Reduced anisotropy of water diffusion in structural cerebral abnormalities demonstrated with diffusion tensor imaging

Titre	Reduced anisotropy of water diffusion in structural cerebral abnormalities demonstrated with diffusion tensor imaging
Type de publication	Article de revue
Auteur	Wieshmann, U C [1], Clark, C A [2], Symms, M R [3], Franconi, Florence [4], Barker, G J [5], Shorvon, S D [6]
Editeur	Elsevier
Type	Article scientifique dans une revue à comité de lecture
Année	1999
Langue	Anglais
Date	1999 Nov
Pagination	1269-74
Volume	17
Titre de la revue	Magnetic Resonance Imaging
ISSN	0730-725X
Mots-clés	Adolescent [7], Adult [8], Anisotropy [9], Cerebral Cortex [10], diffusion [11], Epilepsy [12], Humans [13], Image Processing, Computer-Assisted [14], Magnetic Resonance Imaging [15], Middle Aged [16], water [17]
Résumé en anglais	We used diffusion tensor imaging (DTI) to investigate the behavior of water diffusion in cerebral structural abnormalities. The fractional anisotropy, a measure of directionality of the molecular motion of water, and the mean diffusivity, a measure of the magnitude of the molecular motion of water, were measured in 18 patients with longstanding partial epilepsy and structural abnormalities on standard magnetic resonance imaging and the results compared with measurements in the white matter of 10 control subjects. Structural abnormalities were brain damage (postsurgical brain damage, nonspecific brain damage, perinatal brain damage, perinatal infarct, ischemic infarct, perinatal hypoxia, traumatic brain damage (n = 3), mitochondrial cytopathy and mesiotemporal sclerosis), dysgenesis (cortical dysplasia (n = 2) and heterotopia) and tumors (meningioma (n = 2), hypothalamic hamartoma and glioma). Anisotropy was reduced in all structural abnormalities. In the majority of abnormalities this was associated with an increased mean diffusivity; however, 30% of all structural abnormalities (some patients with brain damage and dysgenesis) had a normal mean diffusivity in combination with a reduced anisotropy. There was no correlation between fractional anisotropy and mean diffusivity measurements in structural abnormalities (r = -0.1). Our findings suggest that DTI is sensitive for the detection of a variety of structural abnormalities, that a reduced anisotropy is the common denominator in structural cerebral abnormalities of different etiologies and that mean diffusivity and fractional anisotropy may be, in part, independent. Combined measurements of mean diffusivity and fractional anisotropy are likely to increase the specificity of DTI.

URL de la notice	http://okina.univ-angers.fr/publications/ua5723 [18]
Autre titre	Magn Reson Imaging
Identifiant (ID) PubMed	10576712 [19]

Liens
[1] http://okina.univ-angers.fr/publications?f[author]=9638
[2] http://okina.univ-angers.fr/publications?f[author]=9639
[3] http://okina.univ-angers.fr/publications?f[author]=9632
[4] http://okina.univ-angers.fr/f.franconi/publications
[5] http://okina.univ-angers.fr/publications?f[author]=9640
[6] http://okina.univ-angers.fr/publications?f[author]=9641
[7] http://okina.univ-angers.fr/publications?f[keyword]=1214
[8] http://okina.univ-angers.fr/publications?f[keyword]=1002
[9] http://okina.univ-angers.fr/publications?f[keyword]=4933
[10] http://okina.univ-angers.fr/publications?f[keyword]=7986
[11] http://okina.univ-angers.fr/publications?f[keyword]=2418
[12] http://okina.univ-angers.fr/publications?f[keyword]=8352
[13] http://okina.univ-angers.fr/publications?f[keyword]=991
[14] http://okina.univ-angers.fr/publications?f[keyword]=8541
[15] http://okina.univ-angers.fr/publications?f[keyword]=6040
[16] http://okina.univ-angers.fr/publications?f[keyword]=5941
[17] http://okina.univ-angers.fr/publications?f[keyword]=5506
[18] http://okina.univ-angers.fr/publications/ua5723
[19] http://www.ncbi.nlm.nih.gov/pubmed/10576712?dopt=Abstract