

Experiential Summary of 1032 Cases of Adult Brain Surgery Using A Navigable Trans-sulcal Tubular Retractor Device for the Removal of Deep-Seated Brain Lesions

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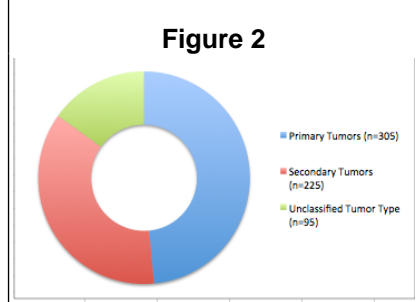
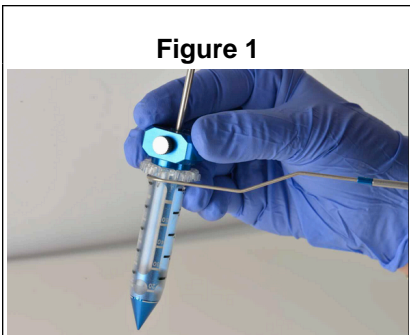
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Introduction

Paramount to functional preservation is a-traumatic surgical access and clear working corridors to subcortical regions. We describe an initial experience with a navigable trans-sulcal tubular retractor engineered to reach deep-seated tumors, hemorrhages and vascular lesions leveraging parafascicular approaches.

Methods

Using a repository of de-identified data collected in "real-time," (1) a cohort analysis of patients (>=22 years) undergoing mini-craniotomies using a navigable tubular retractor (NTR), BrainPath™, BP, (NICO Corporation, Indianapolis, IN), (Figure 1) for brain tumors/lesions & hemorrhages was performed. The NICO Myriad™, a minimally disruptive, automated, non heat generating side-cutting resection tool was used in the majority of cases. Demographic characteristics, tumor/lesion location, type/pathology ("unclassified" if type unknown at time of surgery), size, surgical time, pre-operative deficits, surgical mortality were analyzed.



Results

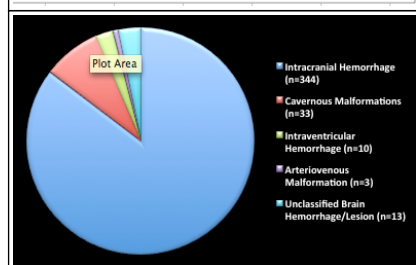
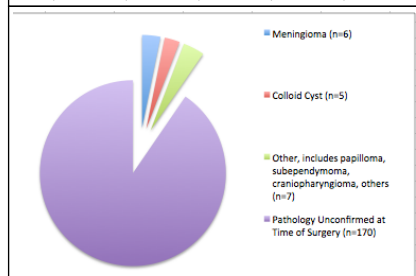
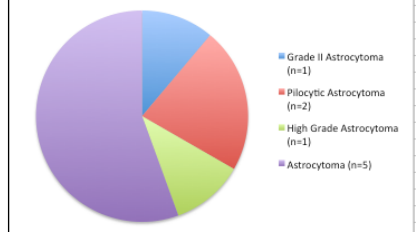
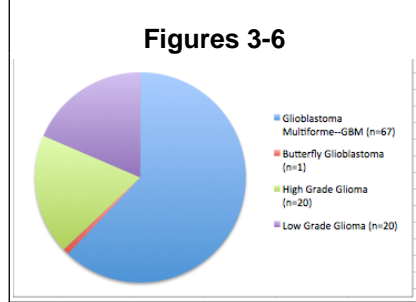
1032 adult patients undergoing NTR-BP surgery between December 12, 2012-August 8, 2017 were included. (1). Myriad was used in 98.6% of tumor/lesion cases & >70% of vascular cases. Subject demographics, tumor/lesion or hemorrhage location(s), mean lesion size, percentage of patients with pre-operative deficits, surgical time & surgical mortality are shown in Table 1. Mean age was similar between the tumor/lesion & vascular cohorts, with more males vs. females in both groups. The subcortical region was the most frequent location of operable lesions/hemorrhages. About one-third of tumor/lesion patients & half of vascular patients had pre-operative deficits. In the tumor group, the most common were pre-operative deficits were headaches (n=56), weakness (n=40), visual impairments (n=18), seizures (n=18) & aphasia (n=18). Vascular pre-operative deficits included: hemiplegia/paralysis (n=48), headache (n=16) & weakness (n=14). No deaths associated with NTR-BP surgery were reported. Tumor/vascular pathology is shown in Figures 2-6.

Table 1

	Tumors/Lesions	Vascular Lesions, Hemorrhages & Malformations	Total
Total N	629	403	1032
Age Range (years)	22 - 91	23 - 91	22-91
Mean Age (years)	57.5	57.8	57.6
Females	272	129	401
Males	298	225	523
Location			
Subcortical	229	188	417
Intra-ventricular	56	10	66
Cortical	21	13	34
Brain Stem	5	0	5
Other	6	8	14
Number of Patients with Reported Pre-operative Deficits	228/629 (36.2%)	199/403 (49.3%)	437/1032 (42.3%)
Mean Operative Time (minutes)	184.0	126.8	155.4
Mean Size (centimeters)	2.78	2.67	2.73
Deaths	0	0	0

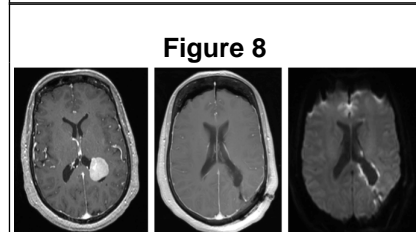
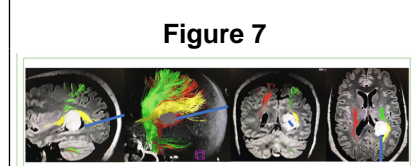
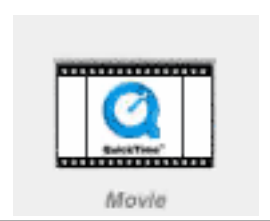
Conclusions

This experiential review represents the largest reported cohort of patients undergoing BP surgery and demonstrates its utility in reaching a variety of lesions primarily located in the subcortical regions. Future trials and investigations are forthcoming. This preliminary analysis allows identification of NTR use demographics so that harmonized data collection can assess the NTR platform in clinical use. Data did not extend beyond the surgeries. A larger, physician-directed adult registry or use analysis is desirable.



NorthShore Department of Neurosurgery Case Study:

A 63-year-old female with a history of seizure underwent BrainPath surgery for a 3.1 x 3.0 x 3.3 cm enlarging meningioma in the left ventricle (WHO Grade II). Preoperative trajectory images (Figure 7) & pre/post operative MRI (Figure 8) are shown. A Gross Total Resection (GTR) was achieved (Figure 8, Video 1). Seizure resolved & the patient was discharged on post-operative Day 5 with a minor visual field deficit that resolved 2 months after surgery.



Reference: 1. Data on File. NICO Corporation. BP20170810.