Frameless image-guided stereotaxy with real-time visual feedback for brain biopsy.

Abstract: Frame-based stereotaxy remains the "gold standard" for cerebral biopsies and functional neurosurgery though new frameless stereotactic systems are evolving continually. As the technique of frameless stereotaxy gains increasing acceptance among neurosurgeons, this study assesses the feasibility of a system for frameless image-guided stereotaxy. All patients biopsied for intracranial lesions between February 2007 and August 2010 using the BrainLAB VarioGuide frameless stereotactic system were evaluated prospectively. Prior to surgery, patients underwent magnetic resonance (MR) imaging; additionally, fluoroethyl-tyrosine (FET)-positron emission tomography (PET) images were acquired and fused to MR images in selected cases. Biopsy trajectory length, lesion volume, procedure duration, and diagnostic yield were assessed. Ninety-six diagnostic biopsies in 91 patients were evaluated. Lesion volume ranged from 0.17 to 121.8 cm³; trajectory length from 25.3 to 101.9 mm. Diagnostic yield was 93.8%. Mean operation time from skin incision to wound closure was 42 min; in the operating room, it was 99 min. Clinical experience indicates VarioGuide to be safe and accurate. Reachable range of lesion localisation appears to be comparable to a frame-based stereotaxy system. Operation times are brief. The unique design of this frameless stereotactic system allows real-time visual
feedback of needle positioning.

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