Frameless robotically targeted stereotactic brain biopsy

Head-mounted robot-guided biopsy could provide the advantages of these 2 techniques without the downsides. The goal of this study was to evaluate the feasibility and safety of a robotic guidance device, affixed to the patient's skull through a small mounting platform, for use in brain biopsy procedures. METHODS This was a retrospective study of 37 consecutive patients who presented with supratentorial lesions and underwent brain biopsy procedures in which a surgical guidance robot was used to determine clinical outcomes and technical procedural operability. RESULTS The portable head-mounted device was well tolerated by the patients and enabled stable drilling and needle positioning during surgery. Flexible adjustments of predefined paths and selection of new trajectories were successfully performed intraoperatively without the need for manual settings and fixations. The patients experienced no permanent deficits or infections after surgery. CONCLUSIONS The head-mounted robot-guided approach presented here combines the stability of a bone-mounted set-up with the flexibility and tolerability of frameless systems. By reducing human interference (i.e., manual parameter settings, calibrations, and adjustments), this technology might be particularly useful in neurosurgical interventions that necessitate multiple trajectories [1)].

1)
Grimm F, Naros G, Gutenberg A, Keric N, Giese A, Gharabaghi A. Blurring the boundaries between frame-based and frameless stereotaxy: feasibility study for brain biopsies performed with the use of a head-mounted robot. J Neurosurg. 2015 Jun 12:1-6. [Epub ahead of print] PubMed PMID: 26067616.