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Is the corpus callosum degeneration a predictor of long-term disability in Multiple Sclerosis patients?

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Axonal injury and loss of white matter has been well documented in corpus callosum (CC) of patients with multiple sclerosis (MS), an inflammatory demyelinating disorder of the of Central Nervous System (CNS). The CC is the largest compact white matter fiber bundle of the brain connecting the two cerebral hemispheres. It seems that CC continue to mature structurally from infancy to adulthood (Muetzel RL, 2008). The topographical organization of its fibers allows the association of its abnormalities with those of specific cortical regions. It is one of the few white matter tracts that can be adequately evaluated by conventional Magnetic Resonance Imaging (MRI), having sharply demarcated two-dimensional limits on a mid-saggital T1W imaging (Fiqueira FF, 2007). So, as a consequence of these anatomic characteristics, it is reasonable to assume that CC morphometrics might be used as a possible marker for the analysis of its integrity. Conventional and non-conventional MRI techniques have been used to characterize pathological damages of the CC; for instance, diffusion tensor imaging (DTI) can show white matter changes undetected by conventional MRI (Bester M, 2008).

We carried out a review focusing our interest on the diagnostic efficacy of MRI to predict MS disability. PubMed search engine was used to select manuscripts with predefined search terms: “corpus callosum”, “multiple sclerosis”, “disability” and “magnetic resonance imaging”. Only manuscripts in English language, published from January 2003 to January 2013, were selected. Abstracts and unpublished studies were excluded. References of all relevant retrieved articles, of review articles, were also evaluated manually in order to find additional articles. For data extraction an electronic form was prepared.

The findings of the review suggest that CC atrophy is a more sensitive marker of disease activity than the global atrophy measures, predicting clinically definite multiple sclerosis (CDMS)conversion as early as 6 months of clinically isolated syndrome (CIS) (Kalincik T, 2012). Furthermore, the occurrence or growth of lesions over the first year in the splenium of corpus callosum, together with the cerebellum and the thalamus, was associated with cognitive worsening at year 5. CC atrophy seems to be a simple and an accurate predictor of disability, mostly for secondary progressive MS (Fiqueira FF, 2007), and it seems helpful for routine clinical activities (Vaneckova M, 2012).

References

[1] Muetzel RL et al. (2008) The development of corpus callosum microstructure and associations with bimanual task performance in healthy adolescents. Neuroimage 39: 1918-1925.
[2] Fiqueira FF et al. (2007) Corpus callosum index: a practical method for long-term follow-up in multiple sclerosis. Arq Neuropsiquiatr 65: 931-935.
[3] Bester M et al. (2008) Early anisotropy changes in the corpus callosum of patients with optic neuritis. Neuroradiology 50: 549-557.
[4] Kalincik T et al. (2012) Volumetric MRI markers and predictors of disease activity in early multiple sclerosis: a longitudinal cohort study. PLoS One 7: e50101.
[5] Vaneckova M et al. (2012) Corpus callosum atrophy--a simple predictor of multiple sclerosis progression: a longitudinal 9-year study. Eur Neurol 68: 23-27.

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Key words
Corpus callosum, Multiple Sclerosis, MRI, predictor disability.