A Case of Primary Central Nervous System Lymphoma: Crucial Implication in Multiphasic Physical and Brain Check-up

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INTRODUCTION

We report a 75-year-old man with primary central nervous system (CNS) lymphoma which was detected on the first physical and brain check-up. He developed headache, depression and the loss of body weight for recent two months, and received multiphasic health check-up in our institute. On brain check-up (Stratis II, Hitachi Medical Co., Japan), T2-weighted imaging revealed multiple hyperintense signal areas in the periventricular white matter and basal ganglia. The differential diagnosis between brain tumors and multiphasic health check-up was made by stereotactic brain biopsy in a University hospital. He was recovered after administration of steroid and radiotherapy. Primary CNS lymphoma was detected in one of 2,312 adult subjects who received brain check-up between April 1, 2001 and January 31, 2002 in our institute. This unique case points out that multiphasic health tests, including simultaneous brain check-up, contribute to the early discovery of brain tumors. The combined data of physical and brain check-up could have benefits for the selection of further laboratory studies and therapeutic strategy in patients with brain tumors.

Key Words Primary CNS Lymphoma; Brain Check-up; Multiphasic Health Testing

CASE REPORT

A 75-year-old man developed headache, depression and the loss of body weight for recent two months. These symptoms gradually progressed and he received the first multiphasic health tests, including brain and physical check-up, in our health institute. He had medication of hypertension, diabetes mellitus and prostatic hypertrophy in another hospital. Height was 162.3 cm and body weight was 57.3 kg. Body mass index was 21.8 kg/m². Blood pressure was 152/92 mmHg. The reduction of body weight was 2 kg for two months. Physical examination showed mild diffuse hypertrophy of the prostate on digital examination. Neurological examination revealed mild degree of depression. There were no other neurological deficits. The laboratory results of physical check-up were summarized in Table 1. The levels of fasting serum glucose and blood hemoglobin A1c were increased to 260 mg/dl and 11.4%, respectively. Urinalysis revealed fasting urine sugar was markedly positive. The data suggested severe degree of diabetes mellitus. Serum lactate dehydrogenase level was markedly elevated to 600 IU (normal < 420). Other blood chemistries and blood cell counts were normal. Occult blood tests of feces were negative twice. Several tumor markers, including serum levels of carcinoembryonic antigen, α-fetoprotein, carbohydrate antigen 19-9 and prostate specific antigen, were normal. Electrocardiography showed hypertrophy in the left ventricle (SV1+RV5:4.47 mV). Spirometry and chest X-ray were normal. Chest helical computed tomography also revealed no malignant tumors. Gastroduodenal X-ray disclosed a gastric polyp and irregular mucous membranes in the esophagus. Abdominal ultrasonography showed small cysts in the liver, gallbladder polyps and small cyst in the left kidney. No tumor mass lesions were seen on ultrasonography. Serum antibodies of human immunodeficiency virus were negative. Brain check-up was produced by 1.5 Tesla superconducting system (Stratis II, Hitachi Medical Co., Japan). Magnetic resonance imaging (MRI) such as T1- (TR/TE = 400/20 msec) and T2-weighted (TR/TE = 4750/120 msec) images, and magnetic resonance angiography were performed. T2-weighted imaging revealed multiple hyperintensities in the periventricular white matter and basal ganglia (Fig. 1). T1-weighted imaging showed a hyperintensity in the right posterior thalamus, but no other obvious lesions (Fig. 2). Magnetic resonance angiography disclosed age-
related atherosclerotic changes. The results of brain check-up indicated brain tumor and/or multiple lacunar infarctions. For the differential diagnosis between both diseases, gadolinium-enhanced T1 and fluid-attenuated inversion recovery (FLAIR, TR/TE/T1 = 10,000/2,200/100 msec) sequences were undergone in our depart-

ment of neurology. FLAIR imaging showed markedly multiple hyperintensities in the cerebral white matter and basal ganglia (Fig. 3). All of those lesions were homogeneously enhanced on gadolinium-enhanced T1-weighted imaging (Fig. 4). Brain MRIs strongly suggested metastatic or primary brain tumors. Brain metastasis of gastric or esophageal cancer was suspected on multiphasic health check-up. He was diagnosed preliminarily as brain tumors of unknown origins and rapidly admitted to a University hospital. On the basis of our check-up data, gastroscopy was performed at first. The cytology revealed a benign gastric polyp (group I). Prostate biopsy also showed benign hyperplasia. Finally, stereotactic brain biopsy was undergone. The histological study demonstrated diffuse large B-cell lymphoma. Following administration of steroid and radiotherapy, he was recovered.

**DISCUSSION**

We reported a man with senile onset of primary CNS lymphoma. The first brain check-up incidentally discovered this brain tumor in our case. Possible brain metastasis of stomach or esophageal cancer was considered by our data of check-up. Further histological studies of the stomach and the prostate were negative. The stereotactic brain biopsy demonstrated primary CNS B-cell lymphoma.

Primary CNS lymphoma is B-cell type in the majority of cases and constitutes approximately 2% of primary brain tumors in brain tumor registry of Japan.12) Recently, the incidence of this tumor is though to be increasing due to immunodeficiency virus and immunocompromised patients. Sex ratio is 1.5 fold higher in men than in women.12) This tumor occurs frequently in the sixth to seventh decade.12) In general, the locations of primary CNS lymphoma prefer to occur in the cerebral hemisphere, the corpus callosum and basal ganglia. The number of lesions is single or multiple.2),11) Recent chemo-radiotherapy significantly increases the survival of patients. Brain MRI features are reported in immunologically normal patients with primary CNS lymphoma.2),11) Recently, the MRI hallmarks of primary CNS lymphoma are studied in immunocompetent 40 patients before treatment.2) The results reveal that tumors are frequently localized near the cerebrospinal fluid space. There are no necrotic findings and moderate to strong contrast enhancement on MRI. The incidence of this tumor is extremely rare on brain check-up. Only one case of primary CNS lymphoma was discovered among total of 2,312 adult subjects with brain check-up between April 1, 2001 and January 31, 2002 in our institute.4) In our case, the characteristic aspects of brain MRI revealed multiple and homogeneous enhanced lesions without edema and necrosis. The locations were periventricular white matter and basal ganglia. The number of lesions was nine on gadolinium-enhanced MRI. MRIs suggested typical patterns of primary CNS lymphoma in our case. However, metastatic brain tumors were similar to those multiple lesions. The final diagnosis of primary CNS lymphoma was made by brain biopsy.

The incidence of all cancers or malignant tumors may be increasing in proportion to senile population. Our case of primary CNS lymphoma points out critical implication in multiphasic physical and brain check-up. One of major duties is postulated that health check-up should first detect early cancers or malignant tumors, leading to healthy promotion. We reported that the incidence of primary brain tumors was 50 to 100 fold higher on brain
check-up, in comparison with the prevalence by brain tumor registry from neurosurgical hospitals in Japan and the United States. Brain check-up can discover asymptomatic brain tumors. In addition to MRI features of brain tumors, physical check-up provides important data for the differential diagnosis between primary and metastatic brain tumors. In our health institute, we usually recommend physical check-up in combination with brain check-up. Such multiphasic health testing could promote the early discovery of fatal brain tumors. The combined data of physical and brain check-up also might contribute to the selection of further laboratory studies and therapeutic strategy in patients with metastatic or primary brain tumors.

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REFERENCES


