Brainlab Elements

Brainlab Elements are efficient, effective, à la carte software modules serving multiple clinical specialties, including interactive and automatic segmentation applications for state-of-the-art planning of image-guided surgery.

Various automatic segmentation algorithms for the subthalamic nucleus (STN) have been published recently. However, most of the available software tools are not approved for clinical use.

The aim of a study of Polanski et al. is to evaluate a clinically available automatic segmentation tool of the navigation planning software Brainlab Elements (BL-E) by comparing the output to manual segmentation and a nonclinical approved research method using the DISTAL atlas (DA) and the Horn electrophysiological atlas (HEA).

Preoperative MRI data of 30 patients with idiopathic Parkinson's disease were used, resulting in 60 STN segmentations. The segmentations were created manually by two clinical experts. Automatic segmentations of the STN were obtained from BL-E and Advanced Normalization Tools using DA and HEA. Differences between manual and automatic segmentations were quantified by Dice and Jaccard coefficient, target overlap, and false negative/positive value (FNV/FPV) measurements. Statistical differences between similarity measures were assessed using the Wilcoxon signed-rank test with continuity correction, and comparison with interrater results was performed using the Mann-Whitney U test.

For manual segmentation, the mean size of the segmented STN was 133 ± 24 mm3. The mean size of the STN was 121 ± 18 mm3 for BL-E, 162 ± 21 mm3 for DA, and 130 ± 17 mm3 for HEA. The Dice coefficient for the interrater comparison was 0.63 and 0.54 ± 0.12, 0.59 ± 0.13, and 0.52 ± 0.14 for BL-E, DA, and HEA, respectively. Significant differences between similarity measures were found for Dice and Jaccard coefficient, target overlap and FNV between BL-E and DA; and FPV between BL-E and HEA. However, none of the differences were significant compared to interrater variability. The analysis of the center of gravity of the segmentations revealed that the BL-E STN ROI was located more medially, superior and posterior compared to other segmentations. Regarding the target overlap for beta power within the STN ROI included with the HEA, the BL-E segmentation showed a significantly higher value compared to manual segmentation.

Automatic image segmentation by means of the clinically approved software BL-E provides STN segmentations with similar accuracy like research tools, and differences are in the range of observed interrater variability. Further studies are required to investigate the clinical validity, for example, by comparing segmentation results of BL-E with electrophysiological data [1].

1)
Polanski WH, Zolal A, Sitoci-Ficici KH, Hiepe P, Schackert G, Sobottka SB. Comparison of Automatic Segmentation Algorithms for the Subthalamic Nucleus. Stereotact Funct Neurosurg. 2020 May 5:1-7. doi: 10.1159/000507028. [Epub ahead of print] PubMed PMID: 32369819.

From:
https://neurosurgerywiki.com/wiki/ - **Neurosurgery Wiki**

Permanent link:
https://neurosurgerywiki.com/wiki/doku.php?id=brainlab_elements

Last update: **2024/06/07 02:49**