Down's Syndrome and Late-Onset Epilepsy : A Case Report on Complications of Vascular and Alzheimer's Dementia

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Down's Syndrome and Late-Onset Epilepsy : A Case Report on Complications of Vascular and Alzheimer's Dementia

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Two types of epilepsies are exhibited in Down's syndrome cases:early-onset and late-onset. Previous reports have shown that late-onset epilepsy is usually manifested as generalized epilepsy, and that the rate of Alzheimer's type dementia (DAT) is high in such cases.

In this paper a report is given of a case of 53-year-old female epileptic patient with Down's syndrome, with vascular dementia (VD) and DAT complications. Her seizure was identified as partial onset generalized tonic-clonic convulsion, and EEG examination revealed spike waves in right brain hemisphere. The type of epilepsy was a localization-related epilepsy, and its epileptogenesis is assumed to have a relation with VD. Previous focus on older Down's syndrome patients' epileptogenesis centerd only on DAT. However, it was indicated that VD had an impact on the epileptogenesis as well. This points out a need for detailed reports regarding the classification of epilepsy types and dementia.

Key words: Down's syndrome, late-onset epilepsy, dementia

Introduction

The high tendency towards epileptic complications connected with autism has been reported in many studies. However,recent studies have reported that Down's syndrome[1], or Trisomy 21, is also connected with higher rates of epileptic complications in comparision with the general population. Reported rate of complication vary between 9.4%[2], 15.9%[3], and 17%[4]. The pattern of the onset of epilepsy in Down's syndrome cases is bimodal[5], and include both early-onset and late-onset types[6]. Down's syndrome patients rarely live beyond the age 50 since many of them have congenital cardiovascular or pulumonary disease. However, late-onset type epilepsy has begun to be reported in recent years due to medical improvements which have lengthened the life expectancies of Down's syndrome patients beyond 50 years. It has been suggested that the late-onset epilepsy in these patients has a relation with Alzheimer's type dementia, of which high rates have been reported among older Down's syndrome patients[7~9].

Epilepsies are divided into two groups : generalized epilepsies and localization-related epilepsies[10]. It is generally understood the former type is more common among older Down's syndrome patients with late-onset epilepsy. This study reports on a case of a 53-year-old female Down's syndrome patients with localization-related epilepsies with VD and DAT complications. In addition, this report discusses epileptogenesis in Down's syndrome.

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Clinical History and Examination

The patient is the youngest of the seven siblings, and was born when her mother was 45 years old. Down's syndrome was not exhibited in any of the other siblings. The patient began to walk when she was two years old. Her speech was limited to babbling, and her intelligence was very low. The patient seldom attended elementary school, never attended junior high school, and has since spent her time passively at home.

Physically, the patient had obesity and nystagmus. When she was 45 she underwent cataract surgery. Surprisingly, through chromosomal examination, she was diagnosed as having Down's syndrome at the hospital at the time of her cataract surgery. Until then, the patient's family thought that she simply suffered from mental retardation. The patient possessed no cardiovascular, pulmonary, or immunological disease and has thus lived a healthy life for over 50 years.

However, at around the age of 50 the patient began to exhibit incontinence and began to require assistance in leading her daily life. She failed to understand simple instructions, her intelligence level decreased, and symptoms of dementia became apparent. Moreover, at the age of 52, epileptic seizures began to occur. The patient's seizures were diagnosed as partial onset Generalized Tonic-Clonic Convulsions („GTC) and occurred about once a month. The patient first visited the hospital at the age of 53, one year after the onset of seizures. At the time of physical examination, she was 124.5 cm in height, 29.0 kg in weight, and 50.5 cm in head circumference. During neurological examination, no hemiplegia was found. No IQ tests had been given prior to the onset of dementia, however, an IQ test given at the time of the psychiatric examination resulted in a score below 20, and advanced dementia was observed.

Electoroencephalographic Findings

EEG (Electoroencephalography) with monopolor lead setting found a single diffuse spike (Fig.1). In addition, the amplitude was high in the right brain hemisphere. When set up in bipolor lead, the spike was identified in the right posterior brain hemisphere, however, no spike and wave or multiple spikes and wave were recognized.

CT-scan Findings

An area of low density was found in the subcortex of right parieto-occipital lesions described above. Vascular dementia was suspected from the CT-scan examination.

MRI Findings

MRI (Magnetic Resonance Imaging) found enlarged lateral ventricles in comparisons with samples from the patient's age group. The degree of enlargment of the lateral ventricle was severe considering the degree in the brain cortex. The atropies were severe at the inferior horn of temporal lobe and the hyppocampus. In addition, multiple lacunar infarctions were identified. DAT and VD were suspected from the MRI findings.

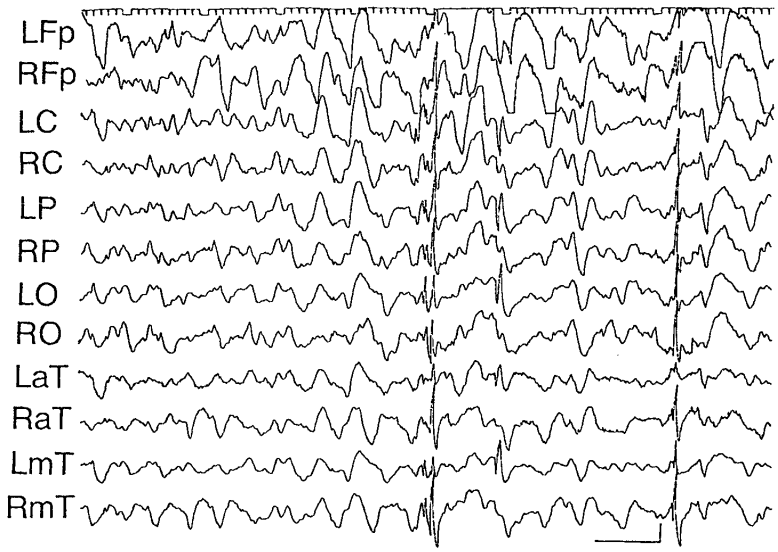

Fig.1 EEG examination showed high voltage spike waves in the right brain hemisphere.

Diagnosis and Treatment

The diagnosis of dementia included both VD and DAT. Seizures were identified as partial onset Generalized Tonic-Clonic convulsions. The type of epilepsy was diagnosed as localization-related epilepsy.

No therapeutic drugs were prescribed for dementia. Sodium valproate was prescribed at 600 mg per day as an antiepileptic drug. Blood levels for antiepileptic prescription were 59.6μg/ml. The first choice of an antiepileptic drug was Carbamazepin. However,sodium valporate was prescribed to prevent drug induced drowsiness and mental deterioration. As a result, epileptic seizures disappered completely. No side effects, such as biochemical or somatic disorders, due to the sodium valproate, were found.

Discussion

Along with everyone else in our aging society, disabled person, too, are aging. In person with autism, mental retadation, and Down's syndrome, aging is frequently accompanied by dementia. Person with such disorders which interfere with or damage their intellectual abilities are difficult to diagnose as having dementia, since their intellctual functions are already reduced. It is especially difficult to diagnose dementia in Down's syndrome patient due to their often severe mental retardation.

In the case of the subject of this report, the patient developed incontinence and began to fail to understand previously understood instructions. However, since several mental retardation had been the case throughout the patient's life, the family did not recognize the presence of

dementia. Considering the alternations in the daily behavior patterns of the patient, pathognomy clearly indicates the onset of dementia at around the age of 50. This dementia is believed to be due to degeneration of and vascular changes in the brain rather than natural physical dementia.

The diagnosis of dementia is based on clinical symptoms. Whether the dementia is VD or DAT cannot be determined by the DSM-IV and ICD-10 ; neither can CT-scan or MRI distinguish between the two. However, it is clear that the patient has dementia; thus, this patient's condition can be concluded as a rare case complication of VA and DAT[11]. DAT is divided into two types, early-onset type which arises before presenium, and late-onset type which arises after the age of 65. Early-onset type DAT is common in Down's syndrome. This is not because Down's syndrome patients usually do not live beyond the age 65, but it is probably because the brain of Down's syndrome patients age more quickly. Recent studies indicate that the β-protein is over-produced in Down's syndrome patient who reach the age of 40 and beyond, and the β- protein concentrates in the brain leading to dementia. DAT appears more often in female, so in this case the sex of the patient was believed to be very significant.

At this point, I would like to discuss Down's syndrome and epilepsy. Regarding Down's syndrome patients, early-onset epilepsy is likely to manifest itself during infancy below the age of one year. On the other hand, it is common for late-onset epilepsy to occur first after the age of 40[7]. This is to say that the epilepsy appearing in Down's syndrome patients demonstrates age-dependency. This age-dependency indicates that cerebral degeneretion is a contributing factor in epileptogenesis due to aging in Down's syndrome patients.

EEGs of late-onset epilepsy show generalized discharge. In late-onset epilepsy, generalized seizures[12] such as GTC and myoclonic seizures, and absence are common. It is characteristic that, at onset, localization-related epilepsy is not common, but generalized epilepsy is. In addition, it is understood that generalized epilepsy is connected to DAT and that DAT contributes to development of epileptogenesis by reason of the deterioration of neurons[6]. Previous reports of cases of localization-related epilepsy with VD complication have been rare. However, in this case the local paroxysmal discharge demonstrated localization-related epilepsy. Furthermore, it was diagnosed as VD and DAT. The local paroxysmal discharge appeared in the right hemisphere and it was seen in the same location as an infarction identified on the CT-scan screen. This suggested that the epileptogenesis of the current case had more to do with VD than DAT. However the connection of DAT with epileptogenesis cannot be rejected. It is common knowledge that the atrophy of the hyppocampus has a tendency towards epileptogenesis in localization-related epilepsy. It is suspected that the atropy of the region recognized through MRI examination contributed to epileptogenesis.

Detailed reports of EEG findings, epileptic seizure types, and epilepsy types are needed in the future. The authors believe that these reports on Down's syndrome patients exhibiting VD and/or DAT will contribute to the advance of epileptology.

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