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Educational Abstract
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Simplified Imaging Based Approach to Updated 2021 WHO Classification of CNS Tumors of the Pediatric Age Group: What Neuroradiologists Must Know

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Summary

The 4th Edition of the 2016 WHO Central Nervous System (CNS) tumor classification marked a significant shift by beginning to incorporate molecular features into tumor assessment. This edition introduced an integrated approach of layered tumor reports that combined both histological and molecular data for more precise diagnosis.

Building on these advancements, the 5th Edition WHO CNS tumor update released in 2021 presents a more refined and sophisticated classification system. This update enables clinicians to group CNS tumors into more biologically and molecularly defined entities.

This refined classification has important implications for clinical research, as it may impact subject enrollment, treatment assignment, and outcome stratification in clinical trials. Neuroradiologists must familiarize themselves with the updated 2021 WHO Classification of CNS neoplasms, especially for the pediatric age group, to function appropriately as part of the multidisciplinary neuro-oncology clinical team.

Educational Objectives

1. We aim to emphasize the major changes of the 2021 WHO Classification of CNS Tumors that mainly affect the children and young adults age group.

2. To present the clinical and molecular characteristics of these tumors.

3. To demonstrate the neuroimaging features on multidisciplinary basic as well as advanced MRI modalities.

Purpose

N/A

Materials and Methods

N/A

Results

N/A

Conclusion

N/A

References

D'Amati et al. "Pediatric CNS tumors and 2021 WHO classification: what do oncologists need from pathologists?" Front Mol Neurosci. 2024 Mar 13;17:1268038. doi:10.3389/fnmol.2024.1268038

Louis et al. "The 2021 WHO Classification of Tumors of the Central Nervous System: a summary" Neuro Oncol. 2021 Jun 29;23(8):1231-1251. doi: 10.1093/neuonc/noab106

Rigbsy et al. "Newly Recognized CNS Tumors in the 2021 World Health Organization Classification: Imaging Overview with Histopathologic and Genetic Correlation" American Journal of Neuroradiology March 2023, doi: https://doi.org/10.3174/ajnr.A7827

Figures

Tumor Type	Major Molecular Designations in WHO CNS5
Diffuse astrocytoma	MYB-altered; MYBL1-altered
Diffuse low-grade glioma (LGG)	MAPK pathway-altered
Diffuse midline glioma	H3 K27-Altered
Diffuse hemispheric glioma	H3 G34-mutant
Diffuse pediatric-type high-grade glioma (HGG)	H3 wildtype and IDH wildtype
Astroblastoma	MN1-altered
Supratentorial ependymoma	ZFTA fusion+; YAP1 fusion+
Posterior fossa ependymoma	Group PFA; Group PFB
Spinal ependymoma	MYCN-amplified
Medulloblastoma	WNT activated; SHH activated and TP53-wildtype; SHH-activated and TP53-mutant; non-WNT/non-SHH
Atypical teratoid/rhabdoid tumor (AT/RT)	ATRT-TYR; ATRT-SHH; ATRT-MYC
Embryonal tumor with multilayered rosettes (ETMR)	C19MC-altered; DICER1-mutant
CNS neuroblastoma	FOXR2-activated
CNS tumor with BCOR internal tandem duplication	BCOR internal tandem duplication
Intracranial mesenchymal tumor	FET-CREB fusion+
CIC-rearranged sarcoma	CIC-rearranged
Primary intracranial sarcoma	DICER1-mutant