Korelasi MRI Difusi Normal-Appearing White Matter Korpus Kalosum dengan Volume Otak dan Disabilitas Klinis Pasien Multipel Sklerosis = Diffusion MRI of Normal Appearing White Matter in Multiple Sclerosis: Correlation with Brain Volume and Clinical Disability

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Abstrak

Latar Belakang: Parameter MRI difusi (ADC dan FA) otak pasien multipel sklerosis (MS) tidak hanya abnormal pada lesi, tetapi juga abnormal pada white matter yang bebas lesi dan terlihat normal pada MRI konvensional, atau disebut sebagai normal-appearing whitte matter (NAWM). Terdapat bukti perubahan mikrostruktural pada NAWM. Belum diketahui korelasi antara parameter MRI difusi NAWM dengan volume otak dan disabilitas neurologis pasien MS. Metode: Studi korelasi dengan desain cross-sectional. Terdapat 33 sampel yang dilakukan MRI otak dengan sekuens DTI. Dilakukan pengukuran nilai ADC dan FA pada struktur NAWM genu, korpus, dan splenium korpus kalosum masing-masing sampel, lalu dikorelasikan dengan volume otak yang diperoleh dari MRI volumetri, dan disabilitas klinis dalam bentuk EDSS. Hasil: Mean ADC korpus kalosum sampel 0,931 ×103 mm2/s (+ 0,131 SD), dan mean FA 0,717 (+ 0,116 SD). Terdapat korelasi kuat antara ADC dan FA NAWM korpus kalosum dengan rasio volume serebri tanpa ventrikel dengan volume intrakranial. Korelasi paling kuat adalah dengan FA (R= 0,78). Terdapat korelasi antara ADC dan FA NAWM korpus kalosum dengan EDSS, korelasi paling kuat dengan FA (R = -0,59). Kesimpulan: Terdapat korelasi antara ADC dan FA NAWM korpus kalosum dengan volume otak dan EDSS pasien MS. Diperlukan penelitian longitudinal untuk menilai kemampuan MRI difusi dalam evaluasi MS progresivitas MS.

.....Background: Diffusion MRI parameters (ADC and FA) abnormalities in multiple sclerosis (MS) patients are not limited to the lesions, but also observed in the white matter that appears normal on conventional MRI sequences, known as normal-appearing white matter (NAWM). There are evidences of microstructural processes occurring in the NAWM. Correlation between diffusion MRI parameters of NAWM with brain volume and clinical disability in MS patients is not well established. Methods: This is a cross-sectional correlation study. Brain MRI with DTI sequence from 33 subjects were included. ADC and FA measurements of the genu, body, and splenium of corpus callosum (CC) were done. ADC and FA values were correlated with brain volume from MR volumetry and clinical disability represented by EDSS. Results: Mean ADC of CC NAWM is 0,931 ×103 mm2/s (+ 0,131 SD), and mean FA 0,717 (+ 0,116 SD). There was a strong correlation between ADC and FA of CC NAWM and the ratio of brain volume to intracranial volume. Strongest correlation observed was with FA (R= 0,78). There was a strong correlation between ADC and FA of CC NAWM and EDSS. Strongest correlation was also with FA (R = -0,59). Conclusion: There was a significant correlation between ADC and FA of CC NAWM with brain volume and EDSS of MS patients. Further longitudinal studies were needed to evaluate the potential of diffusion MRI in the evaluation of MS.