



## Critical Emotional Changes as Symptoms of Recurrent Transient Ischemic Attacks (TIAs) Affecting Brain Temporal Lobe

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### Abstract

Transient ischemic attacks (TIAs) of the temporal lobe are infrequent and when they occur, they cause various and complex symptoms, including memory, language, hearing, but especially behavior and emotions. This is due to the binding that the temporal lobe has with the limbic cortex. Behavior can become submissive or aggressive; emotionality is expressed with apathy, anhedonia, fear. These disorders have been found by us as provoked by TIAs of the mesial temporal lobe, likely for alterations of the middle cerebral artery. The most frequent symptom in temporal lobe disorders is epilepsy, usually drug-resistant. Cognitive disorders can be mis-diagnosed as epileptic seizures for the susceptibility to epileptogenesis of the temporal lobe.

**Keywords:** Temporal lobe; Behavior; Temporal lobe epilepsy; TIA

### Short Communication

The brain Temporal Lobe (TL) consists of four areas: anterior or polar, posterior, medial, and lateral. The TL has several functions, mainly involved with memory, perception and language.

Being so close to the ears, the left and right TLs process what we hear. It plays a role in auditory, visual and long-term memory. The optic nerves pass through it on their way to the occipital lobes at the back of the brain, where vision is processed. The left TL includes Wernicke's area, which includes the region between the temporal and parietal lobes, and plays a key role in speech comprehension. TL is vascularized from the middle cerebral artery that also carries blood to the frontal and parietal lobes. TIAs of the TL are not frequent and when they manifest, they present particular symptoms of the emotional sphere [1]. We report the case of a 32 year old female, who manifested recurrent episodes of TIAs of the temporal lobe. These episodes consisted of anxiety, sadness, crying, and lack of appetite, fear, depressed mood, and desire to be alone. Disappearing within 24 hours the clinical history was as follows: she was affected by blood pressure increase, no diabetes, or other diseases. He was taking oral contraceptives. The laboratory parameters were normal, as well as the neuroimaging, brain MRI and MRI angiography (MRA) examinations. Echocardiogram and electrocardiogram such as electroencephalogram were also normal. Intercritical neurologic examination was normal. Transcranial Doppler (TCD) showed decreased flow from the left middle cerebral artery. During the episodes the patient also had receptive aphasia. Oral contraceptives were suspended and antiplatelet therapy was initiated. For about a year the patient has not presented TIAs. We believe that TL and TIAs are complex cases because they are erroneously interpreted as epileptic disorders. These are cerebrovascular disorders whose cause in some cases is not established and the objective is to prevent them from turning into stroke. TL affects the limbic system, which both stimulates, as well as inhibits, different emotions. People with problems in their mesial temporal lobe can have fits of rage, inappropriate crying or laughing, pseudo bulbar affect, even things like lassitude or apathy, meaning that they don't react to anything [2,3]. Typically, these things require damage to both temporal lobes but even with damage to one, people can notice differences in the way that they process emotions. Aggressive behavior is characterized by episodes of violence and criminal acts but their frequency does not appear different from that of the general population [4]. A low IQ and male sex are statistically relevant in aggression. Psychosis is schizophrenic in appearance, associated with auditory and visual hallucinations, disorders of thought, inconsistency, blocking, insertion of alien thoughts, delusional intuitions, flattening of affection. Depressive states are frequent and manifest themselves with irritability, loss of interest, and reduction of activity, anxiety, phobias, insomnia, sometimes interspersed by euphoric phases [4]. Temporal lobe psychopathology arises from the

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temporo-limbic connections, being the mesial part of the temporal lobe connected to the hippocampus, the site of memory, but especially to the amygdala and the remaining areas of the limbic lobe, where the emotions reside. In short, the temporal lobe is a complex and multiform type of cortex for the richness and variability of functions it contains. The medial or mesial portion carries out psychological functions that underlie the behavior and the emotional aspect. Recall that the temporal lobe contains a lateral portion, used for hearing and receptive language, if it concerns the left temporal lobe where the Wernicke's area is located. Acute cerebrovascular accidents, such as TIAs or resulting in chronicity such as stroke therefore, if they affect the temporal lobe cause psychological disorders, which are expressed in symptoms concerning behavior and emotions [5]. Human social behavior depends on a set of perceptive, mnemonic, and interpretive abilities that together may be termed social cognition. Lesion and functional imaging studies of social cognitive functions implicate the temporal lobes and mesial temporal structures as critical at the front end of social cognitive processes. The frontal lobes, in turn, function to interpret and to modulate these processes *via* top-down control. Damage to temporal regions is associated with specific derangements in social behavior. Lesions affect these neuroanatomic regions and might therefore impact social function. An important aspect of behavioral alterations is the link with epilepsy. The temporal lobe is also epileptogenic for the richness of excitatory neurotransmitters such as glutamate. In particular, the mesial temporal lobe is involved in the genesis of temporal lobe seizures, which are often the cause of drug-resistant epilepsy [6,7]. Changes in the emotional sphere are the consequence of temporal lobe pathologies, species of vascular or epileptic nature. Behavior can cause aggression, a tendency to perform acts against society and against oneself. On the emotional

side are present hyper anxiety, apathy, carelessness of oneself, even fear. These symptoms are the effect of the involvement of the mesial temporal lobe that being in close contact with the limbic cortex causes cognitive changes. It is not frequent, at least from the data of the literature, the response of alterations of behavior and emotionality during TIAs of the temporal lobe, being more frequent symptoms such as hearing impairments and sensory language.

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