Ictal Emotions

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INTRODUCTION

Some types of clinical seizures of epilepsy are manifested as emotional changes involving moods of fear, pleasure, rage, anger and depression; these are collectively referred to as ictal emotions. Unfortunately, the diagnosis of these changes in emotion as ictal emotions is baught with difficulty since ictal emotions cannot easily be distinguished from the nonictal psychiatric symptoms of rage and anger of the epileptic patient. As pointed out by Nakazawa et al.[1], it is not necessarily easy to judge whether the patient's complaints of loneliness or sadness should be taken as emotion or affect. Thus, a clear elucidation of the relationship between emotion and clinical seizure would be of great significance.

Having observed two patients that exhibited ictal emotions we would like to report their clinical courses and then review their cases.

CASE REPORT

Case 1: A 24 year-old scrubwoman

Family history: Her father was a heavy drinker and died of cerebral hemorrhage at age 44. Her mother and married elder sister are living and well.

A review of the family tree revealed no history of neurological or psychiatric disorders.

Growth history: Delivered easily at full-term. Mental and physical growth was delayed a little, probably due to bottle-feeding. She did not begin walking until the age of one year and ten months. Likewise, the development of speech was also much retarded. Probably because she was brought up living in the same house with her grandmother and great-grandmother she had few friends, was shy, obstinate and pretentious.

Her standing in elementary and junior high school was low.

Past history: She had uremia at the age of 6. At that time reten-

tion of urine, edema and clouding of the consciousness continued for 10 days or so and there was one attack of general convulsions. For one month after recovering from this crisis she spoke only baby talk.

Present illness: Since age 13, when menarche occurred, in which she loses consciousness for around 10 seconds and shows behavior such as throwing things or removing her clothing while yelling. During such spells she would also often mutter inarticulately. She was occasionally seized with a sensation of fear and the feeling that a vise was tighteneed around her chest during the one or two minutes immediately preceeding the onset of an episode.

She could recall this sensation of fear but had no memory of the episode itself. This pattern of the sensation of fear followed by an episode occurred two to three times a day. She had been receiving anticonvulsants since the first episode but the medicine had failed to bring the episodes under full control, probably because the rhythm of her life was disorderly and thus she took the medication irregularly.

In the autumn when she was 24, rigidity of the limbs and a state suggestive of cloudiness of consciousness occurred in the wake of an-usual episode and persisted for three hours. A similar state was noted one month later. Both of these episodes were triggered by quarrels she had with family members.

Recently, she had often become irritable, and in addition began worrying that her intellgence level was low, that she had episodes and that she was unmarried.

Findings on admission: Her behavior was childish for her age. Her actions and reactions were slow. She has an athletic build.

Neurological findings were unremarkable.

Laboratory findings: Hepatorenal function and peripheral blood showed no evidence of abnormalities. Reaction to the Wassermann test was negative. The level of serum electrolyte and electrolyte excreted in the urine, serum Cu value, Astrup examination, ceruloplasmin, PBI, T_3 and T_4 resin tests were all within the normal limits.

The fundus oculi showed no abnormalities.

ECG was within normal limits and the cerebrospinal fluid had normal protein, sugar and chloride levels though there was slight pleocytosis, the number of cells being 19/3.

r. CAG showed no travel abnormalities in the arterial system, but on venous patterns the position of the Torcular Herophili was high and the straight sinus showed a nearly horizontal travel. However, in this patient this change is believed to simply be an anatomical anomaly and

seems to have no clinical significance.

PEG showed no pattern indicating an enlarged cerebral ventricle.

Cerebral scintigram was negative.

Intelligence test: WAIS; verbal test, IQ 52, performance test, IQ 56. Suzuki-Binet, IQ 69.

Psychological test: The results of the Yatabe-Guilford "E" type, ink blot test indicated extreme intellectual and emotional indifference and often a negative response to stimuli that normally evoke a desire for affection. Most of the responses manifested themselves in relation to concern and anxiety about her body. She appeared confused about the body image of a grown-up woman and had a sexual conflict. This conflict was suppressed but holds the danger of taking on an uncontrollable impulsiveness at a later time when it manifests itself.

EEG: Electroencephalograms were recorded six times while she was in the hospital. In the awake resting records positive spike discharges appeaerd predominantly in the r. centro-occipital area and formed a square wave. EEG taken during sleep following oral administration of triclofos syrup (15ml) revealed that positive spikes appeared frequently and predominantly in the r. centro-occipital area when the patient was in a drowsy state. With stimulation by intravenous injection of 80mg of bemegride positive spikes appeared in the r. centro-temporal area and photic stimulation applied immediately thereafter resulted in the appearance of diffuse theta activity and also the appearance of negative spikes in the r. frontal pole-anterior temporal area. During the sixth recording, right hemispheric positive and negative spikes appeared frequently following intraveneous injection of bemegride (25mg) and there was a shift to secondary generalized seizure from psychomotor automatism.

Course after admission: On the third day after admission the patient, while asleep, said in a queer voice, "Gya!" and fell from the bed to the floor, swung her hands about and then to sleep. Similar attacks occurred three times before the following morning. During the physical examination the next day she suddenly cried, "I'm scared'" and turning pale she tried to cling to the doctor. One minute later she yelled in a loud and incoherent voice, "I don't know ··· I don't know ··· the fox ···, raccoon dog ···." She licked her lips, swallowed saliva, opened her mouth as if to vomit, rubbed both hands, grabbed at all things around her and tried to throw them, and scratched her chest for about two minutes.

During history taking immediately after the attack she stated that she had suddenly had feeling that were a mixture of loneliness and fear

and that she had felt as if her body were burning while her heart was pounding fast. Thereafter, this kind of attack would occur about twice a day and the nature and course of the attack was always the same. On some occasions, however, the attacks were accompanied by only fear without automatism. Also, there was a tendency for the attacks to occur frequently just before or just after menstruation.

During interviews with her family members she became extremely tense, her voice shaking and larynx quivering rhythmically. Sometimes she complained of anxiety, or a feeling of , onstriction in the chest or a prickling sensation in the limbs on the right side. But these complaints disappeared in several hours.

After oral administration of carbamazepine (400mg/day) was initiated, fear and automatism were completely brought under control. She was then discharged in three months.

In summary, the patient in this case had ictal fear followed by psychomotor automatism. Underlying this disorder was the problem of mental subnormality. At times, the patient's attack was accompained only by ictal fear and then there was a shift from automatism to secondary generalized seizure. These characteristics were combined with somatic symptoms of psychogenic reaction to present a great variety of symptoms.

Case 2: A 30 year-old housewife

Family history: Her father died of pulmonary tuberculosis and her mother died of heart disease. She has no siblings. There is no indication of hereditary factors for psychiatric or neurological disorders.

Growth history: She was delivered easily at full-term. She had febrile convulsions several times in infancy. She was brought up by aunt on the mother's side from her infancy and she graduated from elementary, junior and senior high school with good grades. At a women's college she obtained the degree necessary for work as a kindergarten teacher.

Past history: Not remarkable.

Present history: She was disappointed in love during the summer of her twentieth year when she was a second year student of the women's college. At that time she was seized by feelings of severe depression which were accompanied by suicidal thoughts. While wandering about with such suicidal thoughts she was picked up and placed in protective custody by the police. Two days later her depression lifted.

During the two years that she work as a kindergarten teacher she was gripped three times, each time without any specific cause, by severe sensations of despair. At these times she also had strong suicidal feelings

which were accompanied by episodes of wandering about for one to two days. At age 23 she married for love and eventually bore two children. After marriage she continued to feel occasional anger and loneliness. One or two times a year, both with or without psychological reaction and usually just before or just after menstruation, she would have episodes of wandering about or would punish her children so violently that the neighbors would complain. In all such episodes her memory was well maintained. Finally, she attempted to commit suicide twice within one week by taking overdoses of hypnotics and was admitted to the psychiatric ward.

Findings on admission: All hepatorenal functions and serum electrolyte values were within normal limits except for a mild iron-deficient anemia. Reaction to the serum Wassermann test was negative. ECG and the fundus oculi both appeared normal.

EEG: Electroencephalograms were recorded four times. In the resting records, theta activity sporadically appeared predominantly in both frontal areas and was increased by hyperventilation. In the sleep records following oral administration of triclofos syrup (20ml) positive spikes appeared in the r. fronto-temporal area. With stimulation by 50mg of bemegride, r. hemispheric dominant negative and positive spikes appeared frequently and there was a change from tonic spasms to generalized seizure.

Course after admission: During the second week after admission the patient, while in a depressed state, sneaked out of the hospital at night. She at first intended to commit suicide on the railway tracks but after a period of time changed her mind. She then wandered about for some 20km and eventually returned to the hospital. She stated that when standing by the railway tracks she had suddenly felt as if intoxicated, had felt like humming a song, and had started wandering about in a pleasant mood. With the administration of diphenylhydantoin and phenobarbialt she made satisfactory progress and was discharged three months later.

She stated that the despair, loneliness and pleasure that she experienced during episodes were the same in nature as such emotions experienced during the intermission between episodes.

In summary, in this case the patient suddenly felt despair and loneliness with or without psychological tension. Often this state was synchronous with the onset of menstruation. This state of despair was accompanied by suicidal thoughts which lasted 1 to 2 days. At times this depressive state shifted to a pleasant mood. Memory of the episodes was completely maintained. Generalized seizure was observed following activation with bemegride.

DISCSSION

Jackson (1880) was the first to point out fear as a clinical seizure of epilepsy. He reported that it is observed as part of the aura, occasionally as the initial symptom in a sequence, but rarely as isolated ictal fear. At present it is known that there exists ictal pleasure, ictal depression and so forth in addition to this ictal fear.

Penfield et al.[2] proposed that these emotional changes be classified as ictal emotions. Williams[3] investigated over 2,000 epileptic patients and found 165 patients in whom emotions were mentioned as the chief symptoms. Weil[4] found 28 cases of ictal emotions among 388 cases of symptomatic epilepsy and Nakazawa et al.[1] reported 44 cases of ictal emotions among some 3,500 cases of epilepsy. Among ictal emotions, fear accounts for the majority of the cases, followed by loneliness, pleasure, displeasure and depression, in that order (Nakazawa et al.[1], Williams[3]). Occasionally one patient exhibits two kinds of ictal emotions. "The emotion is stereotyped in that it is constant in both quality and time of occurrence during the attack" (Daly[5]).

Fear in Case 1 is described by the patient as "something like a mixed feeling of fear and loneliness," but there appears to be no substantial difference between this emotion, on the one hand, and the interictal period emotions of fear, loneliness and anxiety on the other.

The loneliness following a feeling of despair that was observed in Case 2 is similar in part to the "illusion of remoteness" described by Penfield et al.[2]. This illusion was related to fear, sadness and loneliness, and perhaps it should be classified as an illusion of emotion. In this case, however, the illusion was accompanied by suicidal thoughts, and in fact, the patient attempted to commit suicide several times. In this patient depressed feeling were brought to the foreground, but they lasted only 1 to 2 days and inhibition of performance was not observed. Therefore, this case is considerably different in nuance from endogenous depression. Inuzuka[6] reported two cases of interictal depression. His report is interesting in that he found that retardation was likewise mild during interictal depression compared with depressive emotion.

In Case 2, ictal pleasure, expressed as a good feeling, like that of being intoxicated, was also observed, though only once.

Fear in Case 1 was accompanied by palpitation and oppressed feeling in the precordial region. The prickling sensation of the limbs that the patient had apart from the foregoing symptoms can be explained fully as somatic symptoms of the psychological tension.

Consciousness was maintained during the emotional episodes in both

patients. As to what was experienced during ictal emotions, apparently neither patient felt that such emotions were completely foreign.

In Case 1, fear was accompanied by psychomotor automatism which on some occasions, further shifted to secondary generalized seizure. In other instances, however, the attacks ended only in fear. In Case 2, the patient's range of response during an episode was restricted to ictal depression or pleasure. However, in this case, two ambivalent emotions, depression and pleasure, were experienced within the course of one attack. Generalized seizure was observed only following activation by intravenous injection of bemegride.

Ictal emotions in Case 1 lasted 1 to 2 minutes and were followed by psychomotor automatism; fear could be regarded as an aura in this case. Ictal depression in Case 2 lasts much longer, from 1 to 2 days. According to the reports of Williams[3] and Weil[4], however, there are cases in which ictal depression lasts several weeks.

EEG findings in both cases suggest that the focus lies in the r. hemisphere, positive spike and theta burst being observed there. Ictal emotions are often found in temporal lobe epilepsy; Weil[4] reported that ictal emotions were found in 21 per cent of the cases of temporal lobe epilepsy belonging to symptomatix epilepsy. There also is a report that the EEG patterns related to emotional change are the rhythmic slow patterns (Walter et al.[8]). The epileptiform emotional change may be taken to be the result of faulte circuiting of responses to external stimuli which is due to underlying anatomical defects (Stevens[9]).

The focus of ictal emotions is located in a region near hypothalamus. The seizure discharge is propagated from there to the limbic system and neocortex, but there is presumed to be a time gap in between (Nakazawa et al.[1]).

In a study on epileptic patients showing cerebral pathology MacRae [10,11] supported the theory of Papez[12] that the cortical portion of the temporal region houses the mechanism of the emotion. Weil[4], due to his work on temporal lesions also sapports the theory of Papez. Meanwhile, Williams[3] presupposed several regions, each corresponding to a particular ictal emotion. As for the focus of ictal depression in particular, he suggested the region below the fissure of Sylvius as its location. In contrast to opinions that presuppose the focus to be in the right hemisphere (Williams[3], Weil[4,7], Henrikson[13]), there are reports that suggest the left hemisphere as the focal region (Nakazawa et al.[1], MacRae[11]). At the moment, it is difficult to decide with any certainty in which hemisphere the focus is actually located.

The treatment of ictal emotions is very difficult, particularly, those cases that do not respond to the administration of diphenylhydantoin or phenobarbital. However, it is reported that the combination of diphenylhydantoin and phenobarbital is effective for about half of the cases (Nakazawa et al.[1]). Carbamazepine in Case 1 and simultaneous administration of diphenylhydantoin and phenobarbital in Case 2 proved effective.

A full elucidation of ictal emotions is intimately related to studies on the brain mechanism of emotion. Thus, beyond the importance of gaining more knowledge so as to provide better clinical care, the further study of ictal emotions will be of great significance for increasing our understanding of brain function.

SUMMARY

Two cases of ictal emotions were presented. In one patient only the ictal emotions of fear and depression were present. In the second patient the emotions of fear and loneliness were sometimes accompanied by the ictal emtion of pleasure. In one of the cases, psychomotor automatism accompanied by generalized seizure followed the initial feeling of ictal fear. In this instance the fear and loneliness are an aura of the generalized seizure. In the other patient, generalized seizure, independent of the emotions was observed. The ictal emotion of depression was present and accompanied by suicidal thoughts that lasted 1 to 2 days.

Fear and depression as ictal emotions were not essentially different from emotions which experienced during the interictal period.

From the EEG it was surmised that the focus was present in the r. hemisphere. The relationship between the development of ictal emotions and other types of epileptic attack was discussed.

REFERENCES

1) Nakazawa, Y., Nakagawa, Y. and Omura, S.: Ictal emotions. (in Jap.). *Kyushu Neuropsychiat.*, 15 : 209-215, 1969.
2) Penfield, W. and Jasper, H.: *Epilepsy and the functional anatomy of the human brain.* Little Brown. Boston. 1954.
3) Williams, D.: The structure of emotions reflected in epileptic experiences. *Brain*, 79 : 29-67, 1956.
4) Weil, A.A.: Ictal emotions occuring in temporal lobe. *Arch. Neurol.*, 1 : 101-111, 1959.
5) Daly, D.: Ictal affect. *Am. J. Psychiat.*, 115 : 97-108, 1958/59.
6) Inuzuka, T.: Two cases of depressive state in the course of epilepsy. (in Jap.). *Kyushu Neuropsychiat.*, 12 : 305-310, 1966.
7) Weil, A.A.: Ictal depression and anxiety in temporal lobe disorders. *Am. J. Psychiat.*, 113 : 149-157, 1956.
8) Walter, V.J. and Walter, W.G.: Central effects of rhythmic sensory stimulation. *Electroence-*

phalog. Neurophysiol., 1 : 57-86, 1949.
9) Stevens, J.R.: Emotion. l activation of electroencephalogram in patient with convulsive disorders. *J. Nerv. Ment. Dis.*, 128 : 339-351, 1959.
10) MacRae, D.: On the nature of fear with reference to its ocurrence in epilepsy, 120 : 385-393, 1954.
11) — : Isolated fear, a temporal lobe aura. *Neurol.*, 4 : 497-505, 1954.
12) Papez, J.W.: A proposed mechanism of emotion. *Arch. Neurol. Psychiat.*, 38 : 725-738, 1937.
13) Henriksen, G.F.: Status epilepticus partialis with fear as clinical expression report of a case and ictal EEG findings. *Epilepsia*, 14 : 39-46, 1973.