RONNA

http://www.ronna-eu.fsb.hr/

Dlaka et al. present et al. a novel robotic neuronavigation system, RONNA G4, used for precise preoperative planning and frameless neuronavigation, developed by a research group from the University of Zagreb and neurosurgeons from the University Hospital Dubrava, Zagreb, Croatia. The aim of the study is to provide a comprehensive error measurement analysis of the system used for brain biopsy.

Frameless stereotactic robot-assisted biopsies were performed on thirty-two consecutive patients. Post-operative CT and MRI scans were assessed to precisely measure and calculate target point error (TPE) and entry point error (EPE).

The application accuracy of the RONNA system for TPE was 1.95 ± 1.11 mm, while for EPE was 1.42 ± 0.74 mm. The total diagnostic yield was 96.87%. Linear regression showed statistical significance between the TPE and EPE and the angle of the trajectory on the bone.

The RONNA G4 robotic system is a precise and highly accurate autonomous neurosurgical assistant for performing frameless brain biopsies [1)].

Dlaka et al. in 2017 presented a case study of a frameless stereotactic biopsy guided by the RONNA G3 robotic neuronavigation system.

A 45-year-old patient with a history of vertigo, nausea, and vomiting was diagnosed with multiple periventricular lesions. Neurological status was unremarkable. A frameless robotic biopsy of a brain lesion was performed.

Three tissue samples were obtained. There were no intraoperative or postoperative complications. Histological analysis showed a B-cell lymphoma. After merging the preoperative CT scan with the postoperative MRI and CT scans, the measured error between the planned and the postoperatively measured entry point was 2.24 mm and the measured error between the planned and postoperatively measured target point was 2.33 mm.

The RONNA G3 robotic system was used to navigate a Sedan brain biopsy needle to take tissue samples and could be a safe and precise tool for brain biopsy [2)].

1)
Dlaka D, Švaco M, Chudy D, Jerbić B, Šekoranja B, Šuligoj F, Vidaković J, Romić D, Raguž M. Frameless stereotactic brain biopsy: a prospective study on robot-assisted brain biopsies performed on 32 patients by using the RONNA G4 system. Int J Med Robot. 2021 Feb 16. doi: 10.1002/rcs.2245. Epub ahead of print. PMID: 33591608.
2)
Dlaka D, Švaco M, Chudy D, Jerbić B, Šekoranja B, Šuligoj F, Vidaković J, Almahariq F, Romić D. Brain biopsy performed with the RONNA G3 system: a case study on using a novel robotic navigation device for stereotactic neurosurgery. Int J Med Robot. 2017 Dec 12. doi: 10.1002/rcs.1884. [Epub ahead of print] PubMed PMID: 29232764.