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C0322 - POSTMORTEM DIFFUSION TENSOR MAGNETIC RESONANCE TRACTOGRAPHY FOR PRECLINICAL STUDIES IN PSYCHIATRIC DEEP BRAIN STIMULATION (DBS)

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Resumen

Objectives: In medically refractary depression stimulation of the superolateral branch of the medial forebrain bundle (slMFB) has shown promising clinical results. Diffusion tensor magnetic resonance tractography is an important tool to assist neurosurgical procedures. Tractography in postmortem brains is a tool recently described (Karla Miller, Oxford), were they perform a Steady State Free Precession sequence (SSFP) for hours without movement artifacts showing large tracts, but a description of more complex and interconnected tracts like the MFB is lacking so far. Our aims were to show the MFB, its course and connections for later validation and also to evaluate reproducibility of the postmortem DTI.

Methods: We performed MRI in 3 postmortem brains with no neurological pathologies. The Steady State Free Precession sequence was used (with slight modifications from the original) in a Siemens Trio MRI. A fitting box for the brain was used filled with Perfluoropolyether (Galden®PFPE, Solvay Inc). The data was analyzed using a MATLAB-based-in-house toolbox for fiber tracking (Universitätsklinikum Freiburg), and a single seed was set in the ventral tegmental area (VTA).

Results: The MFB was reconstructed in all brains. Its course showed two branches anterior to VTA: The inferomedial branch following the lateral wall of the 3rd ventricle into the lateral hypothalamus, and the superolateral branch reaches from VTA through the thalamus into the anterior limb of the internal capsule and ends in the frontal lobe (this last part was less marked and reproducible). After the changes in the diffusion directions made from the original sequence, the DTI with SSFP was reproducible in all 3 brains with no further incidents.

Conclusions: In this postmortem study the human MFB was reproducible in all brains, showing similar depiction, course and relation to other areas. More variability was shown in the frontal end of the tracts. SSFP is a reproducible sequence for postmortem DTI and could be helpful to validate clinical tractography.