Apparent diffusion coefficient in vestibular schwannoma

To investigate the validity of various approaches, to extract quantitative measurements of diffusion imaging (i.e. apparent diffusion coefficient (ADC)) to investigate tumors of the central nervous system. In current studies the region of interest (ROI) for the quantitative measurements are placed arbitrarily according to morphology. Our aim is to investigate how placement patterns influence the ADC estimation in intracranial tumors.

METHODS: Twenty consecutive patients affected by vestibular schwannoma were studied using diffusion imaging. Apparent diffusion coefficient values were obtained using different ROI placement methods: segmentation of the whole tumor volume as ROI (vADC), random choice of 10 different ROIs (pADC) and a single ROI in the internal auditory canal portion (iADC).

RESULTS: iADC and vADC differed significantly (p<0.01). vADC was different between cystic and microcystic schwannomas (p=0.009) and between cystic and solid (p=0.006).

CONCLUSIONS: The positioning of ROI in these measurements is pivotal. While "whole tumor volume" measurements represent the largest amount of information, multiple seed points can be used as well. However, there have to be multiple seeds and their placement has to be reported. ADC can be used as a versatile tool for tumor assessment, but has to be used judiciously and structured to yield comparable results [1].

[1]

Mario G, Amir S, Madjid S, Arya N. MRI-ADC assessment of vestibular schwannomas: systematic approach, methodology and pitfalls. World Neurosurg. 2019 Feb 7. pii: S1878-8750(19)30287-6. doi: 10.1016/j.wneu.2019.01.176. [Epub ahead of print] PubMed PMID: 30738940.