論 文 要 旨

Histological Grade of Meningioma: Prediction by Intravoxel Incoherent Motion Histogram Parameters

（ Intravoxel incoherent motion ヒストグラムパラメータによる髄膜腫の組織学的グレードの予測 ）

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Rationale and Objectives: To evaluate the usefulness of intravoxel incoherent motion (IVIM) histogram analysis for differentiating low grade meningiomas (LGMs) and high-grade meningiomas (HGMs).

Materials and Methods: Fifty-nine patients with pathologically confirmed meningiomas (45 LGMs and 14 HGMs) underwent IVIM MR imaging. Maps of IVIM parameters (perfusion fraction, f; true diffusion coefficient, D; and pseudo diffusion coefficient, D*), as well as of the apparent diffusion coefficient (ADC), were generated. Histogram analysis was performed using parametric values from all voxels in regions-of-interest manually drawn to encompass the whole tumor. The histogram results of ADC and IVIM parameters were compared using the Mann-Whitney U test. Area under the receiver operating characteristic curve (AUC) values were generated to evaluate how well each parameter could differentiate LGMs from HGMs. Spearman's rank correlation coefficients were used to evaluate correlations between histogram parameters and Ki-67 expression.

Results: Compared to LGM, HGM showed significantly higher standard deviation (SD), variance, and coefficient of variation (CV) of ADC ($p< 0.006\_0.028$; AUC, 0.693_0.748), D ($p< 0.004\_0.032$; AUC, 0.670_0.752), and significantly higher CV of f ($p< 0.005\_0.024$; AUC = 0.737). Means and percentiles of ADC and IVIM parameters did not differ significantly between LGM and HGM. Significant positive correlations were identified between Ki-67 and histogram parameters of ADC (SD, variance, kurtosis, skewness, and CV) and D (SD, variance, kurtosis, and CV), whereas no significant correlation with Ki-67 was shown for mean or percentiles of ADC and IVIM parameters.

Conclusion: Heterogeneity histogram parameters of ADC, D, and f may be useful for differentiating LGMs from HGMs.