Cho/NAA ratio

A study of Wang et al., measured the diagnostic examination quality of magnetic resonance spectroscopy in differentiating high grade gliomas from metastases. PubMed, Embase, and Chinese Biomedical databases were systematically searched for relevant studies published through 10 July 2016. Based on the data from eligible studies, heterogeneity and threshold effect tests were performed; pooled sensitivity, specificity, and areas under summary receiver-operating characteristic curve of magnetic resonance spectroscopy were calculated. Finally, seven studies with a total of 261 patients were included. Quantitative synthesis of studies showed that pooled sensitivity/specificity of Cho/NAA and Cho/Cr ratio in peritumoral region was 0.85 (95% confidence interval: 0.79-0.90)/0.93 (95% confidence interval: 0.80-0.99) and 0.86 (95% confidence interval: 0.76-0.92)/0.86 (95% confidence interval: 0.73-0.94). The area under the curve of the summary receiver-operating characteristic curve was 0.95 and 0.90. Pooled sensitivity, specificity, and area under the curve of magnetic resonance spectroscopy to identify high-grade gliomas from metastases were 0.85 (95% confidence interval: 0.79-0.90), 0.84 (95% confidence interval: 0.75-0.90), and 0.90, respectively.

They concluded that magnetic resonance spectroscopy demonstrated moderate diagnostic performance in distinguishing high-grade gliomas from metastases. Furthermore, Cho/NAA ratio showed higher specificity and higher value of area under the curve than Cho/Cr ratio in peritumoral region. They suggested that Cho/NAA ratio of peritumoral region should be used to improve diagnostic accuracy of magnetic resonance spectroscopy for differentiating high-grade gliomas from metastases [1].

MRS has moderate diagnostic performance in distinguishing HGGs from LGGs. • There is no significant difference in AUC between Cho/Cr and Cho/NAA ratios. • Cho/NAA ratio is superior to NAA/Cr ratio. • Cho/NAA ratio shows higher sensitivity and specificity than Cho/Cr and NAA/Cr ratios. • MRS should combine other advanced imaging techniques to improve diagnostic accuracy [2].

MRS metabolites overcome volumetric parameters of peritumoral oedema and viable tumour, as well as tumour region ADC measurements. Specific MRS ratios (Cho/Naa, L-L/Cr) might be considered in a regular follow-up for these tumours. Advances in knowledge: Cho/Naa ratio is the strongest survival predictor with a log-hazard function of 2.672 in GBM. Low levels of lipids-lactate/Cr ratio represent up to a 41.6% reduction in the risk of death in GBM [3].

A meta-analysis shows that MRS alone has moderate diagnostic performance in differentiating glioma recurrence from radiation necrosis using metabolite ratios like Cho/Cr and Cho/NAA ratio. It is strongly recommended that MRS should combine other advanced imaging technologies to improve diagnostic accuracy. This article underlines the importance of implementing multimodal imaging trials and multicentre trials in the future [4].

For Bradac et al., strong correlation was demonstrated between Cho/Cr and Ch/NAA ratios. Strong

correlation was demonstrated between histological parameters of biopsy samples taken using Cho/Cr ratio and those from total tumour examination. Diagnostic accuracy of MRS-guided biopsy was 84%. Sensitivity and specificity of MRS combined with structural MR reaches 86% and 80% [5].

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