

Cerebral perfusion pattern of idiopathic normal pressure hydrocephalus studied by SPECT and statistical brain mapping

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Objectives: To investigate the specific pattern of cerebral blood flow (CBF) in subjects with idiopathic normal pressure hydrocephalus (iNPH) using voxel-based analysis. **Methods:** *N*-isopropyl-*p*-[¹²³I]iodoamphetamine (IMP) single photon emission computed tomography (SPECT) images were performed in 30 iNPH patients, who met probable iNPH criteria, 30 Alzheimer disease (AD) patients and 15 normal control (NC) subjects. Inter-group comparisons between iNPH patients and NC subjects and between AD patients and NC subjects were performed using three-dimensional stereotactic surface projection (3D-SSP) analysis. Individual 3D-SSP images of the iNPH patients were assessed by visual inspection. **Results:** On the Z-score maps, areas of relative hypoperfusion were recognized around the corpus callosum in all 30 iNPH patients, as well as in the Sylvian fissure regions in 19 of 30 iNPH patients which included artifacts by dilated ventricles and the Sylvian fissures. Ten frontal dominant, eight parietotemporal dominant, and 12 diffuse hypoperfusion types were demonstrated. Inter-group comparison between iNPH and NC subjects showed relative hypoperfusion in the frontal and parietotemporal areas and severe hypoperfusion around the corpus callosum and Sylvian fissure regions, while parietotemporal and posterior cingulate CBF reduction was demonstrated between the AD and NC groups. **Conclusion:** Voxel-based analysis showed a characteristic pattern of regional CBF reduction with frontal dominant or diffuse cerebral hypoperfusion accompanying severe hypoperfusion around the corpus callosum and Sylvian fissures with artifacts.

Key words: idiopathic normal pressure hydrocephalus, cerebral blood flow, single photon emission computed tomography (SPECT), dementia, Alzheimer disease