Incidence and survival of adult central nervous system tumors in the Veneto region: a population-based registry study (2016-2020)

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Purpose

Central nervous system (CNS) tumors represent a heterogeneous group of neoplasms with significant clinical impact and variable prognosis. Despite the relatively low incidence, they account for considerable morbidity and mortality. In Italy, population-based data on incidence and survival by histological subtype and tumor grade remain limited, particularly for rarer CNS tumor entities.

Methods

We conducted a retrospective population-based study using data from the Veneto Cancer Registry, including adults diagnosed with CNS tumors between 2016 and 2020. A dedicated text-mining algorithm was applied to pathology reports to extract tumor grade. Tumors were categorized into six main histological groups. We estimated incidence rates, relative survival, and 5-year conditional relative survival, stratified by sex, age, tumor type, and grade.

Results

A total of 1,636 incident CNS tumors with confirmed histopathology and intermediate to high-grade behavior were identified. Glioblastoma was the most frequent subtype (64.6%), followed by grade 2-3 meningiomas (18.2%) and astrocytomas (9.4%). The overall crude incidence was 8.0 per 100,000, higher in males (9.5) than females (6.6). Five-year relative survival varied substantially by tumor type and grade: glioblastoma had the poorest outcome (5.7%), while grade 2-3 ependymomas and oligodendrogliomas showed favorable prognosis (87.7% and 82.0%, respectively). Conditional 5-year survival after surviving one year remained low for glioblastoma (11.0%) but exceeded 85% for most lower-grade tumors.

Conclusion

Our findings underscore the prognostic relevance of tumor grade and histology, supporting the need for tailored clinical strategies, molecular diagnostics, and the development of innovative therapies for informed healthcare planning and resource allocation.

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