SWAN SEQUENCE IN COMPARISON TO T2 FOR STN VISUALIZATION IN DBS SURGERY

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Background

Direct targeting of the *Subthalamic Nucleus* (STN) using MRI is difficult because of the low image contrast in common modalities.

Until recently the predominant approach for image-based STN localisation was based on T2 MRI.

Methodology

The use of *Susceptibility Weighted Imaging* (SWI) for STN visualisation was discussed earlier [1]. *Susceptibility Weighted Angiography* (SWAN) is an MR sequence recently introduced by General Electric based on multiple Gradient Echo T2* acquisitions.
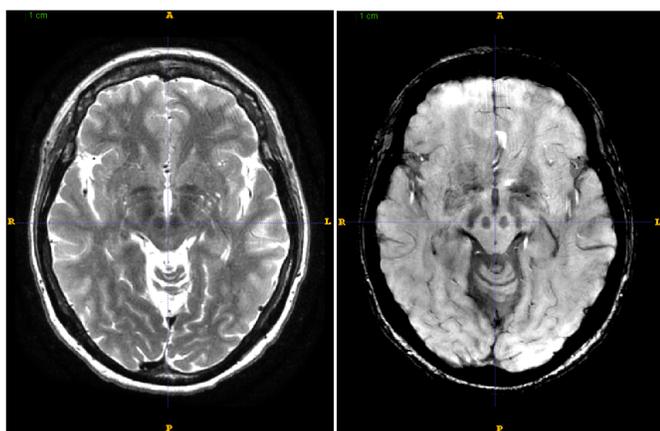

Figure 1 - Comparison of axial T2 (left) and SWAN images (right)

We compared the performance of SWAN- and T2-MRI for STN determination in daily clinical routine use. As the STN and the adjacent *Substantia Nigra* (SNr) are not discriminable in MRI, we regard both structures as a composite object that we refer to as SNr+STN.

Results

SWAN images yield a clearer delimitation of the SNr+STN to the surrounding tissue than T2 images. The fact that
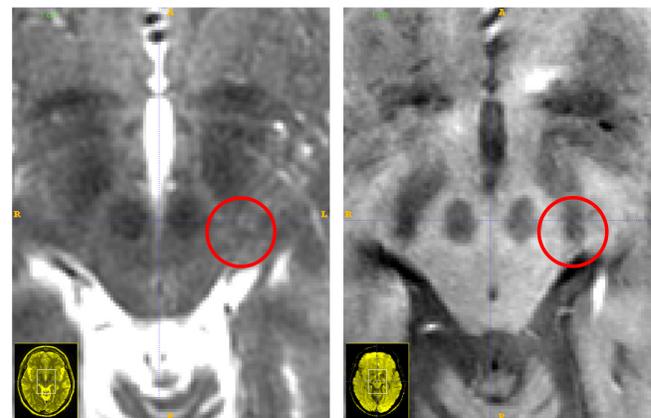

Figure 2 - Comparison of axial T2- (left) and SWAN-images (right) of the midbrain area. SWAN image shows very good contrast of the area of STN and Substantia Nigra to the surrounding tissue. Note the increased posterior extent of the STN in the SWAN image that is not visible in the T2 image

SWAN is more sensitive to iron deposits and that the STN is an iron-rich structure support this finding.

Furthermore, the STN appears larger in SWAN images than in T2 images. In SWAN images the posterior extent of the STN is increased compared to T2 images (Figure 2). It is unclear which is the reality.

Conclusion

SWAN may be superior to T2 for STN visualisation, however, the delineation of the STN and the SNr is still difficult.

References

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