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# Minimally Invasive Resection and Excisional Biopsies of Deep-Seated Brain Tumors Using Tubular Retractors with Exoscopic Visualization

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## Resumen

Deep-seated brain tumors are a surgical challenge. These lesions reside in eloquent regions, where access and resection can cause significant morbidity and mortality. The conventional approach when surgical resection is pursued involves large craniotomies, extensive white matter dissection, and use of fixed retractors. Biopsy of these lesions typically involve stereotactic needle biopsies. We present an alternative method whereby tubular retractors are used with exoscopic visualization for resection of excisional biopsies of deep-seated brain tumors.

27 patients (13 resections and 14 excisional biopsies) were prospectively identified who were operated on using tubular retractors (BrainPath™, Nico, Indianapolis, IN) and exoscopic visualization (Vitom™, Karl Storz, Segundo, CA). This was done for a deep-seated, extraventricular brain tumor (basal ganglia, thalamus, subcortical white matter) from January 2015-January 2017. Resection was defined as an attempt at complete resection, while excisional biopsy was defined as a planned subtotal resection. The average age (± standard deviation) was 49.9 ± 18.1 years. The primary location of the tumor included thalamus/basal ganglia in 9 (33%), optic pathway in 4 (15%), deep cerebellar nuclei in 4 (15%), and centrum seimovale/corpus callosum in 10 (37%). The pathology included glioblastoma in 9 (33%), metastatic brain tumor in 4 (15%), anaplastic astrocytoma in 4 (15%), and lymphoma in 3 (11%). Of the 13 patients who underwent attempted gross total resection, 8 (62%) had gross total resection of their lesion. A diagnosis was obtained in all patients (100%) who underwent excisional biopsy, whereby 5 (19%) patients underwent palliative debulking to relieve mass effect. Of the 27 patients, only two (7%) patients had worsened weakness than pre-operative exam. This minimally invasive approach provides an alternative method for treating deep-seated brain tumors with minimal morbidity.