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Pathophysiology of hepatic encephalopathy: exploratory study using ^{13}N -ammonia PET

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Abstract

Increased blood ammonia in patients with liver cirrhosis is key factor to develop hepatic encephalopathy (HE). But, the pathophysiology of hyperammonemia-induced HE still do not have been fully understood. Nishiguchi et al. reported the evaluation of ammonia metabolism in the skeletal muscles of patients with cirrhosis using N-13 ammonia positron emission tomography (PET) before and after branched-chain amino acids (BCAAs) administration. Thus our aim is to clarify the regional cerebral ammonia metabolism before and after BCAAs administration. We are going to undertake N-13 ammonia PET of brain of cirrhotic patients before and after BCAA-enrich infusion, that are used as a treatment for hyperammonemia in Japan. Simultaneously, we are going to conduct neuropsychiatric tests, to consider the mechanism of HE by analysing the results and patient's biochemical profiles.

Symptomatic internal carotid artery occlusion that indicated development of FMZ binding with development of cognitive impairment after superficial temporal artery - middle cerebral artery bypass surgery. Two case report.

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Abstract

¹¹C-Flumazenil(FMZ) is a specific marker of the Benzodiazepine receptor. And permanently and irreversibly damaged cortex can be detected by reduced FMZ binding early after stroke. But in the present report, we describe two case of symptomatic internal carotid artery occlusion that indicated development of FMZ binding with development of cognitive impairment and cerebral metabolic rate for oxygen(CMRO₂) after superficial temporal artery - middle cerebral artery bypass.

Key words: Flumazenil, internal carotid artery occlusion, bypass

**A patient with focal rt patiero-occipital atrophy
in the right cerebral hemisphere
- Comparison with dementia of Alzheimer type and frontotemporal dementia-**

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Abstract

We report a 65-year-old woman who presented progressive left hemispatial neglect and left hemianopsia and focal parietooccipital atrophy in the right cerebral hemisphere. The patient noticed that difficulty in seeing the left side during driving since a year ago. Neurological examination revealed mild left hemispatial neglect and left hemianopsia while the other higher cortical dysfunction including memory disturbance was observed. MRI showed focal atrophy in the right parietal and occipital lobe without any vascular abnormality including posterior cerebral artery on MRA. The steady-state ^{15}O technique at positron emission tomography (PET) showed marked to mild decrease in regional cerebral blood flow (rCBF), oxygen metabolism (rCMRO₂) and oxygen extraction (rOEF) in the right parietooccipital cortex. The patient is still showing only left hemispatial neglect and left hemianopsia and mild constructional agnosia without any memory disturbance and other higher cortical dysfunction even the three years later from the onset. Our case does not match any diagnostic criteria of neurodegenerative disorders with focal brain atrophy with focal brain atrophy such as frontotemporal lobar degeneration (FTLD) and visual variant of Alzheimer's disease (vvAD), suggesting the possibility the new clinical entity of dementia caused by neurodegenerative disorders.

Experience of using PET-CT for head and neck cancer

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Abstract

Recently, PET examination has become common. We have reported the usefulness of using ^{18}F FDG-PET examination for head and neck cancer. In 2007, we performed PET-CT examination which can investigate whole body. In the present study, we reported the outline of it.

In 2007, we performed PET-CT examination for 14 patients. One of these, we suspected metastasis for abdomen after primary therapy. In this patient, there was a sign of integration of ^{18}F FDG in right abdomen in whole scan PET image. Later, we performed CT examination for abdomen. Then, it turned out cyst of kidney.

The distant metastasis is a great influence on prognosis in cancer. By using PET-CT examination which can investigate whole body, we can investigate not only metastasis for local lymph nodes or recurrence in primary lesion but also metastasis for distant organs. Therefore, PET-CT examination contribute to improve prognosis of patients who has head and neck cancer.

A visualization method of the PET brain functional image for clinical application

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Abstract

The role of the PET (positron emission computed tomography) has become more and more important for patients and nuclear researchers to obtain useful information. In the field of brain functional imaging, the PET images of CBF (cerebral blood flow), OEF (oxygen extraction fraction) and CMRO₂ (cerebral metabolic rate of oxygen) are quite valued. However as the PET images are not good anatomically, they often need to be registered with the ones from other imaging modalities, such as MR (magnetic resonance) and CT (computed tomography). Another problem is that PET CBF image cannot be directly registered with the other two (OEF and CMRO₂) images for some technical reasons. The purpose of this work is to establish a method of simultaneous displaying of the integrated PET image of the above three brain functions. The work was proceeded through three steps; normalization, simplification and integration of the three functional images. For normalization, the CBF images of normal volunteers are integrated with their OEF and CMRO₂ images by statistical processing and the accuracy of the integrated image was examined. 536 ROIs (regions of interest) are settled on the image using the 3DSRT software and the normal value for each ROI was determined by statistically analyzing the collected data of normal volunteers. To simplify the display of the integrated image, the parts whose data are within mean \pm 2SD of the normal are processed not to be discriminated. Although the integrated image has yet been improved for practical application, it has enabled simultaneous diagnosis of CBF, OEF and CMRO₂.