Computerized Transverse Axial Tomography in Late Onset Epilepsy

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(Received December 3, 1977)

INTRODUCTION

In epilepsy that develops in adolescence and the middle years of one's life, attention should be paid as to whether tumors are present in the brain or not.

According to the results of bibliographical investigation on the incidence of epileptic seizures in patients with intracranial tumor, epileptic seizures appear in about 30 per cent and are rarely found among those under 15 years of age (Wada[1]).

According to statistics in Japan, epileptic seizures are found in 46 per cent of the cases of supratentrial tumors. In 53 per cent of them, epileptic seizures were the initial symptoms (Sano[2]).

In the same study, it was pointed out that intracranial tumors should be considered in late onset epileptics in whom the disease first developed at 20 or more years of age.

Those who developed the disease at age 21 and above accounted for as much as 20.05 per cent in an investigation on epileptics who attended the Out-Patient Clinic, Department of Neuropsychiatry, Yamaguchi University School of Medicine during 1976, as previously reported on. (Yamada et al.[3]).

Considering this large percentage bespeaks the existence of various problems with the usual method of examining epileptics. We performed computerized transverse axial tomography (CTAT) concurrently with EEG on 35 cases of late onset epilepsy during the period from January to June, 1977. Of them, three cases were found in which an intracranial

tumor was present. Operations were performed and the findings are reported here.

CASE REPORTS

Case 1: Male, 35 years of age

At age 29, the first generalized seizure was observed. EEG, CAG and brain scintigrams were performed on two occasions, but no abnormalities were found.

After that, generalized seizures were noted 2 or 3 times a month, and at 30 he was seen at the Out-Patient Clinic of this department.

EEG revealed sporadic theta burst bilaterally in the centroparietal areas.

Anticonvulsants had since been administered for four years in order to bring the seizures under full control.

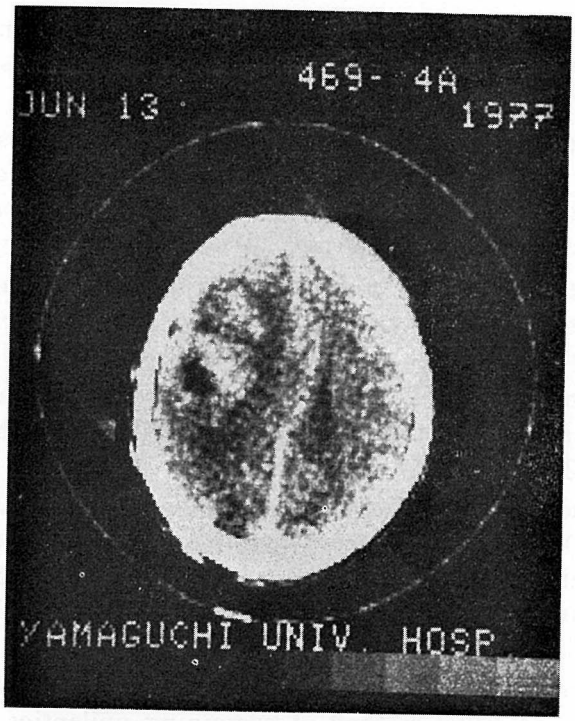

Fig. 1. Case 1. The CTAT reveals a large mass of increased density in the left hemisphere. The tumor is surrounded by an area of edema. Lower Vat portion corresponding tocystic region founds urgically. There is a marked shift toward the right side. Astrocytoma.

EEG examinations, once every six months, did not show any findings suggestive of the presence of an intracranial tumor. At age 35, headaches, hemiparesis on the right side, central type facial paresis on the right side, and slurred speech suddenly appeared.

Left congested papilla was observed, and a space-taking lesion near the motor area in the left hemisphere was suspected. A CTAT was performed which revealed a large mass of high density deep in the frontal lobe of the right hemisphere, as shown in Fig. 1.

A surgical operation to remove the brain tumor was performed at the Department of Neurosurgery, Yamaguchi University School of Medicine, and the patient was histopathologically shown to have malignant astrocytoma.

Case 2: Female, 33 years of age

At age 32, she had her first generalized seizure while asleep. After that, she came to have generalized seizures 1 or 2 times a month, and frequent losses of consciousness lasting several minutes.

Fig. 2: Case 2. The CTAT reveals a calcified mass in the right frontal region. The mass has a well defined border. Meningioma.

Findings of the EEG, funduscopic examination and cerebrospinal fluid test showed no abnormalities, and anticonvulsants were administered

However, since the seizures were not fully brought under control, a CAG on the right side was performed, the results of which revealed that a tumor was present in the anterior aspect of the right frontal region, and also that small aneurysms were present, one each in the right ophthalmic artery and right posterior communicating artery.

A brain scintigram revealed a concentration of RI in the right parietal area.

EEG's taken during this period showed spiky elements appearing in the leads from both frontal poles, and phase reversal, indicating the presence of focus in the right frontal lobe, was also observed.

A CTAT revealed densely calcified meningioma in the right frontal region (Fig. 2).

A surgical operation showed typical falx meningioma arising from the falx; a finding somewhat different from the CTAT pattern. Total extirpation was successful.

Case 3: Male, 24 years of age

At age 23, he had his first generalized seizure. EEG, funduscopic examination, cerebrospinal fluid test and scout film examination of the skull showed no abnormalities. Nor were there any findings worthy of note, neurologically.

Generalized seizures occurring about once a month were brought under control with the administration of anticonvulsants.

Personality changes became conspicuous three months after the onset of the generalized seizures. An EEG taken at the 6th month after the onset of the disease showed theta bursts appearing dominantly in both frontal regions, but there was no spike discharge.

At age 24 (8 months after the onset of the disease). the patient began having generalized seizures often, and gradually, his consciousness became cloudy. Finally, findings such as left facial palsy and nuckal stiffness appeared.

As for CTAT patterns, there was a butterfly-shaped large mass in both frontal hemispheres. In this high density area was a cyst-like low density area. A CAG revealed that the middle cerebral arteries on both sides retracted outside symmetrically to show displacement. Diagnosed as falx meningioma, the patient was operated on.

A tumor in the right hemisphere was found to be in close contact with the falx, and at depth, reaching the wall of the frontal horn of the

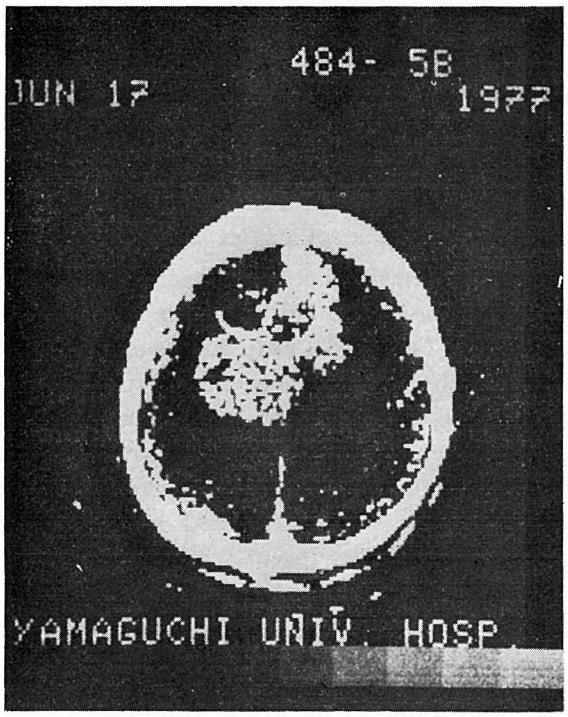

Fig. 3. Case 3. The CTAT reveals an irregularly formed large high density mass in the both frontal area. Glioblastoma multiforme.

right cerebral ventricle. The tumor in this area was extirpated almost completely. The tumor in the right hemisphere, not attached closely to the falx, was located in the white matter, and communicated continually with the corpus callosum, irrespective of the falx. It is to be extirpated in the second operation.

Histopathologically, glioblastoma multiforme is considered.

DISCUSSION

Great importance is attached to brain tumors as a cause of epileptic seizures that develop for the first time from age 20. Particularly, between the ages of 40 to 50, it should be considered a maior cause of epileptic fits.

Cases of brain tumors as the etiology of epilepsy are very few with epileptic patients taken together, with a low incidence of 0.03 per cent (Livingston[4]) to 0.6 per cent (Smith et al.[5]) reported. However, Lennox et al.[6] reported a high incidence of 8.8 per cent.

If viewed by age, brain tumors may be cited as a cause of epilepsy,

the incidence being about 10 per cent for persons in their 20's, or over, and about 20 per cent in persons 40 or over (Sheehans[7]).

In diagnosing patients who had late onset epileptic seizures, therefore, history taking, neurologic and EEG examinations must naturally be performed. Where these examinations showed no findings suggestive of brain tumors, it was usual to perform examinations such as spinal fluid test, pneumoencephalograms, angiograms and further brain scintigrams.

Even with the combination of these examinations, brain tumors may sometimes escape detection, depending on its localization, unless it grows to some extent. In such a case, anticonvulsants are administered and observations made on the clinical case, under special classification as late onset epilepsy. However, such a case often imbues therapists with a preconception that the case is primary epilepsy, since various examinations yield negative results and since attacks are controlled by anticonvulsants. Furthermore, in EEG's performed subsequently, diffuse alpha waves, arising from anticonvulsants, cancel slow waves, which leads to misdiagnosis.

In order to avoid such a pitfall in the diagnosis of epilepsy, Gastaut and Gastaut[8] advocate that EEG examination be combined with CTAT.

According to their reports, accurate diagnosis can be made 100 per cent of the time using CTAT, against only 21 per cent using only the clinical findings, 30 per cent using only the EEG, and 59 per cent using only the neurological method in epilepsy secondary to brain tumor.

Regarding the kinds of brain tumors and seizures, there are a great variety of brain tumors, such as hemangioblastoma, oligodendroglioma, astrocytoma and meningeal fibroblastoma, and generally, the incidence of seizures in high in tumors whose growth is slow (Penfield et al.[9]).

Also, it is reported that epileptic seizures are the initial symptoms in 53 per cent of the patients in which a supratentorial brain tumor is present, and that seizures are often the initial symptoms in cases where the tumor is benign (Sano[2]).

In conclusion therefore, it may be said that combining the CTAT test with various conventional tests is very important in making accurate diagnosis of epilepsy and observations on its clinical course.

As stressed by Gastaut and Gastaut[8], the introduction of CTAT in the research of epilepsy will make possible the anatomical study of the brain in living persons, thus opening up a wide prospect in the research of epilepsy.

SUMMARY

The CTAT, in combination with various conventional tests such as EEG, was performed on patients with late onset epilepsy in whom epileptic seizures occurred at 20 or more years of age.

Of 35 such patients, three were shown to have epileptic seizures arising from a brain tumor, and underwent neurosurgical operations.

Each had been on anticonvulsants for eight months to seven years with no findings of brain tumors tumors detected, even by neurological examinations, including EEG.

The slower the growth of the tumor, as in the case of benign tumors, the more likely epileptic seizures will occur.

Thus, it is stressed that performing a CTAT jointly is indispensible in diagnosing such cases.

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