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Top advances of the year: Neuro-oncology

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Abstract

Management of brain tumors has been challenging given the limited therapeutic options and disabling morbidities associated with central nervous system (CNS) dysfunction. This review focuses on recent developments in the field, with an emphasis on clinical management. The growing clinical trials landscape reflects advanced insights into cancer immunology and genomics and the need to address molecular and clinical heterogeneity. Recent phase 3 trials investigating anti-PD-1 immunotherapies, particularly nivolumab, have failed to demonstrate improved survival in glioblastoma, underscoring the need to better understand the complexity of CNS immunologic surveillance. Conversely, targeted therapies have accounted for several US Food and Drug Administration approvals extended to brain tumors, particularly therapies directed to BRAF V600E mutations and TRAK fusions, underscoring a need to routinely screen patients for these rare molecular abnormalities. In primary CNS lymphoma, attention has turned to long-term outcomes of consolidation therapies, and recent studies have highlighted the excellent disease control afforded by high-dose chemotherapy and stem cell transplantation. Meningiomas remain a focus of investigations, with preliminary promising results observed with octreotide combined with mTOR inhibition, and immunotherapy with single-agent pembrolizumab. Finally, proton radiotherapy has emerged as a novel alternative for leptomeningeal metastases from solid tumors, which can now be treated more safely with craniospinal irradiation and monitored by the enumeration of circulating tumor cells in the cerebrospinal fluid as a biomarker. Taken together, these incremental advances have improved outcomes in select brain tumor patient populations, whereas ongoing clinical trials hold the promise of meaningful advances and breakthroughs for larger proportions of patients with brain tumors.

Keywords: glioblastoma; glioma; immunotherapy; leptomeningeal metastasis; meningioma; primary brain neoplasms; primary central nervous system (CNS) lymphoma; radiotherapy; targeted molecular therapy.

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