OncoTargets and Therapy

Dovepress
Taylor & Francis Group

Open Access Full Text Article

CASE REPORT

Utility of Vorasidenib in IDH1 R132C-Mutant WHO Grade 2 Astrocytoma: A Case Report

Justin Hickey[1], Emily Pack[1], Denisse Arteaga[2], Johnie Hodge[2], Sanjay Bhatia[2], Peng Han[3], Parissa Feizi[4], Liv Miller[5], Sonikpreet Aulakh[6]

[1]West Virginia University School of Medicine, Morgantown, WV, USA; [2]Department of Neurosurgery, West Virginia University School of Medicine, Morgantown, WV, USA; [3]Department of Pathology, Anatomy and Laboratory Medicine, West Virginia University School of Medicine, Morgantown, WV, USA; [4]Department of Neuroradiology, West Virginia University School of Medicine, Morgantown, WV, USA; [5]Department of Neuroscience, West Virginia University School of Medicine, Morgantown, WV, USA; [6]Department of Medical Oncology, West Virginia University School of Medicine, Morgantown, WV, USA

Correspondence: Sonikpreet Aulakh, Department of Medical Oncology, West Virginia University School of Medicine, 1 Medical Center Drive, Morgantown, WV, 26506, USA, Tel +1 304 598 4000, Email sonikpreet.aulakh@hsc.wvu.edu

Abstract: WHO grade 2 astrocytomas are defined by an IDH mutation and the absence of 1p/19q codeletion. Most harbor the canonical IDH1 R132H substitution; rarer R132X variants, including R132C, remain underrepresented in prospective trials. Vorasidenib, a brain-penetrant dual IDH1/IDH2 inhibitor, prolongs progression-free survival in residual or recurrent grade 2 IDH-mutant glioma and is now included in contemporary North American guidelines when radiotherapy and chemotherapy can be deferred. We report a 25-year-old man who underwent maximal safe resection of a right temporal mass diagnosed as WHO grade 2 astrocytoma, IDH1 R132C mutant, with co-occurring ATRX and TP53 alterations. Serial postoperative MRI showed progressive residual non-enhancing T2/FLAIR signal (7 × 6 mm, then 10×7 mm, then 10×9 mm), and a 2024 biopsy confirmed residual grade 2 tumor without anaplastic features. Vorasidenib 40 mg orally once daily was started in fall 2024. After 17 months of continuous therapy (35 months after resection), the residual non-enhancing focus remains radiographically stable, and no treatment-related adverse events have occurred. Vorasidenib binds an allosteric pocket at the IDH1 dimer interface that does not directly include codon 132, which supports anticipated class activity across R132X variants. This observation is structural, not a demonstration that R132C is more sensitive than R132H. Direct comparative clinical data for R132C remain absent. This case adds real-world evidence that vorasidenib can be used safely in this uncommon molecular subgroup.

Plain Language Summary: Astrocytomas are brain tumors that often affect young adults. Many are driven by a change in a gene called IDH1. Most patients have a common IDH1 change known as R132H. A smaller group has a rarer change called R132C. Because R132C is uncommon, doctors have little published information about how newer targeted drugs work for these patients.

We describe a 25-year-old man who developed seizures and was found to have a World Health Organization grade 2 astrocytoma in the right temporal lobe. Surgery removed as much tumor as was safe. Specialized testing showed the rare IDH1 R132C change. Scans after surgery still showed a small amount of tumor, and that remnant grew on later scans.

He started vorasidenib, a once-daily tablet that blocks abnormal IDH1 and IDH2 proteins. This medicine is approved for grade 2 IDH-mutant gliomas after surgery. He has taken it for 17 months without serious side effects, and the remaining tumor has stayed the same size on MRI.

This single-patient report does not prove that every person with an R132C tumor will respond in the same way. It does show that vorasidenib can be given safely in this rare subgroup and that longer, variant-specific studies are still needed.

Keywords: WHO grade 2 astrocytoma, IDH1 R132C, vorasidenib, targeted therapy, case report

Introduction

WHO grade 2 astrocytoma is a slow-growing, infiltrative glial tumor composed of well-differentiated neoplastic astrocytes with only modestly increased cellularity and atypia.[1] The average annual incidence of IDH-mutant WHO

https://doi.org/10.2147/OTT.S638827
Received: 8 July 2026
Accepted: 6 October 2026
Published: 16 October 2026

© 2026 Hickey et al. This work is published and licensed by Dove Medical Press Limited. The full terms of this license are available at https://www.dovepress.com/terms.php and incorporate the Creative Commons Attribution – Non Commercial (unported, v4.0) License (http://creativecommons.org/licenses/by-nc/4.0/). By accessing the work you hereby accept the Terms. Non-commercial uses of the work are permitted without any further permission from Dove Medical Press Limited, provided the work is properly attributed. For permission for commercial use of this work, please see paragraphs 4.2 and 5 of our Terms (https://www.dovepress.com/terms.php).

grade 2 astrocytoma in the United States is approximately 0.21 per 100,000 persons.[2] These tumors usually arise in the cerebral hemispheres, most often the frontal, temporal, or parietal lobe, and commonly present with headache or seizure rather than focal deficit.

In the current classification, adult-type WHO grade 2 astrocytomas are IDH-mutant diffuse astrocytic tumors that lack 1p/19q codeletion.[3] Among IDH1-mutant gliomas, only codon 132 is substituted. R132H accounts for more than 90% of cases. The remaining R132X substitutions are uncommon: R132C approximately 4.7%, R132G 2.1%, R132S 1.7%, and R132L 0.8%.[4] IDH mutation is a favorable prognostic marker. In lower-grade glioma, patients with IDH-wildtype tumors had substantially shorter median survival than patients with IDH-mutant, 1p/19q-intact tumors (1.7 versus 6.3 years; age-adjusted hazard ratio for death 7.4; 95% CI 4.0–13.8).[5] Mutant IDH acquires neomorphic activity that converts α-ketoglutarate to the oncometabolite D-2-hydroxyglutarate. D-2-hydroxyglutarate competitively inhibits α-ketoglutarate-dependent dioxygenases, including histone and DNA demethylases, and thereby establishes the glioma CpG-island methylator phenotype.[5,6]

Seizures are the most common presenting feature of diffuse lower-grade gliomas. Tumor-related epilepsy in IDH-mutant disease is thought to reflect both peritumoral cortical disruption and a metabolic effect of D-2-hydroxyglutarate, which structurally resembles glutamate and may increase excitatory neurotransmission.[7] Early case-level observations suggest that lowering D-2-hydroxyglutarate with an IDH inhibitor can reduce seizure burden, although seizure control was not a primary endpoint of the registrational trial.[8,9]

Canonical IDH1 R132 mutations are not confined to the central nervous system. They also drive subsets of acute myeloid leukemia and cholangiocarcinoma, in which the mutant-selective IDH1 inhibitor ivosidenib is already approved.[10,11] That shared vulnerability is relevant when considering IDH inhibition in uncommon glioma genotypes. Within neuro-oncology, WHO CNS5 diagnosis now depends on integrated molecular data rather than histology alone. Genome-wide DNA-methylation profiling classifies diffuse gliomas into subgroups with prognostic value beyond IDH status, and co-occurring ATRX, TP53, and 1p/19q alterations define lineage.[3,12,13] Methylation-based and transcriptomic maps of rare variants such as R132C remain far thinner than those for R132H.

Historical standard of care for IDH-mutant WHO grade 2 astrocytoma began with maximal safe resection. Subsequent treatment depended on risk. Younger patients after gross-total resection could be observed. Older patients or those with residual tumor were considered for radiotherapy followed by PCV (procarbazine, lomustine, and vincristine) or temozolomide.[14] RTOG 9802 showed that radiotherapy plus six cycles of PCV improved median overall survival from 7.8 to 13.3 years compared with radiotherapy alone in high-risk grade 2 glioma.[15] Radiotherapy plus temozolomide has also produced multi-year progression-free and overall survival in IDH-mutant grade 2 astrocytoma.[16]

That paradigm has changed since regulatory approval of vorasidenib. The January 2025 ASCO-SNO guideline update recommends offering vorasidenib to patients with grade 2 IDH-mutant astrocytoma or oligodendroglioma after at least one surgery when radiotherapy and chemotherapy can reasonably be deferred. Radiotherapy plus temozolomide or PCV remains appropriate when deferral is not advisable.[17] NCCN Central Nervous System Cancers guidelines (version 1.2026) list vorasidenib as a preferred option, category 1 for residual or measurable disease, after surgery or biopsy when radiotherapy and chemotherapy are not the preferred first postoperative approach.[18] Vorasidenib has not yet been fully incorporated into EANO guidelines, so international practice is not completely harmonized.[14] The course described here—surgery followed by vorasidenib for residual, enlarging, non-enhancing disease without immediate radiotherapy or chemotherapy—is consistent with current North American guidance.

Vorasidenib is approved for patients 12 years of age and older with grade 2 astrocytoma or oligodendroglioma and a susceptible IDH1 or IDH2 mutation after surgery, including biopsy, subtotal resection, or gross-total resection. In the double-blind Phase 3 INDIGO trial, vorasidenib 40 mg once daily prolonged median progression-free survival from 11.1 months with placebo to 27.7 months (hazard ratio 0.39; 95% CI 0.27–0.56; P<0.001) and had a low-grade safety profile.[8] The trial included 31 patients with non-R132H IDH1 substitutions (R132X), of whom 17 received vorasidenib. Benefit was directionally consistent across pre-specified subgroups, but no formal R132C-only analysis was planned.[8]

Case Presentation

A 25-year-old man with no prior radiotherapy and no family history of cancer presented in spring 2023 with a first generalized tonic-clonic seizure. He reported no other neurologic symptoms. The examination showed no focal deficit. Contrast-enhanced MRI demonstrated a 6.2×5.5 × 4.1 cm non-enhancing mass in the medial right temporal lobe involving the hippocampus, extending toward the medial right occipital lobe, and abutting the right thalamus (Figure 1A and B). He underwent right temporoparietal craniotomy for maximal safe resection. Histomorphology was consistent with WHO grade 2 astrocytoma (Figure 2A).

Table 1 summarizes the integrated molecular profile. Immunohistochemistry for the canonical IDH1 R132H protein was negative (Figure 2B), which prompted reflex polymerase-chain-reaction testing and next-generation sequencing. Those assays identified IDH1 R132C. Co-occurring ATRX and TP53 mutations were present, and 1p/19q codeletion was absent by fluorescence in situ hybridization, satisfying WHO CNS5 criteria for IDH-mutant astrocytoma rather than oligodendroglioma.[3] Tumor mutational burden was low (2 mutations/Mb). The MGMT promoter was unmethylated. EGFR amplification was absent. No additional actionable driver (BRAF, CDKN2A/B, FGFR1–3, IDH2, NF1, PIK3CA, PTEN, TERT promoter, or TSC1/2) was detected. Ki-67 on the resection specimen was 2–3%. The integrated diagnosis was astrocytoma, IDH-mutant (R132C), WHO grade 2.

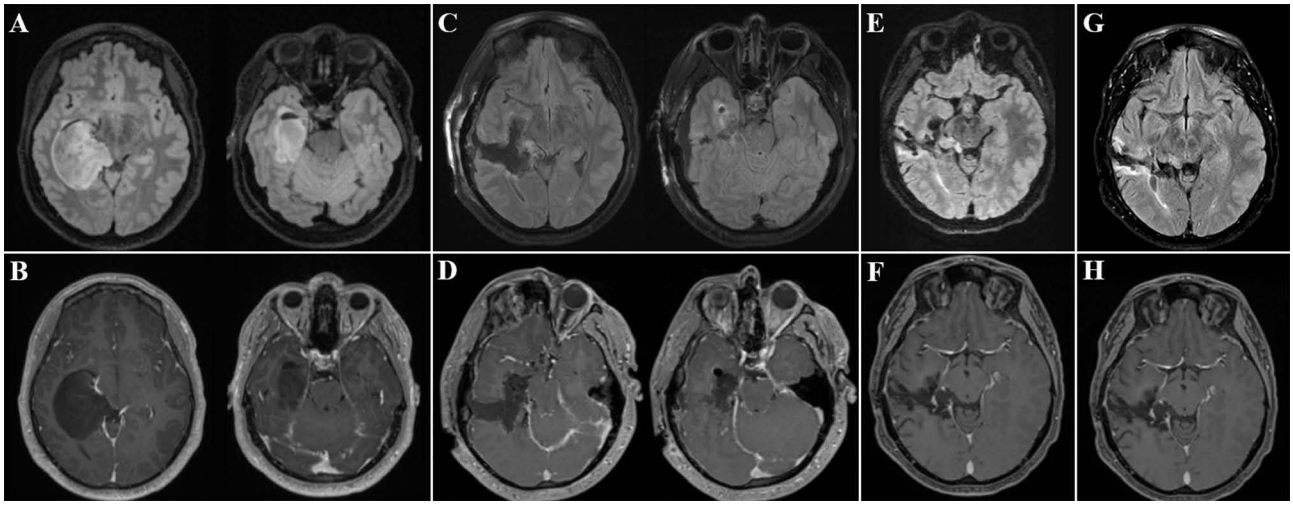


Figure 1 Axial FLAIR (upper row) and contrast-enhanced T1-weighted (lower row) MRI. (**A** and **B**) Preoperative non-enhancing right temporal mass involving the hippocampus and extending into the ambient and quadrigeminal plate cisterns. (**C** and **D**) Postoperative cavity with residual T2/FLAIR signal. (**E** and **F**) Persistent residual non-enhancing disease after 2 months of vorasidenib. (**G** and **H**) Residual non-enhancing disease after 9 months of vorasidenib, without new enhancement. MRI after 17 months of continuous therapy, described in the Case Presentation, showed no further interval change relative to the pre-treatment residual focus.

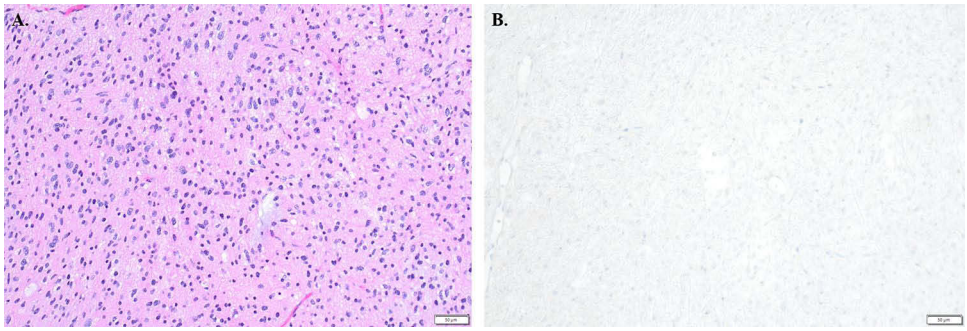


Figure 2 Histopathology of the resected WHO grade 2 astrocytoma. (**A**) Hematoxylin and eosin stain showing a moderately hypercellular glial neoplasm with oval to elongated nuclei and fibrillary cytoplasm, without necrosis or microvascular proliferation. Mitotic activity is sparse. (**B**) Immunohistochemistry for IDH1 R132H is negative. Next-generation sequencing subsequently identified IDH1 R132C.

https://doi.org/10.2147/OTT.S638827

Table 1 Integrated Molecular Profile of the Present Case

Molecular or Laboratory Finding	Result	Diagnostic or Prognostic Significance
IDH1 R132H immunohistochemistry	Negative	Prompted reflex molecular testing
IDH1 mutation (next-generation sequencing)	R132C (non-canonical)	Confirms IDH-mutant astrocytoma; uncommon variant (approximately 4.7% of IDH1-mutant gliomas)
ATRX	Mutated	Supports astrocytoma lineage per WHO CNS5
TP53	Mutated	Supports astrocytoma lineage per WHO CNS5
1p/19q codeletion (FISH)	Absent	Excludes oligodendroglioma
MGMT promoter	Unmethylated	May reduce expected benefit from alkylating chemotherapy if used later
EGFR amplification	Absent	Argues against a glioblastoma-associated copy-number profile
Tumor mutational burden	2 mutations/Mb (low)	Low likelihood of immunotherapy responsiveness as monotherapy
Ki-67, initial resection	2–3%	Low proliferative index, consistent with grade 2
Ki-67, residual-tumor biopsy	5%	Modest increase; no anaplastic histologic features

Early postoperative MRI showed reduced mass effect on the right lateral ventricle, unchanged 6.5 mm left midline shift at the foramina of Monro, and residual mass-like T2/FLAIR signal along the resection cavity (Figure 1C and D). An initial residual focus measured 7×6 mm on early postoperative surveillance imaging. Because the remnant persisted, a medial temporal biopsy was performed in 2024 and confirmed residual WHO grade 2 IDH-mutant astrocytoma without microvascular proliferation, necrosis, or other anaplastic features (Ki-67 5%; sparse mitotic activity by phosphohistone-H3). Subsequent surveillance MRI during 2023–2024, before systemic therapy, showed continued enlargement of the residual non-enhancing focus to 10×7 mm and then 10×9 mm.

Given radiographic progression of residual non-enhancing disease in a young patient after subtotal resection, vorasidenib 40 mg orally once daily was started in fall 2024, deferring radiotherapy and chemotherapy in line with contemporary guidance. The patient has tolerated treatment without clinical or laboratory adverse events. MRI after 2 months and after 9 months of vorasidenib showed a persistent residual non-enhancing T2/FLAIR focus without new enhancement (Figure 1E–H). The most recent surveillance MRI, obtained after 17 months of continuous therapy and 35 months after resection, showed no interval change in the size of the residual non-enhancing focus relative to the immediate pre-treatment examination. No new enhancement, mass effect, or treatment-limiting toxicity has been observed. The diagnostic and treatment sequence is summarized in Figure 3.

Discussion

This patient has an IDH1 R132C-mutant WHO grade 2 astrocytoma treated with vorasidenib after documented growth of residual non-enhancing disease. Published experience with vorasidenib outside the canonical R132H majority remains limited (Table 2). INDIGO demonstrated a progression-free-survival benefit that was consistent across molecular subgroups, including a small R132X cohort, but that trial was not powered for variant-specific inference.[8] Only 15 enrolled patients had R132C, and 8 of those were assigned to vorasidenib.[8]

Structurally, vorasidenib occupies an allosteric pocket at the tetrahelical dimer interface of mutant IDH1. Cocrystal data show that the inhibitor is stabilized by hydrophobic contacts with residues that include Trp124, Val255, Met259, and Trp267 and by hydrogen bonding to Gln277.[20,21] Those contact residues surround codon 132 rather than include it. The binding-site architecture is therefore expected to be largely conserved across R132X proteins. That expectation is

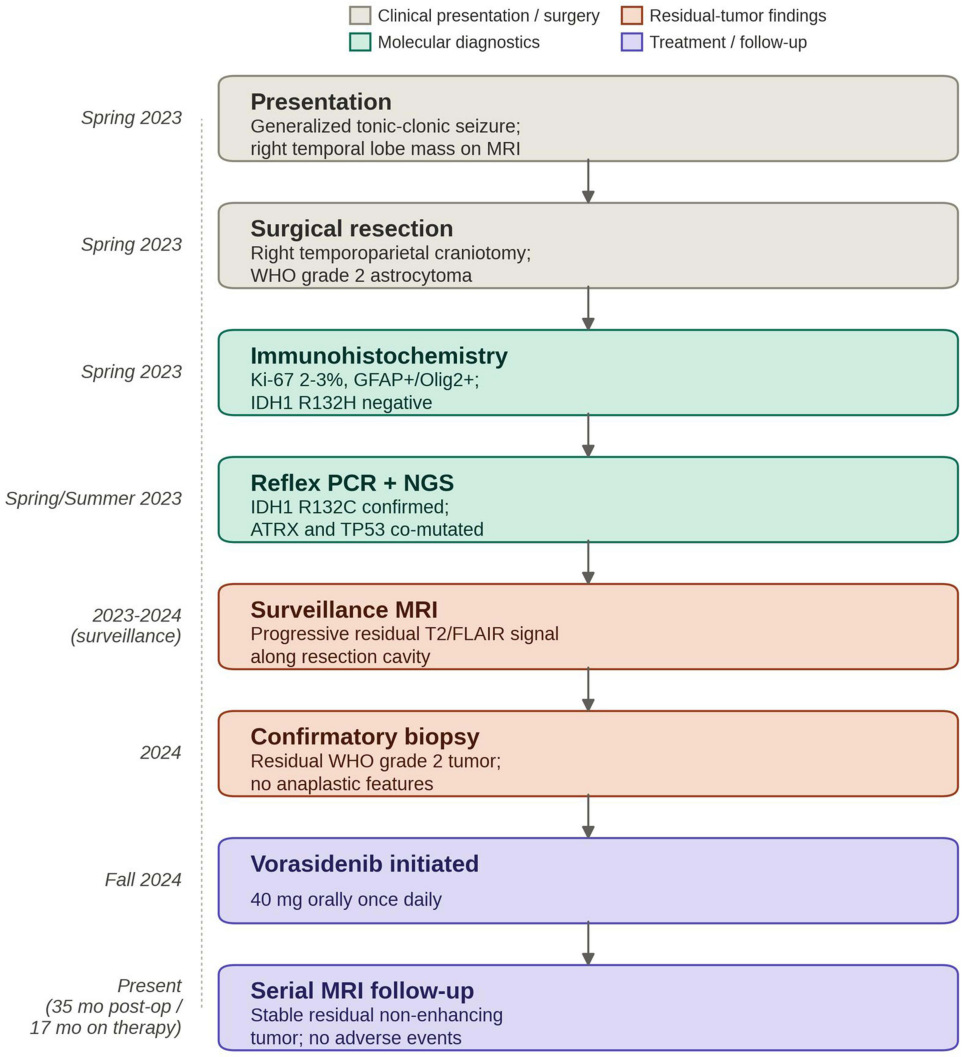


Figure 3 Diagnostic and treatment workflow from presentation in spring 2023 through last follow-up at 35 months after resection and 17 months of vorasidenib.

a structural inference. It has not been confirmed by an R132C-specific cocrystal structure, and it does not establish that every R132 substitution is equally drug-sensitive in patients.

Wild-type IDH1 catalyzes oxidative decarboxylation of isocitrate to α-ketoglutarate. R132H and R132C both replace a charged arginine with a lower-polarity residue, impair isocitrate binding, and confer neomorphic conversion of α-ketoglutarate to D-2-hydroxyglutarate.[22,23] Kinetic studies indicate that R132 substitutions are not enzymatically identical; R132C can show a lower Michaelis constant for α-ketoglutarate than R132H.[24] A lower Km raises the biochemical hypothesis that D-2-hydroxyglutarate production could differ by variant. It does not demonstrate greater or lesser clinical responsiveness to

Table 2 Published Reports of Vorasidenib in IDH1-Mutant Glioma Relevant to This Case

Year	Population	Patients, n	Line of Treatment	Reference
2023	IDH-mutant WHO grade 2 astrocytoma or oligodendroglioma (INDIGO)	315	After surgery; radiotherapy and chemotherapy deferred	Mellinghoff et al[8]
2025	Non-enhancing recurrent WHO grade 3 oligodendroglioma	1	Expanded use after prior therapy	Himstead et al[19]

https://doi.org/10.2147/OTT.S638827

vorasidenib. No controlled experimental or clinical comparison of vorasidenib sensitivity between R132C and R132H has been published, and we do not interpret this single case as such a comparison.

Co-occurring alterations in this tumor help define lineage and may influence later treatment choices. ATRX loss and TP53 mutation frequently travel together in IDH-mutant astrocytoma and cooperate to produce the alternative-lengthening-of-telomeres phenotype that distinguishes astrocytoma from oligodendroglioma.[25] Unmethylated MGMT status, if later relevant, would be expected to blunt alkylator benefit. In a young patient with residual non-enhancing grade 2 disease, those findings support prioritizing an IDH-targeted approach while radiotherapy and chemotherapy remain available as later options.

Combination strategies are under study and may eventually matter for uncommon variants, for which monotherapy data remains sparse. IDHEAL-4U (NCT05592743) is evaluating vorasidenib with temozolomide. ViCToRy (NCT05609994) is testing vorasidenib with a tumor-specific peptide vaccine in recurrent IDH1-mutant lower-grade glioma. A Phase 1 study (NCT05484622) is combining vorasidenib with pembrolizumab. These programs pair suppression of D-2-hydroxyglutarate with cytotoxic or immune mechanisms. They do not yet report R132C-stratified results, and this patient has not required combination therapy.

Conclusion

This case documents 17 months of radiographic stability and the absence of adverse events during vorasidenib treatment of a residual, previously enlarging, non-enhancing IDH1 R132C-mutant WHO grade 2 astrocytoma. It does not establish variant-specific efficacy, does not show that R132C is more sensitive than R132H, and does not replace randomized evidence from INDIGO.[8] Together with the small R132X subgroup in that trial and isolated expanded-use reports in related IDH-mutant gliomas,[19] it supports offering vorasidenib to R132C-mutant patients who otherwise meet contemporary eligibility criteria, while highlighting the need for variant-inclusive registries so that future guidance rests on direct rather than extrapolated evidence.

Abbreviations

2-HG, 2-hydroxyglutarate; ALT, alternative lengthening of telomeres; ASCO, American Society of Clinical Oncology; EANO, European Association of Neuro-Oncology; FISH, fluorescence in situ hybridization; IDH, isocitrate dehydrogenase; MRI, magnetic resonance imaging; NCCN, National Comprehensive Cancer Network; NGS, next-generation sequencing; PCV, procarbazine, lomustine, and vincristine; PFS, progression-free survival; SNO, Society for Neuro-Oncology; WHO, World Health Organization.

Data Sharing Statement

All data evaluated for this case report are contained in the article and its figures and tables. Underlying protected health information remains in the institutional medical record and is not publicly deposited.

Ethics Approval and Informed Consent

This case was reviewed under West Virginia University Institutional Review Board protocol STUDY00000225, "Retrospective Analysis in Patients with Primary and Metastatic Brain Tumors at WVU Cancer Institute." The West Virginia University Office of Human Research Protections determined that the protocol meets exempt category (4) (secondary research on data or specimens) on 22 April 2026. Institutional approval to review and report the case details was therefore in place under this exempt determination. The authors confirm that written informed consent for clinical care documentation was handled in accordance with institutional policy.

Consent for Publication

Written informed consent for publication of this case report, including the accompanying clinical images, was obtained from the patient. The patient was shown the content intended for publication, in accordance with COPE guidance.

Acknowledgments

We thank the patient and his family for consenting to publication of this case, and the multidisciplinary teams at West Virginia University for their contributions to his care.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

The authors received no financial support for the research, authorship, or publication of this article. The sponsor, if any, had no role in case selection, data interpretation, writing, or the decision to submit.

Disclosure

The authors declare no competing financial or non-financial interests related to this work.

References

1. Berger TR, Wen PY, Lang-Orsini M, Chukwueke UN. World Health Organization 2021 classification of central nervous system tumors and implications for therapy for adult-type gliomas: a review. *JAMA Oncol*. 2022;8(10):1493–1501. doi:10.1001/jamaoncol.2022.2844
2. Price M, Ballard C, Benedetti J, et al. CBTRUS statistical report: primary brain and other central nervous system tumors diagnosed in the United States in 2018–2022. *Neuro Oncol*. 2025;27(Suppl 4):iv1–iv66. doi:10.1093/neuonc/noaf194
3. Louis DN, Perry A, Wesseling P, et al. The 2021 WHO classification of tumors of the central nervous system: a summary. *Neuro Oncol*. 2021;23 (8):1231–1251.
4. Kloosterhof NK, Bralten LB, Dubbink HJ, French PJ, van den Bent MJ. Isocitrate dehydrogenase-1 mutations: a fundamentally new understanding of diffuse glioma? *Lancet Oncol*. 2011;12(1):83–91. doi:10.1016/S1470-2045(10)70053-X
5. Cancer Genome Atlas Research Network. Comprehensive, integrative genomic analysis of diffuse lower-grade gliomas. *N Engl J Med*. 2015;372 (26):2481–2498. doi:10.1056/NEJMoa1402121
6. Zhang C, Moore LM, Li X, Yung WKA, Zhang W. IDH1/2 mutations target a key hallmark of cancer by deregulating cellular metabolism in glioma. *Neuro Oncol*. 2013;15(9):1114–1126. doi:10.1093/neuonc/not087
7. Seidel S, Wehner T, Miller D, Wellmer J, Schlegel U, Grönheit W. Brain tumor related epilepsy: pathophysiological approaches and rational management of antiseizure medication. *Neurol Res Pract*. 2022;4(1):45. doi:10.1186/s42466-022-00205-9
8. Mellinghoff IK, van den Bent MJ, Blumenthal DT, et al. Vorasidenib in IDH1- or IDH2-mutant low-grade glioma. *N Engl J Med*. 2023;389 (7):589–601. doi:10.1056/NEJMoa2304194
9. Rudà R, Bruno F, Pellerino A, Pronello E, Zotta M, Morbelli S. Early seizure freedom with [18F]fluorodopa positron emission tomography response after isocitrate dehydrogenase inhibition with vorasidenib: first case report. *Epilepsia*. 2025;66(10):e242–e247. doi:10.1111/epi.18593
10. DiNardo CD, Stein EM, de Botton S, et al. Durable remissions with ivosidenib in IDH1-mutated relapsed or refractory AML. *N Engl J Med*. 2018;378(25):2386–2398. doi:10.1056/NEJMoa1716984
11. Abou-Alfa GK, Macarulla T, Javle MM, et al. Ivosidenib in IDH1-mutant, chemotherapy-refractory cholangiocarcinoma (ClarIDHy): a multicentre, randomised, double-blind, placebo-controlled, phase 3 study. *Lancet Oncol*. 2020;21(6):796–807. doi:10.1016/S1470-2045(20)30157-1
12. Capper D, Jones DTW, Sill M, et al. DNA methylation-based classification of central nervous system tumours. *Nature*. 2018;555(7697):469–474. doi:10.1038/nature26000
13. Ceccarelli M, Barthel FP, Malta TM, et al. Molecular profiling reveals biologically discrete subsets and pathways of progression in diffuse glioma. *Cell*. 2016;164(3):550–563. doi:10.1016/j.cell.2015.12.028
14. Weller M, van den Bent M, Preusser M, et al. EANO guidelines on the diagnosis and treatment of diffuse gliomas of adulthood. *Nat Rev Clin Oncol*. 2021;18(3):170–186.
15. Buckner JC, Shaw EG, Pugh SL, et al. Radiation plus procarbazine, CCNU, and vincristine in low-grade glioma. *N Engl J Med*. 2016;374 (14):1347–1355. doi:10.1056/NEJMoa1500925
16. Minniti G, Paolini S, Antonelli M, et al. Long-term treatment outcomes of temozolomide-based chemoradiation in patients with adult-type diffuse IDH-mutant grade 2 astrocytoma. *J Neurooncol*. 2023;164(2):331–339. doi:10.1007/s11060-023-04418-z
17. Blakeley JO, Mohile NA, Messersmith H, et al. Therapy for diffuse astrocytic and oligodendroglial tumors in adults: ASCO-SNO guideline rapid recommendation update. *J Clin Oncol*. 2025;43:2129–2133. doi:10.1200/JCO-25-00250
18. National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology: Central Nervous System Cancers. Version 1.2026. Available from: https://www.nccn.org. Accessed September 22, 2026.
19. Himstead AS, Chen JW, Chu E, et al. Expanded use of vorasidenib in non-enhancing recurrent CNS WHO grade 3 oligodendroglioma. *Biomedicines*. 2025;13(1):201. doi:10.3390/biomedicines13010201
20. Konteatis Z, Artin E, Nicolay B, et al. Vorasidenib (AG-881): a first-in-class, brain-penetrant dual inhibitor of mutant IDH1 and 2 for treatment of glioma. *ACS Med Chem Lett*. 2020;11(2):101–107. doi:10.1021/acsmedchemlett.9b00509

21. Xu J, Wang F, Ma Q, et al. Crystal structures of pan-IDH inhibitor AG-881 in complex with mutant human IDH1 and IDH2. *Biochem Biophys Res Commun*. 2018;503(4):2912–2917.
22. Han S, Liu Y, Cai SJ, et al. IDH mutation in glioma: molecular mechanisms and potential therapeutic targets. *Br J Cancer*. 2020;122(11):1580–1589. doi:10.1038/s41416-020-0814-x
23. Lu VM, McDonald KL. Isocitrate dehydrogenase 1 mutation subtypes at site 132 and their translational potential in glioma. *CNS Oncol*. 2018;7(1):41–50. doi:10.2217/cns-2017-0019
24. Avellaneda Matteo D, Grunseth AJ, Gonzalez ER, et al. Molecular mechanisms of isocitrate dehydrogenase 1 (IDH1) mutations identified in tumors: the role of size and hydrophobicity at residue 132 on catalytic efficiency. *J Biol Chem*. 2017;292(19):7971–7983. doi:10.1074/jbc.M117.776179
25. Diplas BH, Liu H, Yang R, et al. Genome-wide profiling of 8,803 diffuse gliomas identifies ATRX loss and TP53 mutation as co-drivers of the ALT phenotype in IDH-mutant astrocytoma. *Nat Commun*. 2018;9:2087. doi:10.1038/s41467-018-04448-6

OncoTargets and Therapy

Dovepress
Taylor & Francis Group

Publish your work in this journal

OncoTargets and Therapy is an international, peer-reviewed, open access journal focusing on the pathological basis of all cancers, potential targets for therapy and treatment protocols employed to improve the management of cancer patients. The journal also focuses on the impact of management programs and new therapeutic agents and protocols on patient perspectives such as quality of life, adherence and satisfaction. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit http://www.dovepress.com/testimonials.php to read real quotes from published authors.

Submit your manuscript here: https://www.dovepress.com/oncotargets-and-therapy-journal