

Image numbers of cardiac failure

Case 392

3. Alzheimer dementia

【Progress】

His family did not receive aid and care from medical service after diagnosis of suspicious Alzheimer disease.

【Discussion】

According to Japan Psychiatric hospital association, dementia is largely categorized into 4 types: Alzheimer disease, Lewy bodies dementia, brain vessels dementia, and frontal-temporal lobe dementia (1). Of these, brain vessels dementia arises from damages of ischemia due to brain infarction and/or brain hemorrhages.

Lewy bodies dementia is caused by accumulation of alpha synuclein (Lewy bodies) in neural cells. Lewy bodies dementia is reported to arise from dopamine deficiency. When dopamine deficiency occurs from shortage of dopamine secretion from substantia nigra, it is called Parkinson disease. Meanwhile, dopamine supply-deficiency occurs to whole brain, Lewy bodies dementia onsets. Dopamine produced by brain stem (substantia nigra) is carried to caudate nucleus and putamen, thereafter to whole brain cortex. Utilizing this mechanism, Radioisotope imaging diagnosis with dopamine transporter (DAT) is conducted for diagnosis of Parkinson disease and Lewy bodies dementia. Namely, comparing with healthy people, patients for Lewy bodies dementia and Parkinson disease, uptake of DAT is remarkably decreased. However, no specific changes for Lewy bodies dementia or Parkinson disease are recognized on MRI or CT, just aging-related changes.

Alzheimer disease is caused by accumulation of β amyloid in extra neural space and by accumulation of Tau protein in neural cells falling into apoptosis of neuron. What part of neuron apoptosis occurs first? Atrophy of Alzheimer disease begins with hippocampus and its connection route, especially amygdala (2-6). Amygdala is a center of emotion. Linkage between hippocampus and amygdala is so strong for repeated information going back and forth that memory is fixed in hippocampus (2-6). At the early stage of Alzheimer disease, the connection route between Amygdala and hippocampus is damaged, selectively falling into apoptosis of neuron. It induces disorder of retaining early memory.

Frontal-temporal lobe dementia is accompanied with both atrophy of frontal lobe and temporal lobe. Sylvian fissure is a groove space surrounded by lid and insula. Frontal lid is a component of frontal lobe and posterior lid is one of temporal lobe. Atrophy of frontal lobe and temporal lobe induces dilatation of Sylvian fissure. Then, dilated Sylvian fissure is an indirect sign of atrophy of frontal lobe and temporal lobe.

Insula is composed of spindle neuron which exists only in the brain of high-grade ape (7, 8). Anterior insula connects with cortex of limbic system and posterior insula is related with meditation or rationality. In other words, anterior insular is related with conscious desire that wells up from within the body: drug addiction such as heroin, nicotine, and alcohol (9, 10). Selective infarction of insula leads to loss of drug dependency. Posterior

insula is related with empathy of pain of others, and self-recognition to deal with emotion and information. All information comes from thalamus and output of information reach to amygdala and limbic system. Insula is thought to be a kind of information hub.

【Summary】

We presented a seventy-six-year-old male for memory disturbance for Alzheimer disease. Chronological CT over ten years depicted volume loss of bilateral amygdala, compatible with Alzheimer disease. It is borne in mind that atrophic change of amygdala is characteristic of Alzheimer disease, atrophic changes of frontal lobe and temporal lobe without atrophy of amygdala can be diagnostic with dementia of frontal lobe and temporal lobe, Lewy bodies dementia cannot be differentiated from aging-related brain change. Brain vessels dementia occurs accompanied with brain hemorrhage or brain infarction.

【References】

1. 認知症初期集中支援チームに必要な若年性認知症の知識」 (国立研究開発法人 国立長寿医療研究センター)
2. Coupé P, et al. Lifespan changes of the human brain in alzheimer's disease. Sci Rep. 2019 Mar 8;9(1):3998. doi:10.1038/s41598-019-39809-8
3. Jhaveri DJ, et al. Evidence for newly generated interneurons in the basolateral amygdala of adult mice. Mol Psychiatry. 2018 Mar;23(3):521-532.
4. Ressler KJ. Amygdala activity, fear, and anxiety: modulation by stress. Biol Psychiatry. 2010 Jun 15;67(12):1117-1119.
5. Morey RA, et al. Amygdala volume changes in posttraumatic stress disorder in a large case-controlled veterans group. Arch Gen Psychiatry. 2012 Nov;69(11):1169-1178.
6. Bickart, K. C., et al. (2011). Amygdala volume and social network size in humans. Nature Neuroscience,2011; 14:163-164.
7. Sara W. Lazar, et al. "Meditation experience is associated with increased cortical thickness". NeuroReport 2011; 16 (17): 1893-1897.
8. Nasir H. et al. "Damage to the Insula Disrupts Addiction to Cigarette Smoking". Science 2007; 315 (5811): 531-534.
9. Hyman, Steven E. (2005-08-01). "Addiction: A Disease of Learning and Memory". Am J Psychiatry 2005; 162 (8): 1414-1422. doi:10.1176/appi.ajp.162.8.1414 2008年3月4日閲覧
10. Marco Contreras, et al. "Inactivation of the Interoceptive Insula Disrupts Drug Craving and Malaise Induced by Lithium". Science 2007;318 (5850): 655-658.

back

2025.6.27