extent of resection for malignant meningioma. Chemotherapy for this disease has been disappointing.

Symptoms and imaging abnormalities associated with PCNSL often improve with the administration of corticosteroids because of the cytotoxic effects of steroids on lymphoma cells. However, administration of steroids before brain biopsy reduces the yield of tissue biopsy. Surgical biopsy, but not resection, is the recommended method for diagnosis. The treatment for this tumor is currently evolving as new treatments emerge. Methotrexate chemotherapy is the most effective treatment. Combining high-dose methotrexate with standard-dose brain radiation carries a risk of neurotoxicity, especially in elderly patients, but reduced-dose whole brain radiation following methotrexate chemotherapy is currently under study.

Standard therapy for patients with a single brain metastasis is complete resection if the tumor is in a noneloquent part of the brain and if the extent of systemic disease predicts a survival of at least 4 to 6 months. In addition, some patients with limited systemic cancer show a survival benefit with resection of up to three metastatic tumors. Resection is typically followed by whole brain radiation or stereotactic surgery to the tumor margin. If the patient does not receive whole brain radiation, close observation with periodic MRI scans is indicated to assess for recurrence at the original site or at other sites in the brain. For patients presenting with more than three metastases, whole brain radiation as indicated. A meta-analysis of the addition of stereotactic radiosurgery and whole brain radiation did not identify a survival benefit when compared with whole brain radiation therapy alone, except for patients with a single brain metastasis (6.5 versus 4.9 months). A variety of systemic chemotherapies show therapeutic efficacy in newly diagnosed and recurrent brain metastasis, depending upon the sensitivity of the brain metastasis to the agent, rather than to delivery of the drug to the lesion.

The extent of resection is prognostic in medulloblastomas. Staging evaluations for the extent of disease include postoperative MRI of the brain and spine and lumbar CSF sampling. Prospective randomized trials and single-arm trials suggest that adjuvant chemotherapy administered during and after craniospinal radiation improves the progression-free survival and overall survival in both average and poor risk groups. The therapy for children younger than 3 years of age excludes craniospinal radiation therapy because of the long-term deleterious effects and includes surgery and chemotherapy alone. Distinct subgroups of medulloblastomas have been identified, and profiling of these subgroups reveals distinct genomic events, several of which represent actionable targets for therapy.

Vasogenic edema associated with parenchymal and meningeal tumor causes neurological symptoms and signs, and it can be life-threatening. Treatment with corticosteroids often reduces edema and improves neurologic function. Dexamethasone is the preferred steroid because of its long half-life. Patients with symptoms related to vasogenic edema often improve within 48 hours of dexamethasone administration. Doses used for treatment of tumor-related edema are typically 4-24 mg/day given in divided doses (2 to 4 times daily). Because steroids can be associated with a variety of adverse effects, the lowest dose and duration of administration should be sought. In patients with severe neurologic signs related to brain edema, an intravenous bolus of 10 to 20 mg dexamethasone should be considered. If the neurologic signs are life-threatening, including signs of brain herniation, mannitol and dexamethasone should be administered and urgent neurosurgical consultation obtained. Seizures should be aggressively managed with antiepileptic drugs. Nonenzyme inducing antiepileptic drugs are generally favored because of a better safety profile than enzyme-inducing drugs and because of the lack of interaction with other medications prescribed to treat the tumor, including steroids and chemotherapy. Prophylactic antiepileptic drugs are generally not recommended for patients with a primary or metastatic brain tumor when there is no history of seizure.

PROGNOSIS

The histology of high-grade glioma, performance status, and age are important predictors of prognosis. Glioblastoma has the worst prognosis, with a median survival of just over 1 year even with aggressive therapy. Good prognosis patients can live more than 2 years. Data from the nationwide Surveillance, Epidemiology, and End Results registry identified an overall median survival of 15 months and 42 months for patients with anaplastic astrocytomas and anaplastic oligodendrogliomas, respectively. This analysis did not include the status of 1p19q chromosomal loss, and the more favorable survival of patients with codeletions was not demonstrated. Low-grade gliomas have a median survival of approximately 5 years, but there is individual variation depending on age, size of tumor, and extent of resection.

Recurrence rates in meningioma depend upon grade and vary from greater than 25% in grade 1 to greater than 90% in grade 3. Risk factors for recurrence include incomplete resection, tumor grade, young age, specific subtypes, brain infiltration, and high proliferative rate.

Five-year survival rates in meningioma are approximately 69% overall but vary significantly with tumor grade. Survival in PCNSL ranges from 1 to several years, depending on patient age and treatment modality. Performance status, age, status of the extracranial tumor, and number of brain metastases are factors that predict prognosis in patients with brain metastasis. The median survival ranges from 3 to 6 months in patients with multiple metastases treated with whole brain radiation therapy. Patients with a single metastasis with limited extracranial disease who undergo surgical resection and whole brain radiation therapy have significantly improved survival (40 weeks) as compared with those who undergo whole brain radiation therapy alone (15 weeks). Importantly, the improved survival is accompanied by a longer period of functional independence. The 5-year progression-free survival in medulloblastomas is 70% to 85%. However, more than one third of patients experience recurrence, and there is no standard therapy at the time of recurrence. Median survival after recurrence is usually less than 1 year. For children less than 3 years of age at diagnosis, 5-year progression-free survival ranges between 30% and 70%, depending on the extent of dissemination at diagnosis.

SUGGESTED READINGS

American Cancer Society: www.cancer.org. Accessed October 22, 2013.

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