Putamen-to-caudate nucleus ratio

The putamen-to-caudate nucleus ratio is a measurement used in neuroimaging studies to assess differences in the size or volume of specific brain structures. The putamen and caudate nucleus are both structures within the basal ganglia, a group of nuclei in the brain that are involved in motor control, cognition, and emotion.

The putamen-to-caudate nucleus ratio is typically calculated by measuring the volume of these two structures using magnetic resonance imaging (MRI) or other imaging techniques. The ratio is then determined by dividing the volume of the putamen by the volume of the caudate nucleus.

Research has suggested that changes in the putamen-to-caudate nucleus ratio may be associated with various neurological and psychiatric conditions, such as Parkinson's disease, Huntington's disease, and obsessive-compulsive disorder. However, the use of this measurement is still being investigated, and its clinical utility has not been fully established.

Pak et al. investigated the predictive value of dopamine transporter (DAT) availability in the striatum of healthy subjects using 123I-FP-CIT single-photon emission computed tomography (SPECT). In total, 84 participants with available data on their weight for the 60 months after SPECT were included. Specific binding of 123I-FP-CIT to DAT was calculated using region-of-interest analysis, and the putamen-to-caudate nucleus ratio (PCR) was determined. After comparing the weights at 12, 24, 36, 48, and 60 months after SPECT with the baseline weight, they categorized participants into three groups: weight gain (> 5%), stable (-5%-5%), and weight loss (< -5%). PCRs of the weight-loss, stable, and weight-gain groups significantly differed at 36 and 48 months. According to post-hoc analysis, PCRs were lower in the weight gain group at 36 and 48 months compared with at the remaining time points. Overall, the results suggest that PCRs calculated based on DAT availability could be used to predict future weight changes. It is possible that the interactions between the caudate nucleus and the putamen, rather than the individual behavior of each structure, might play an important role in weight regulation. Further studies are needed to investigate the time-dependence of the predictive value of DAT [1) 2)].

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Pak K, Kim K, Lee MJ, Lee JM, Kim BS, Kim SJ, Kim IJ. Prediction of future weight change with the dopamine transporter. Brain Imaging Behav. 2019 Jun;13(3):588-593. doi: 10.1007/s11682-018-9878-0. Erratum in: Brain Imaging Behav. 2023 Apr 25;: PMID: 29744803.
2)
Pak K, Kim K, Lee MJ, Lee JM, Kim BS, Kim SJ, Kim IJ. Correction to: Prediction of future weight change with the dopamine transporter : Kyoungjune pak. Brain Imaging Behav. 2023 Apr 25. doi: 10.1007/s11682-023-00777-3. Epub ahead of print. Erratum for: Brain Imaging Behav. 2019 Jun;13(3):588-593. PMID: 37095417.