

Volumetric Comparison of Fraction Anisotropy Using Diffusion Tensor Imaging for Corona Radiata in Patients with Intracerebral Hemorrhage

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Introduction

: In injury of the corona radiata of intracerebral hemorrhage (ICH), motor impairment and improvement can be predicted. This study was conducted for comparison of fractional anisotropy (FA) of the corona radiata depending on volume of ICH using diffusion tensor imaging (DTI).

Methods

Twelve patients with cerebral hemorrhage located around the corona radiata in the brain underwent DTI within 6 months of onset. The FA of the corona radiata located in the posterior internal capsule was calculated and compared depending on intracerebral volumes. FA was compared between healthy and unhealthy side and motor improvements were analyzed. FA ratio was compared between Group 1 (Group1, volume of ICH<30ml) and Group 2 (Group 2, volume of ICH=30ml).

Conclusions

Large ICH has a lower FA ratio. Negative correlation was observed between FA ratio and volume of hematoma. The FA of the corona radiata located in the posterior internal capsule showed good correlation with motor function and ICH volume.

Learning Objectives

Volumetric comparison of fractional anisotropy using diffusion tensor imaging for corona radiata in patients with intracerebral hemorrhage

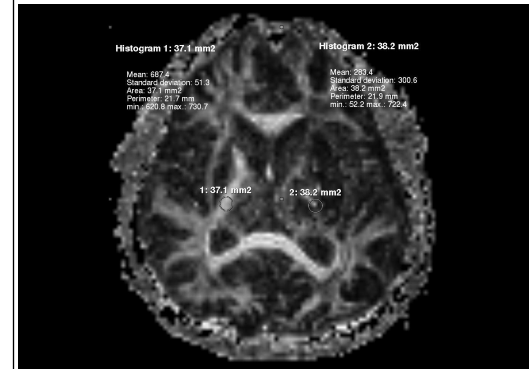
Results

Lower FA was found in Group 2 than in Group 1. Negative correlation was observed between FA ratio and volume of hematoma. Motor function also showed good correlation with FA anisotropy of corona radiata located in the posterior internal capsule.

References

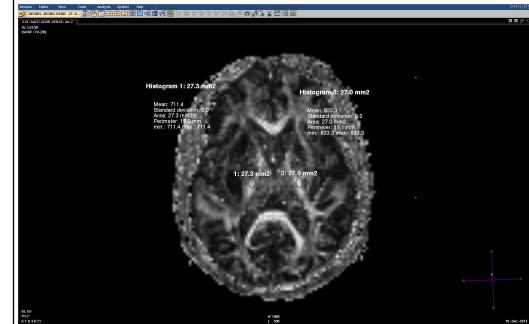
- Alexander AL, Lee JE, Lazar M, Boudos R, DuBray MB, Oakes TR, et al.: Diffusion tensor imaging of the corpus callosum in autism. *Neuroimage* 34: 61-73, 2007
- Alexander AL, Lee JE, Lazar M, Field AS: Diffusion tensor imaging of the brain. *Neurotherapeutics* 4: 316-329, 2007
- Basser PJ, Pajevic S, Pierpaoli C, Duda J, Aldroubi A: In vivo fiber tractography using dt-mri data. *Magn Reson Med* 44: 625-632, 2000
- Biernaskie J, Corbett D: Enriched rehabilitative training promotes improved forelimb motor function and enhanced dendritic growth after focal ischemic injury. *J Neurosci* 21: 5272-5280, 2001
- Broderick JP, Brott TG, Tomsick T, Barsan W, Spilker J: Ultra-early evaluation of intracerebral hemorrhage. *J Neurosurg* 72: 195-199, 1990
- Broderick JP, Brott TG, Duldner JE, Tomsick T, Huster G: Volume of intracerebral hemorrhage. A powerful and easy-to-use predictor of 30-day mortality. *Stroke* 24: 987-993, 1993
- Cho SH, Kim SH, Choi BY, Kang JH, Lee CH, Byun WM, et al.: Motor outcome according to diffusion tensor tractography findings in the early stage of intracerebral hemorrhage. *Neurosci Lett* 421: 142-146, 2007
- Conturo TE, Lori NF, Cull TS, Akbudak E, Snyder AZ, Shimony JS, et al.: Tracking neuronal fiber pathways in the living human brain. *Proc Natl Acad Sci U S A* 96: 10422-10427, 1999
- Crosson B, Ford A, McGregor KM, Meinzer M, Cheshkov S, Li X, et al.: Functional imaging and related techniques: An introduction for rehabilitation researchers. *J Rehabil Res Dev* 47: vii-xxxiv, 2010
- Grafton G, Goodall M, Gregory CD, Gordon J: Mechanisms of antigen receptor-dependent apoptosis of human b lymphoma cells probed with a panel of 27 monoclonal antibodies. *Cell Immunol* 182: 45-56, 1997

Figure 1



measuring the diffusion anisotropy in group A

Figure 2



measuring the diffusion anisotropy in group B