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کانسرهای مغز

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Purpose

The prevalence of nonconvulsive status epilepticus (NCSE) in brain tumor patients is unknown. Since NCSE has been associated with significant mortality and morbidity, early identification is essential. This study describes the clinical and EEG characteristics, treatment, and outcome in brain tumor patients with NCSE.

Method

All patients admitted to Mount Sinai Hospital from 2009 to 2012 with an ICD-9 brain tumor code were cross-referenced with the epilepsy department's database. EEGs from matching patients were reviewed for NCSE. Relevant information from the medical records of the patients with NCSE was extracted.

Results

1101 brain tumor patients were identified, of which 259 (24%) had an EEG and 24 (2%) had NCSE. The vast majority of seizures captured were subclinical with 13 patients (54%) having only subclinical seizures. Treatment resolved the NCSE in 22 patients (92%) with accompanying clinical improvement in 18 (75%) of those patients. Tumor recurrence or progression on MRI was associated with decreased 2-month survival (75% mortality, \( p = 0.035 \)) compared to stable tumors (20% mortality). Patients with metastatic disease had median survival from tumor diagnosis of 1.2 months.

Conclusion
NCSE in brain tumor patients may be under diagnosed due to the frequent lack of outward manifestations and highly treatable with improvement in the majority of patients. NCSE patients with progressing brain lesions, tumor recurrence, or metastatic disease are at serious risk of mortality within 2 months. Continuous EEG monitoring in brain tumor patients with recent clinical seizures and/or a depressed level of consciousness may be critical in providing appropriate care.

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**2. Long term outcome of Gamma Knife radiosurgery for metastatic brain tumors**

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Gamma Knife radiosurgery (GKRS; Elekta AB, Stockholm, Sweden) has emerged as an important treatment option for metastatic brain tumors (MBT). However, the long term outcome of GKRS on MBT is not well understood. We reviewed the treatment of MBT with GKRS at our institution. We performed a retrospective review (2000–2013) of 298 patients with MBT who received GKRS. The study population was monitored clinically and radiographically after GKRS treatment. Survival
benefits and predictive factors of the outcome were analyzed using the Kaplan–Meier test and Cox regression model, respectively. GKRS in MBT showed significant variation in tumor growth control (decreased in 135 [45%] patients, arrested growth in 91 [37%] patients and increased tumor size in 72 [24%] patients). The median survival in the study population was 17 months. Overall and progression free survival after 3 years were 25% and 45%, respectively. The predictive factors for improving survival in the patients with MBT were recursive partitioning analysis class I (p < 0.0001), absence of hydrocephalus (p < 0.0001), Karnofsky Performance Status (KPS) >80 (p = 0.007) and absence of recurrent MBT (p = 0.01). Forty (12%), 15 (4.3%) and two (0.6%) patients required GKRS, resection and whole brain radiation, respectively, after initial GKRS due to tumor progression and worsening of signs and symptoms. Our findings revealed that GKRS offers a high rate of tumor control and good survival benefits in both new and recurrent patients with MBT. Thus, GKRS is an effective treatment option for new patients with MBT, as well as an adjuvant therapy in patients with recurrent MBT.

Little progress has been made in the long-term management of glioblastoma multiforme (GBM), considered among the most lethal of brain cancers. Cytotoxic chemotherapy, steroids, and high-dose radiation are generally used as the standard of care for GBM. These procedures can create a tumor
**glioblastoma multiforme (GBM)**

microenvironment rich in glucose and glutamine. Glucose and glutamine are suggested to facilitate tumor progression. Recent evidence suggests that many GBMs are infected with cytomegalovirus, which could further enhance glucose and glutamine metabolism in the tumor cells. Emerging evidence also suggests that neoplastic macrophages/microglia, arising through possible fusion hybridization, can comprise an invasive cell subpopulation within GBM. Glucose and glutamine are major fuels for myeloid cells, as well as for the more rapidly proliferating cancer stem cells. Therapies that increase inflammation and energy metabolites in the GBM microenvironment can enhance tumor progression. In contrast to current GBM therapies, metabolic therapy is designed to target the metabolic malady common to all tumor cells (aerobic fermentation), while enhancing the health and vitality of normal brain cells and the entire body. The calorie restricted ketogenic diet (KD-R) is an anti-angiogenic, anti-inflammatory and pro-apoptotic metabolic therapy that also reduces fermentable fuels in the tumor microenvironment. Metabolic therapy, as an alternative to the standard of care, has the potential to improve outcome for patients with GBM and other malignant brain cancers.
The treatment for brain metastases has evolved over the past decades, however, whole brain radiation (WBRT) still remains a stalwart pillar in the treatment of multiple brain metastases. Multiple dose fractionation studies of WBRT with higher doses than the standard, 30 Gy in 10 daily fractions, have not demonstrated a functional or overall survival advantage. Most patients are treated with 30 Gy in 10 daily fractions or 20 Gy in five daily fractions. Prognostic factors such as age, performance status, status of extracranial disease, and disease histology are used in estimating survival and are often used to determine treatment. Surgery and radiosurgery have an established role based on level 1 evidence in the treatment of select patients with solitary and up to four brain metastases. Results of trials combining radiosensitizers with WBRT have so far been disappointing and are not used in clinical practice. Some recent studies have documented the detrimental effect of WBRT on memory and neurocognition. Technological advances in radiation therapy planning and delivery are now allowing delivery of WBRT while sparing parts of the brain that are crucial to memory and learning, such as the hippocampus. Hippocampal-sparing WBRT is being investigated in clinical trials. Finally, the exclusive role of WBRT in the treatment of more than four brain metastases is being challenged with a growing number of studies attempting to exclude WBRT in select patients and treat with radiosurgery alone.
Growth hormone (GH) is increasingly used for treatment of pediatric brain tumors. However, controversy remains over its safety. This meta-analysis assessed whether GH treatment was associated with risk of recurrence or development of secondary neoplasm for brain tumors in children. Systematic computerized searches of PubMed and Web of Knowledge were performed. Pooled relative risks (RR) with 95% confidence interval (CI) for recurrence and/or secondary neoplasm in children who were treated with GH versus those who did not receive GH were calculated. Ten studies were included. The pooled recurrence rates were 21.0% and 44.3% in the GH-treated group and non-GH-treated group, respectively. The pooled RR for recurrence was 0.470 (95% CI 0.372–0.593; z = 6.33, p = 0.000). Begg’s test (p = 0.060) and Egger’s test (p = 0.089) suggested there was no significant publication bias. The pooled RR in sensitivity analysis was 0.54 (95% CI 0.37–0.77; z = 3.32, p = 0.001), which showed the result was robust. The pooled RR for secondary neoplasm was 1.838 (95% CI 1.053–3.209; z = 2.14, p = 0.032). Begg’s test (p = 1.000) and Egger’s test (p = 0.553) suggested there was no significant publication bias. We found no evidence that GH therapy is associated with an increased risk of recurrence for pediatric brain tumors. However, because of our small sample size, the association of GH therapy with an increased risk of secondary neoplasm is uncertain. Further prospective cohorts are needed.

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Purpose

Our aim is to describe the spectrum of proton-MR spectroscopy in malignant focal brain lesions and to detect grade of malignancy using MRS tumor biomarkers.

Materials and methods

87 patients (63 males and 24 females) with focal brain lesion(s) are included in this study. All had a brain tumor recently diagnosed by MRI and had received no previous treatment. They were referred to MRS examination before surgical biopsy and/or resection or radiotherapy.

Results

In malignant brain tumors, average Cho/NAA ratio was $3.3 \pm 0.22$, Cho/Cr ratio was $2.95 \pm 0.21$, MI/NAA ratio was $1.5 \pm 0.12$, MI/Cr was $0.53 \pm 0.11$ with lower MI levels and higher choline levels in more malignant tumours, lipid/lactate peak was detected in brain metastasis and high grade malignant brain tumors.

Conclusion

Higher Cho/NAA, Cho/Cr and MI/NAA ratios with lower MI/Cr, and high lipid/lactate peak, were most likely to be in high grade malignant brain tumors.
Objective

To report a minimally invasive, nontubular endoscopic technique to resect intraparenchymal brain tumors and assess the feasibility, safety, and surgical resection margins achievable by this novel technique.

Methods

Over a 21-month period, 48 patients underwent 50 consecutive endoscopic intraparenchymal tumor resections. Data on surgical morbidity and mortality and length of stay were collected prospectively. The percentage of surgical resection and residual tumor volumes were calculated using preoperative and postoperative volume computed tomography or magnetic resonance imaging. All tumors were resected through a 2-cm minicraniotomy using a high-definition rigid endoscope with a 30-degree viewing angle. Bimanual resection was performed using standard microsurgical technique.

Results

Mean patient age was 53 years. There were 42 supratentorial (19 frontal, 17 temporal, 3 occipital, 1 parietal, and 2 parafalcine) tumors and 8 infratentorial tumors. Mean tumor volume was 41 cm³. There were 12 metastases, 24 glioblastomas, 4 World Health Organization grade III gliomas, 5 World Health Organization grade I–II gliomas, 3 meningiomas, and 2 hemangioblastomas. On volumetric analysis, the overall mean percent resection was 96%. In 70% of cases, >95% resection was achieved; total resection was achieved in 48% of cases. At 30 days postoperatively, there was 1 new postoperative neurologic deficit; there were no deaths during this period.
Conclusions

Our experience demonstrates that resection of intraparenchymal tumors using a minimally invasive endoscopic technique is technically feasible and safe, achieves good tumor resection margins, and has some potential advantages over a traditional microscopic technique.

8. Serum lactate as a potential biomarker of malignancy in primary adult brain tumours

Lactate, a by-product of glycolysis, is an indicator of poor tissue perfusion and is a useful biomarker with prognostic value in risk-stratifying patients in several diseases. Furthermore, elevated lactate production is observed in tumour glycolysis, also known as the Warburg effect, and is essential in promoting tumour cell invasion, metastasis, and immune system evasion, promoting resistance to cell death. However, there are no studies of elevated serum lactate in brain tumour patients as a potential biomarker, to our knowledge. The aim of this study is to determine possible correlations between the malignancy of tumours and pre- and intraoperative serum lactate elevation in patients undergoing craniotomy for tumour resection. We provide initial evidence that a rise in serum lactate can be used as a non-invasive biomarker that correlates with brain tumour grade. The results from this study and future prospective studies may allow for determination of tumour progression and response to therapy using serum lactate as a biomarker.
Single-voxel (SV) magnetic resonance spectroscopy (MRS) provides a noninvasive metabolic fingerprint for the multimodal evaluation and clinical management of brain tumoral masses thanks to the signals of protons from biomolecules such as lactate, lipids, creatine, or choline. This chapter considers three distinct scenarios in which SV MRS may be of clinical utility. First, when an abnormal mass is found in the brain, SV MRS can help in the differentiation between tumor and pseudotumoral pathology. Second, when the mass has been identified as a tumor, SV MRS can be of help in suggesting a specific diagnosis before a tumor sample can be analyzed by the pathologist. Finally, after treatment, SV MRS can be of help in assessing new lesions, by distinguishing between tumor progression and post-treatment changes.
We have reviewed the scant literature on status epilepticus in patients with brain tumours. Patients with brain tumour-associated epilepsy (TAE) appear less likely to develop status epilepticus (TASE) than patients with epilepsy in the general population (EGP) are to develop status epilepticus (SEGP). TASE is associated with lesions in similar locations as TAE; in particular, the frontal lobes. However, in contrast to TAE, where seizures commence early in the course of the disease or at presentation, TASE is more likely to occur later in the disease course and herald tumour progression. In marked contrast to TAE, where epilepsy risk is inversely proportional to World Health Organization tumour grade, TASE risk appears to be directly proportional to tumour grade (high grade gliomas appear singularly predisposed). Whilst anti-epileptic drug (AED) resistance is more common in TAE than EGP (with resistance directly proportional to tumour grade and frontal location), TASE appears paradoxically more responsive to simple AED regimes than either TAE or SEGP. Although some results suggest that mortality may be higher with TASE than with SEGP, it is likely that (as with SEGP) the major determinant of mortality is the underlying disease process. Because all such data have been derived from retrospective studies, because TASE and SEGP are less common than TAE and EGP, and because TASE and SEGP classification has often been inconsistent, findings can only be considered preliminary: multi-centre, prospective studies are required. Whilst preliminary, our review suggests that TASE has a distinct clinical profile compared to TAE and SEGP.
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