Medical Background of the Alzheimer Type Dementia

Alzheimer's disease (AD) and senile dementia of Alzheimer type (SDAT) are now universally concerned, and the prevention and therapy for these are most important. However, we have no concrete procedure for it. AD (and SDAT) has hitherto been mainly treated by the psychiatrists in Japan. But recent progress of image diagnosis and biochemical and immunological methods revealed many of newer aspects of this disease, and in these points, cooperative study with the internists and neurologists is indispensable. AD (or SDAT) is a disease in which abnormality is confined within the central nervous system, and indeed, we have not found any visceral or generalized abnormalities specific for this disease. But recently immunological studies by Khansari et al. (J. Neuroimmunol. 7: 279–285, 1985) showed a severely low production of Interleukin-1 by patients peripheral blood monocytes and significant decrease of the number of autologous rosette forming cells (ARFC). These data suggest a profound immunological deficit in AD.

Autoimmune mechanism for AD has been postulated from the following points: high incidence of the disease in female, the late onset, familial incidence and presence of amyloid in the core of senile plaques, and a tendency of familial clustering of autoimmune disorders such as lymphoma or thyroid disease. But, real correlation of these autoimmune phenomena to the brain pathology of AD is not clear.

Pouplard et al. (Rev. Neurol. 139: 187–191, 1983) detected anti-prolactin-cell antibody in 96% of 27 cases of AD, and in similar frequency of the patients with Down's syndrome.

Tiggelen (J. Orthomolecular Psychiatr. 13: 97–104, 1983) demonstrated, in AD patients, low level of vitamin B₁₂ in CSF despite of normal serum B₁₂ level and significant increase in the ratio of serum Cu/serum Zn, when it compared with those of patients with multi-infarct dementia as well as with a matched control group. The meaning of this finding is not so clear, though some abnormal mechanism of vitamin B₁₂ metabolism and zinc deficiency in this disease may be suggested. On the other hand, aluminium (Al) has been implicated already in the pathogenesis of AD. This way of thinking is not always properly appreciated, but it is important that Al may change the blood brain barrier function and permit any of toxic substances including Al penetrate into the brain (Banks, W.A. et al.: Lancet, ii: 1227–1229, 1983).

We have measured neurotransmitters and neuropeptides in the cerebrospinal fluid (CSF) of the patients with AD, SDAT, and multi-infarct dementia as well as controls (Nakamura, S. et al.: Jpn. J. Med. 25: 87–89, 1986). In CSF of AD, decrease of acetylcholinesterase, dopamine-β-hydroxylase and glutamic acid decarboxylase activity, and of homovanillic acid and 5-hydroxyindole acetic acid were proved. Vasopression decreased in SDAT. But CSF study is not proper way for screening AD or SDAT in the routine clinical works.

Recently, Atack et al. (J. Neurol. Sci. 70: 1–12, 1985) reported that plasma acetylcholinesterase (AChE) activity is significantly elevated in the AD and SDAT group as compared with the control and other clinical groups. They postulated that the increase of AChE in the plasma is due to increased release from degenerating cholinergic neurons. If the method to measure plasma AChE can be more simplified, the measurement of plasma AChE may be an important procedure for early and accurate detection of AD and SDAT in the clinical level.

Masakuni KAMEYAMA
Professor, Department of Neurology,
Kyoto University
Kyoto, Japan