Diffuse intrinsic pontine glioma

- Nimotuzumab Combined With Chemoradiation Therapy in Newly Diagnosed Pediatric Diffuse Intrinsic Pontine Glioma
- Exploring the tumor microenvironment in diffuse intrinsic pontine glioma: immunological insights and therapeutic challenges
- Erratum to: Phase 1 dose-escalation trial using convection-enhanced delivery of radio-immunotheranostic 124I-Omburtamab for diffuse intrinsic pontine glioma
- Integrative Multi-Omics Analysis Identifies Nuclear Factor I as a Key Driver of Dysregulated Purine Metabolism in DIPG
- BMI-1 Modulation and Trafficking During M Phase in Diffuse Intrinsic Pontine Glioma
- Combination therapy of supercharged NK cells and ONC201 or ONC206 to target aggressive K27M brain tumor
- Beyond Base Camp: Promise and Pitfalls of PI3K/mTOR Inhibition in Pediatric High- Grade Gliomas
- Determination of the Intralesional Distribution of Theranostic (124)I-Omburtamab Convection-Enhanced Delivery in Treatment of Diffuse Intrinsic Pontine Glioma

see also Diffuse midline glioma H3 K27M-mutant.

Diffuse midline glioma H3 K27M-mutant includes tumors previously referred to as diffuse intrinsic pontine glioma (DIPG).

Epidemiology

Approximately 300 children are diagnosed with diffuse intrinsic pontine gliomas (DIPG) each year, usually between the ages of 5 and 9.

They account for 10% to 25% of pediatric brain tumors.

The majority of DIPGs are astrocytic, infiltrative, and localized to the pons.

Etiology

The majority of the tumors were positive for GFAP (24/24), MIB1 (23/24), OLIG2 (22/24), p16 (20/24), p53 (20/24), SOX2 (19/24), EGFR (16/24), and BMI1 (9/24). The results suggest that dysregulation of EGFR and p53 may play an important role in the development of DIPGs. The majority of DIPGs express stem cell markers such as SOX2 and OLIG2, consistent with a role for tumor stem cells in the origin and maintenance of these tumors [1)].

Results suggest that dual targeting of NOTCH and MYCN in DIPG may be an effective therapeutic strategy in DIPG and that adding a γ-secretase inhibitor during radiation therapy may be efficacious initially or during reirradiation [2)].

Clinical Features

The symptoms of DIPG usually develop very rapidly prior to diagnosis, reflecting the fast growth of these tumors. Most patients start experiencing symptoms less than three months—and often less than three weeks—before diagnosis. The most common symptoms include:

Rapidly developing problems controlling eye movements, facial expressions, speech, chewing, and swallowing (due to problems in the cranial nerves) Weakness in the arms and legs

Problems with walking and coordination.

Diagnosis

Frameless robotic assisted biopsy of DIPG in pediatric population is an easier, effective, safe and highly accurate method to achieve diagnosis [3].

After the start of the era of biopsy, DIPGs bearing Histone H3K27 mutations have been reclassified into a novel entity, diffuse midline glioma, based on the presence of this molecular alteration. However, it is not well established how clinically diagnosed DIPG overlap with H3 K27-mutated diffuse midline gliomas, and whether rare long-term survivors also belong to this group [4].

Platelet-derived growth factor receptor A is altered by amplification and/or mutation in diffuse intrinsic pontine glioma (DIPG).

A retrospective review of magnetic resonance imaging (MRI) scanning in a pure population of DIPG was undertaken. Baseline diagnostic MRI findings included; local tumour extension in upper medulla (74%) or midbrain (62%), metastatic disease (3%), basilar artery encasement (82%), necrosis (33%), intratumoural haemorrhage (26%), hydrocephalus (23%) and dorsal exophytic component (18%). Post-treatment MRI scans demonstrated increases in; leptomeningeal metastatic disease (16%), cystic change/necrosis (48%), enhancement (72%) and intratumoural haemorrhage (32%). Response rates were calculated according to both RECIST (4%) and WHO (24%) criteria. No MRI parameter in either the diagnostic or response scans had prognostic significance [5].

Accurately determining diffuse intrinsic pontine glioma (DIPG) tumor volume is clinically important.

Eight patients from a Phase I clinical trial testing convection-enhanced delivery (CED) of a therapeutic antibody were included in the study. Pre-CED, post-radiation therapy axial T2-weighted images were analyzed using 2 methods requiring high degrees of subjective judgment (picture archiving and communication system [PACS] polygon and Volume Viewer auto-contour methods) and 1 method requiring a low degree of subjective judgment (k-means clustering segmentation) to determine tumor volumes. Lin's concordance correlation coefficients (CCCs) were calculated to assess interobserver agreement. RESULTS The CCCs of measurements made by 2 observers with the PACS polygon and

the Volume Viewer auto-contour methods were 0.9465 (lower 1-sided 95% confidence limit 0.8472) and 0.7514 (lower 1-sided 95% confidence limit 0.3143), respectively. Both were considered poor agreement. The CCC of measurements made using k-means clustering segmentation was 0.9938 (lower 1-sided 95% confidence limit 0.9772), which was considered substantial strength of agreement.

The poor interobserver agreement of PACS polygon and Volume Viewer auto-contour methods highlighted the difficulty in consistently measuring DIPG tumor volumes using methods requiring high degrees of subjective judgment. k-means clustering segmentation, which requires a low degree of subjective judgment, showed better interobserver agreement and produced tumor volumes with delineated borders [6].

Biopsy

Diffuse intrinsic pontine glioma biopsy

Treatment

see Diffuse intrinsic pontine glioma treatment.

Outcome

see Diffuse intrinsic pontine glioma outcome.

Complications

see Diffuse intrinsic pontine glioma complications.

Case series

Diffuse intrinsic pontine glioma case series.

References

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