Tau PET

Tau PET (Positron Emission Tomography) is a medical imaging technique that uses a radioactive tracer to detect and visualize the distribution of tau protein in the brain. Tau protein is a substance found in the central nervous system, and abnormal accumulation or aggregation of tau is associated with various neurodegenerative disorders, including Alzheimer's disease and certain types of dementia.

In individuals with Alzheimer's disease and other tauopathies, tau protein forms tangles within brain cells, leading to cognitive decline and neurological symptoms. Tau PET imaging allows researchers and clinicians to non-invasively examine the presence and extent of tau pathology in the brain, providing valuable information for diagnosis, monitoring disease progression, and evaluating treatment response.

During a Tau PET scan, a small amount of a radioactive tracer, such as [18F]AV-1451 (also known as flortaucipir), is injected into the bloodstream. This tracer binds specifically to tau deposits in the brain. The positron-emitting isotopes in the tracer decay, emitting positrons that collide with electrons, leading to the emission of gamma rays. These gamma rays are detected by the PET scanner, which generates three-dimensional images that reflect the distribution and intensity of tau protein in the brain.

Tau PET imaging is a relatively new technique that is still primarily used in research and clinical trials. It holds promise for improving early detection, differential diagnosis, and monitoring of tau-related disorders. However, it is important to note that Tau PET imaging is not yet widely available and may not be routinely used in clinical practice. Consulting with a healthcare professional or specialist is recommended for specific information and guidance regarding Tau PET and its applications.

Amyloid-β plaques and neurofibrillary tangles (NFTs) are the 2 histopathologic hallmarks of Alzheimer disease (AD). On the basis of the pattern of NFT distribution in the brain, Braak and Braak proposed a histopathologic staging system for AD. Braak staging provides a compelling framework for staging and monitoring of NFT progression in vivo using PET imaging. Because AD staging remains based on clinical features, there is an unmet need to translate neuropathologic staging to a biologic clinical staging system. Such a biomarker staging system might play a role in staging preclinical AD or in improving recruitment strategies for clinical trials. Macedo et al. reviewed the literature regarding AD staging with the Braak framework using tau PET imaging, here called PET-based Braak staging. The aim is to summarize the efforts of implementing Braak staging using PET and assess correspondence with the Braak histopathologic descriptions and with AD biomarkers.

They conducted a systematic literature search in May 2022 on PubMed and Scopus combining the terms "Alzheimer" AND "Braak" AND ("positron emission tomography" OR "PET").

The database search returned 262 results, and after assessment for eligibility, 21 studies were selected. Overall, most studies indicate that PET-based Braak staging may be an efficient method to stage AD since it presents an adequate ability to discriminate between phases of the AD continuum and correlates with clinical, fluid, and imaging biomarkers of AD. However, the translation of the original Braak descriptions to tau PET was done taking into account the limitations of this imaging technique. This led to important interstudy variability in the anatomic definitions of Braak stage regions of interest. Refinements in this staging system are necessary to incorporate atypical variants

and Braak-nonconformant cases. Further studies are needed to understand the possible applications of PET-based Braak staging to clinical practice and research. Furthermore, there is a need for standardization in the topographic definitions of Braak stage regions of interest to guarantee reproducibility and methodologic homogeneity across studies [1].

[1]

Macedo AC, Tissot C, Therriault J, Servaes S, Wang YT, Fernandez-Arias J, Rahmouni N, Lussier FZ, Vermeiren M, Bezgin G, Vitali P, Ng KP, Zimmer ER, Guiot MC, Pascoal TA, Gauthier S, Rosa-Neto P. The Use of Tau PET to Stage Alzheimer Disease According to the Braak Staging Framework. J Nucl Med. 2023 Jun 15:jnumed.122.265200. doi: 10.2967/jnumed.122.265200. Epub ahead of print. PMID: 37321820.

From:
https://neurosurgerywiki.com/wiki/ - **Neurosurgery Wiki**

Permanent link:
https://neurosurgerywiki.com/wiki/doku.php?id=tau_pet

Last update: **2024/06/07 02:58**