from 1960 (Table 2). It is based on two factors: (1) measurement of an intense mystical experience and (2) a religious interpretation of mysticism.[28,29]

Rare studies, some using these scales, have tried to examine hyper-religiosity in patients with temporal lobe epilepsy. Trimble and Freeman, in a study of 80 subjects (28 with temporal lobe epilepsy and prominent religious inclinations, 22 patients with TLE and no religious inclination and 30 church-going control volunteers), were given the BFI, the INSPIRIT and M-scale, as well as screens for depression and anxiety.[15] In general, the hyper-religious patients scored higher on the BFI on almost every trait, and scored higher on the M-scale and INSPIRIT than the normal churchgoing controls and non-religious group. Tucker et al. studied 76 patients with TLE with a unilateral focus and two control groups (one group with pseudoseizures and another with primary generalized epilepsy) for interictal hyper-religiosity and found no difference between the TLE patients and the two control groups.[30] He examined right versus left temporal lobe foci and found no difference between these two groups as well.[30] However, the scale used in this study was the MMPI, which is not as sensitive in detecting hyper-religiosity as other scales.[24]

Localization, Lateralization and Neuroimaging

Finding a neuroanatomical basis for psychiatric disease is becoming increasingly popular, but difficult to perform. As no consistent lateralization has been found for Gastaut-Geschwind syndrome across all studies, finding an anatomical lesion and correlate is difficult. The initial studies by Bear and Fedio suggested that patients with temporal lobe epilepsy with Gastaut-Geschwind localized to the right temporal lobe; however follow up studies were not concordant. Wuerfel et al .attempted to show an anatomical correlate in their study of 33 patients with refractory temporal lobe epilepsy and found that patients who scored higher on the Neurobehavioral Inventory (a revised version of the BFI) had smaller right hippocampi than those who scored lower.[31] No studies have confirmed this finding, likely due to lack of concordance of lateralization.

Interestingly, this has some correlation with the meta-analysis by Shetty and Timble which suggested that patients with mesial temporal epilepsy scored higher on the BFI than those with a lateral neocortical focus, although those with left temporal focus scored higher than those with a right sided focus. Some studies have found that those with bitemporal foci scored higher on the BFI than those with unilateral foci of either side,[6,15,21] while others determined that a left sided focus resulted in higher BFI score.[32] There are no data to support a localized or lateralized hyper-religious focus. One study of religious people during religious recitation found that there was activation of the dorsolateral prefrontal, dorsomedial frontal and medial parietal cortex on functional MRI, which are areas important in cognitive processing.[33] The results of this study have not been duplicated, and no conclusions or correlates can be drawn in those with the post-ictal religious psychosis and inter-ictal hyperreligious behavior.

Conclusion

Much debate remains about the association between religion and epilepsy and the existence and prevalence of the "temporal lobe personality" and hyper-religiosity. While certain personality characteristics have been noted in those with temporal lobe epilepsy, they may also be seen in those with chronic medical illnesses. The true incidence of isolated personality characteristics, such as hyper-religiosity, in these patients remains unknown, due to a combination of both lack of standardized definition and lack of inquiry on the subject.

The scientific study of religion is difficult; therefore, the scientific study of religious events and epilepsy is an arduous task. Anecdotal case reports are not enough to define a disease, but can raise questions about it. As validated standardized tests and definitions of hyper-religiosity are made and more studies are performed, more insight and evidence will come to either support or refute an association between epilepsy and religion. **PN**

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