Brain Atrophy and Multiple Sclerosis

Media Fact Sheet

What is brain atrophy in neurological diseases?
Brain atrophy is the permanent loss of brain tissue (both myelin and axons)\(^1,2\). It can affect the whole brain or be limited to specific regions, and can lead to physical or cognitive impairment. For example, if some elements of the cerebral hemispheres (the two lobes of the brain that form the cerebrum) are affected, conscious thought and voluntary processes may be impaired\(^2\).

How is brain atrophy measured?
Brain atrophy is assessed in patients as brain volume loss over time. Brain volume loss is measured by Magnetic Resonance Imaging (MRI), which uses a strong magnetic field to create detailed images of pathological changes in the brain including areas of inflammation, damage or scarring in nerve tissue\(^3\).

How is brain volume loss linked to multiple sclerosis (MS)?
MS patients lose brain volume at around three to five times faster than people without MS\(^4\). It occurs early and continues through the course of MS, and has been associated with cognitive impairment and disability in MS\(^5,6\). In MS, just as in other neurological conditions such as Alzheimer’s and Parkinson’s, the more brain tissue loss an MS patient has, the worse their future disability\(^7\).

MRI images of the brain demonstrate the extent of atrophy in people with MS compared to a healthy control (images B & C)\(^8\)

Assessing brain volume loss is increasingly becoming an important consideration in monitoring MS treatment effects. Several clinical trials have shown that brain volume loss is one of the best prognostic indicators of disability progression over the long term in MS\(^7,9,10\), and the prognostic value of brain volume loss for future disability progression has now been established in a number of studies. It is also becoming a standard secondary outcome in clinical trials\(^7,11\).

There are now disease-modifying therapies (DMTs) that aim to alter the natural course of MS by modifying the immune response. There are DMTs available that can reduce the frequency of relapses, delay the accumulation of physical disability and minimize brain volume loss\(^12\). The differences between the efficacy profiles of DMTs in relation to brain volume loss may be explained by the different effects they have on the CNS\(^13,14\).

References:

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