

Study for utilization of databases of CBF and metabolism
Comparison of the normal data among the Japanese Council of Nuclear Neuroimaging,
NMCC 2D and NMCC 3D

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Abstract

Positron Emission Computed Tomography (PET) is widely used in clinical centers not only for diagnosis, staging and therapy monitoring in oncology, but also for brain studies such as functional imaging of cerebral blood flow (CBV) and oxygen metabolism. Most PET facilities obtain normal volunteers' data before applying PET study to patients. If those normal data are available to each other, it helps to reduce the number of healthy volunteers for PET study in all. There are PET database of CBF, oxygen extraction fraction (OEF), cerebral metabolic rate of oxygen (CMRO₂) and cerebral blood flow (CBV) of healthy volunteers in Japan, and they are kept in the Japanese Council of Nuclear Neuroimaging (JCNN). The Purpose of this paper is to consider to utilize the JCNN database to check preciseness of the PET quantitative value in our facility. We compared 3 types of PET quantitative database (the JCNN data, NMCC 2 Dimension (NMCC2D) data and NMCC 3 dimension (NMCC3D) data) and their standard deviations.

Method: We used the 3DSRT to set automatically the region of interest and analyzed the 3 types of database.

Result: Mean value's for superior frontal are as follows, CBF: JCNN=42.9, NMCC2D=39.1, NMCC3D=38.0(ml/100ml/min), OEF: JCNN=0.41, MCC2D=0.44, NMCC3D=0.44, CMRO₂: JCNN=3.3, NMCC2D=3.2,

NMCC3D=3.3(ml/100ml/min), CBV: JCNN=4.0, NMCC2D=4.3, NMCC3D=4.8(ml/100ml). There are significant differences in many areas for CBF, OEF and CBV while CMRO2 values are similar among 3 types of the database.

Conclusion: It seems difficult for us to directly quote CBF, OEF, CBV from JNCC, because our NMCC2D and NMCC 3D CBF quantitative values are lower, and OEF and CBV are higher than JNCC. But by comparing with JNCC data, we can recognize our data's inclination and variance, and this may serve to reduce the number of healthy normal volunteers for PET study.