RESEARCH TOPIC CLI26

Advanced Neuroimaging in brain tumors – ANTHEM (AdvaNced Technologies for Human-centrED Medicine)

Research Area

Services Area

Clinical Unit name

Neuroradiology dpt

Supervisor

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Abstract

The pathological contrast enhancing tumor (CET), depicted by conventional Magnetic Resonance, identifies the lesion burden. However, tumor cells that infiltrate beyond the CET are not detected and can lead to local recurrence. To overcome this limitation, a novel advanced diffusion MRI (dMRI) protocol based on both linear and spherical tensor diffusion encoding will be deployed. dMRI allows to separate confounding sources of diffusion variance, providing new indices of diffusion that are more specific to microstructural changes, determined by tumor infiltration, than conventional MRI. Scopes of the Doctorate will be the implementation of advanced imaging methodologies based on MRI in the depiction of tumor infiltration beyond macroscopic margins, and in the differentiation of treatment-induced changes from disease progression in primary and metastitic brain tumors.

Scientific references

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2. Szczepankiewicz F, van Westen D, Englund E, Westin CF, Ståhlberg F, Lätt J, Sundgren PC, Nilsson M. The link between diffusion MRI and tumor heterogeneity: Mapping cell eccentricity and density by diffusional variance decomposition (DIVIDE). Neuroimage. 2016 Nov 15;142:522-532. doi: 10.1016/j.neuroimage.2016.07.038. Epub 2016 Jul 20. PMID: 27450666; PMCID: PMC5159287.

Type of contract

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