



The Safety and Efficacy of Diffusion Tensor Imaging (DTI)- Guided Transulcal Radial Tubular Corridors to subcortical neoplasms: A Multicenter Study

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Introduction

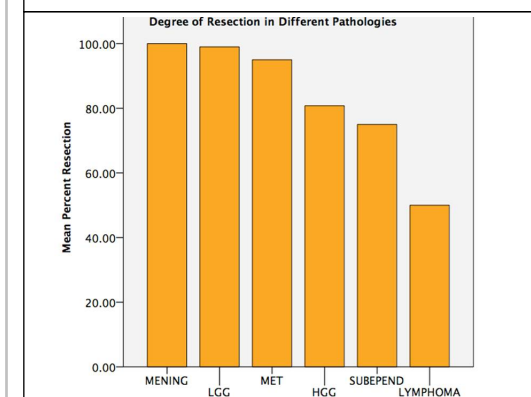
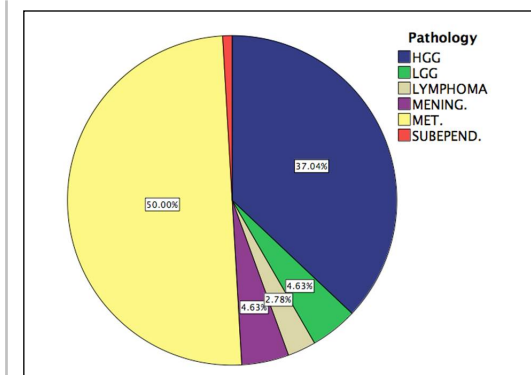
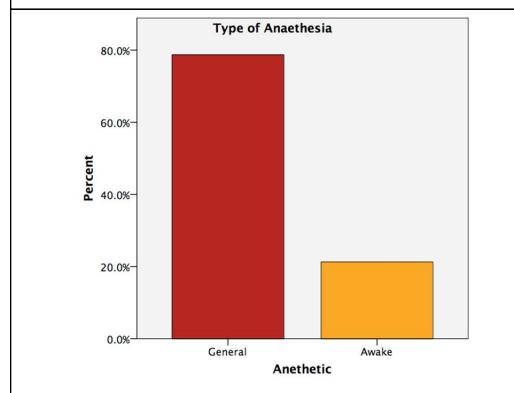
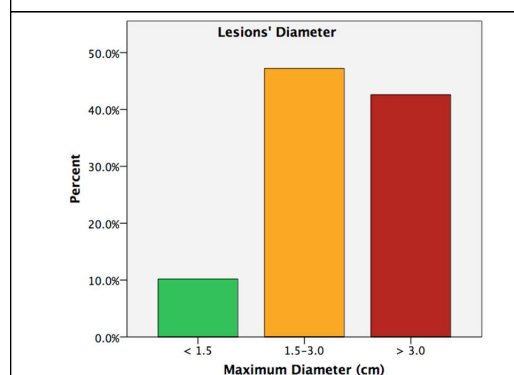
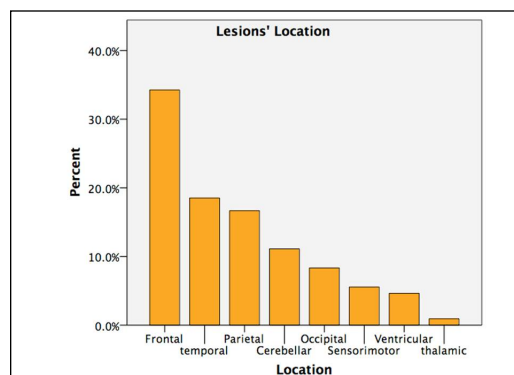
Subcortical injury resulting from the surgical management of deep lesions can be devastating. The present study evaluates the safety and efficacy of a novel DTI-guided, exoscopic-assisted, radial tubular transulcal access approach to subcortical neoplastic lesions.

Methods

Four neurosurgeons from 4 different centers were trained through a CME course to use a standardized technique incorporating 5 cores competencies: image interpretation and trajectory planning, 2) dynamic navigation, 3) atraumatic access system, 4) Extracorporeal optics, and 5) automated atraumatic resection. Demographical, clinical, and radiological, data of patients operated on over a two-year- period were collected and analyzed retrospectively.

Results

We identified 108 patients (49 males, 59 females) with a mean age of 57.2 years (SD, 14.1). Fifty six percent of the lesions were left sided. The most common sites of presentation were frontal (34 %), temporal (19%), and parietal (17%) lobes. Eleven percent of the lesions involved the cerebellum. There were 5 intra-ventricular lesions. The maximum diameter of the lesions were: < 1.5 cm, 1.5-3.0 cm, and > 3.0 cm in 10.2%, 47.2%, and 42.6 % of the patients, respectively. Twenty one percent of the cases were done under "awake" anesthesia. The ratio of primary to secondary tumors was 1:1. Seventy four percent of the primary lesions were High Grade Gliomas (HGG). The mean degree of resection was 81% (Median 90%, SD 24.4) for HGG, 99% (Median 100%, SD 2.24) for Low Grade Gliomas (LGG), and 95% (Median 100%, SD 15.9%) for metastasis. Forty nine percent of patients had neurological improvement post-operatively. The rates of new, transient and permanent neurological deficits were 7.4% and 4.7 %, respectively. There were 2 post-operative hematomas; both patients improved subsequently. The 30-day- mortality rate was 2.8%.



Conclusions

The minimally invasive subcortical parafascicular approach described above is both safe and effective for managing a wide range of brain tumors.

