Outcomes Following Microscopic Excision of Primary Malignant Versus Secondary Metastatic Neoplasms of the Brain

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Introduction

• Malignant intracranial neoplasms include primary and metastatic neoplasms, and the treatment of both neoplastic etiologies often involves neurosurgical intervention and/or radiation therapy.

• Here, we compare the post-excision outcomes of patients diagnosed with primary malignant versus secondary metastatic neoplasms of the brain.
Methods

- Using the 2016 NIS database, we conducted a retrospective cohort analysis of 3,789 patients who underwent microscopic surgical excision of a primary malignant (N=2,365) or secondary metastatic (N=1,424) brain neoplasm.

- Statistics were conducted using RStudio with Welch Two-Sample t-test and odds ratios. Length of stay (LOS) adjusted cost was calculated by dividing total cost by the number of inpatient days. Unpaired two-sample Wilcoxon testing was conducted to ensure that there were no differences in geographic location between the two groups.
Results

• The average length of stay was found to be significantly different between those undergoing microscopic excision of primary (6.49±8.28 days) and metastatic (7.04±5.74 days) neoplasms (p=0.0151).

• Patients who underwent elective microscopic excision of a primary malignant neoplasm had a significantly lower mortality rate than those undergoing non-elective resection (OR:0.206, 95% Cl:0.0573,0.570, p=0.00233), but no such association was found for secondary metastasis patients.
• Postprocedural cerebrovascular infarction occurred at a significantly lower rate in patients with secondary metastasis versus primary malignant neoplasms of the brain (OR:0.168, 95% CI:0.0248,0.577, p=0.00386).

• Both the total charge (Primary: $135,457.60±$126,934.50, Secondary: $124,298.60±$86,862.22) and LOS adjusted cost (Primary: $28,522.95±$20,060.02, Secondary: $23,328.41±$17,453.24) were significantly different between the two groups (p<0.002).
Discussion

- Microscopic excision of primary malignant neoplasms of the brain is associated with shorter LOS, and patients who undergo elective excision of a primary neoplasm have decreased postsurgical death rates.

- Excision of secondary metastatic neoplasms is significant for a lower rate of postsurgical cerebrovascular infarction. These differences in outcomes may contribute towards the significant difference in cost between primary and secondary neoplasms.
Summary Points

• There exist inherent differences between primary malignant and secondary metastatic CNS tumors.

• Further studies are warranted to better understand the ideal approach and management of each tumor type.