

Brain Tumours

127 questions in three levels, with answer key

For NEET-PG, USMLE, DNB and DM revision and for classroom tests. Level 1 covers core facts; Level 2 tests applied reasoning (calculations, imaging and fluid findings, trial interpretation, sequencing); Level 3 covers landmark trials and newer therapies. Answers and explanations are at the end. No drug doses.

Dr. Haritha Chiramana

MD (Internal Medicine), DM (Medical Oncology) · Senior Medical Oncologist & Hemato-Oncologist
C.R. Reddy Cancer Center, C.R. Reddy Superspeciality Hospital · info@drharitha.co.in · drharitha.co.in

9 October 2026 · Free for teaching with attribution (CC BY-NC-ND 4.0) · Online version with instant scoring:
drharitha.co.in/professionals/brain-tumours-mcq

Level 1 · Basics

- Q1. Metastases** In adults over 40, what is the commonest type of intracranial tumour?
- A Pituitary adenoma
 - B Metastasis from a systemic cancer
 - C Primary CNS lymphoma
 - D Glioblastoma
 - E Meningioma
- Q2. Glioma** Which is the commonest malignant primary brain tumour in adults?
- A Glioblastoma, IDH-wildtype
 - B Ependymoma
 - C Oligodendroglioma
 - D Pilocytic astrocytoma
 - E Medulloblastoma
- Q3. Glioma** Which is the only firmly established environmental risk factor for glioma and meningioma?
- A Mobile phone use
 - B Ionising radiation to the head
 - C Living near power lines
 - D Processed meat
 - E Head injury
- Q4. Glioma** What is the commonest presenting symptom of a low-grade (IDH-mutant) glioma in a young adult?
- A Hemiplegia
 - B Seizure
 - C Coma
 - D Papilloedema
 - E Severe morning headache
- Q5. Glioma** Which statement about brain tumour headache is correct?
- A It is usually tension-type and rarely occurs without other symptoms
 - B Headache alone for 6 months is typical
 - C Most patients have the classic early-morning headache with vomiting
 - D It is always on the side of the tumour
 - E It is relieved by lying flat
- Q6. Glioma** Which headache feature is a red flag that warrants brain imaging?
- A Headache after missing a meal
 - B Lifelong episodic migraine unchanged in pattern
 - C New headache after age 50, or a change in pattern
 - D Bilateral pressing headache relieved by paracetamol
 - E Headache with neck stiffness after exercise that settles in an hour
- Q7. Glioma** Which investigation is best for a suspected brain tumour?
- A Plain CT head
 - B Lumbar puncture
 - C MRI brain with and without contrast
 - D Skull X-ray
 - E EEG
- Q8. Glioma** Which molecular pair defines oligodendroglioma in the 2021 WHO classification?
- A BRAF V600E with CDKN2A deletion
 - B H3 K27M mutation
 - C IDH-wildtype with EGFR amplification
 - D ATRX loss with TP53 mutation
 - E IDH mutation with 1p/19q codeletion

Q9. Glioma Methylation of which gene promoter predicts benefit from temozolomide in glioblastoma?

- A IDH1
- B MGMT
- C PTEN
- D TERT
- E EGFR

Q10. Glioma What is the standard first-line treatment for a fit 55-year-old after resection of glioblastoma?

- A Temozolomide alone
- B Radiotherapy alone
- C Radiotherapy 60 Gy with daily temozolomide, then 6 monthly cycles of temozolomide
- D Whole-brain radiotherapy
- E Bevacizumab with radiotherapy

Q11. Glioma The classic "fried egg" cells with chicken-wire capillaries and calcification describe:

- A Medulloblastoma
- B Glioblastoma
- C Meningioma
- D Oligodendroglioma
- E Pilocytic astrocytoma

Q12. Glioma A biopsy shows a highly cellular astrocytic tumour with a band of crowded nuclei around necrosis (schematic shown). In an adult with an IDH-wildtype tumour this is:

- A Pilocytic astrocytoma
- B Meningioma
- C Glioblastoma
- D Ependymoma
- E Oligodendroglioma

Q13. Metastases A patient with a brain tumour has never had a seizure. What should be done about antiseizure medication?

- A Start phenytoin for life
- B No prophylactic antiseizure drug
- C Start carbamazepine during radiotherapy
- D Start valproate and check levels
- E Start levetiracetam for 1 year

Q14. Metastases Which antiseizure drug is preferred for a patient with a brain tumour who has had a seizure and is receiving chemotherapy?

- A Carbamazepine
- B Levetiracetam
- C Phenytoin
- D Phenobarbital
- E Oxcarbazepine with rifampicin

Q15. Metastases Dexamethasone is preferred over other steroids for brain tumour oedema mainly because:

- A It prevents seizures
- B It crosses into tumour but not normal brain
- C It shrinks the tumour cells directly
- D It is potent with almost no mineralocorticoid effect
- E It has no effect on glucose

Q16. Metastases A 60-year-old smoker has three ring-enhancing lesions at the grey-white junction with extensive oedema. Which is the most useful next test?

- A Lumbar puncture
- B Repeat MRI in 6 months
- C CT chest, abdomen and pelvis
- D EEG
- E Serum CEA only

- Q17. Metastases** Which treatment is usually preferred for 1–4 small brain metastases in a patient with controlled systemic disease?
- A Observation only
 - B Prophylactic phenytoin
 - C Whole-brain radiotherapy alone
 - D Stereotactic radiosurgery alone
 - E Craniospinal irradiation
- Q18. Metastases** Patients with brain tumours who develop a deep vein thrombosis should usually:
- A Be anticoagulated after a CT shows no bleeding
 - B Never receive anticoagulants
 - C Receive an IVC filter routinely
 - D Receive aspirin only
 - E Receive anticoagulation only if the tumour is benign
- Q19. Paediatric** What is the commonest group of brain tumours in children?
- A Glioblastomas
 - B Low-grade gliomas
 - C Meningiomas
 - D Metastases
 - E Primary CNS lymphomas
- Q20. Paediatric** Roughly what proportion of childhood brain tumours arise in the posterior fossa?
- A One-third to one-half
 - B About 90%
 - C None in infants
 - D Less than 5%
 - E All medulloblastomas and no gliomas
- Q21. Paediatric** A 5-year-old has early-morning vomiting for 6 weeks, a broad-based gait and a head tilt. The best next step is:
- A Eye refraction
 - B Stool examination
 - C Urgent brain MRI (or CT if MRI unavailable)
 - D Anthelmintic treatment
 - E Proton pump inhibitor trial
- Q22. Paediatric** The commonest malignant brain tumour of childhood is:
- A Glioblastoma
 - B Craniopharyngioma
 - C Medulloblastoma
 - D Oligodendroglioma
 - E Meningioma
- Q23. Paediatric** Optic pathway glioma is most strongly associated with:
- A Tuberous sclerosis
 - B Von Hippel-Lindau disease
 - C Neurofibromatosis type 1
 - D Li-Fraumeni syndrome
 - E Down syndrome
- Q24. Paediatric** Subependymal giant cell astrocytoma is associated with:
- A NF2-related schwannomatosis
 - B Gorlin syndrome
 - C Lynch syndrome
 - D Turcot syndrome with APC
 - E Tuberous sclerosis complex

- Q25. Paediatric** Bilateral vestibular schwannomas are diagnostic of:
- A NF1
 - B Li-Fraumeni
 - C Tuberous sclerosis
 - D NF2-related schwannomatosis
 - E Cowden syndrome
- Q26. Paediatric** A cystic cerebellar mass with an enhancing mural nodule in a child (schematic shown) is most likely:
- A Medulloblastoma
 - B Metastasis
 - C Pilocytic astrocytoma
 - D Glioblastoma
 - E Meningioma
- Q27. Paediatric** DIPG can usually be diagnosed without a biopsy because:
- A Blood tests are diagnostic
 - B Typical MRI appearance in the right clinical setting is sufficient
 - C Biopsy is impossible
 - D It never progresses
 - E It is always benign
- Q28. Paediatric** The main treatment for DIPG is:
- A Temozolomide alone
 - B Surgical resection
 - C Craniospinal irradiation
 - D Observation
 - E Focal radiotherapy
- Q29. Glioma** What is the first step in management of most accessible diffuse gliomas?
- A Whole-brain radiotherapy
 - B Maximal safe resection
 - C Temozolomide alone
 - D Watch and wait without tissue
 - E Steroids alone
- Q30. Glioma** After resection of a high-grade glioma, postoperative MRI should be done:
- A Only if symptoms appear
 - B After radiotherapy
 - C At 6 weeks
 - D At 3 months
 - E Within 24–48 hours
- Q31. Glioma** Which statement about mobile phones and brain tumours is supported by evidence?
- A They cause most brain metastases
 - B Earphones increase the risk
 - C They cause meningiomas in children
 - D They are a proven cause of glioma
 - E No causal link has been shown in large studies
- Q32. Metastases** Whole-brain radiotherapy added to radiosurgery for 1–3 metastases:
- A Is required in all patients
 - B Improves overall survival
 - C Has no effect on intracranial control
 - D Reduces new brain metastases but worsens cognition without improving survival
 - E Prevents seizures

Q33. Metastases Which side effect is NOT typical of long-term dexamethasone?

- A Weight loss and low blood sugar
- B Hyperglycaemia
- C Insomnia and mood change
- D Proximal myopathy
- E Oral thrush

Q34. Glioma Tumour-treating fields are:

- A A form of proton therapy
- B A vaccine
- C A scalp-worn device delivering alternating electric fields, used with adjuvant temozolomide
- D An implanted chemotherapy wafer
- E A radiosurgery technique

Q35. Glioma A 61-year-old man has 3 weeks of right-sided weakness. Post-contrast MRI (schematic) shows a large left hemispheric mass with a thick irregular enhancing rim, central necrosis, oedema and midline shift. He has no history of cancer. The most likely diagnosis is:

- A Glioblastoma
- B Pilocytic astrocytoma
- C Meningioma
- D Low-grade oligodendroglioma
- E Colloid cyst

Level 2 · Applied & innovative

Q36. Glioma A 38-year-old has a non-enhancing right frontal tumour. MRI (schematic) shows a mass bright on T2 but dark in its centre on FLAIR with a bright rim. This sign suggests:

- A Lymphoma
- B IDH-mutant, 1p/19q-intact astrocytoma
- C Glioblastoma
- D Oligodendroglioma
- E Abscess

Q37. Glioma CT of a 42-year-old with a frontal mass shows clumped calcification reaching the cortex (schematic). Which diagnosis is suggested?

- A Oligodendroglioma
- B Glioblastoma
- C Pilocytic astrocytoma
- D Meningioma
- E Metastasis

Q38. Glioma A histologically grade 2 IDH-wildtype diffuse astrocytoma in a 63-year-old carries a TERT promoter mutation. The WHO 2021 diagnosis is:

- A Astrocytoma, IDH-mutant, grade 2
- B Pleomorphic xanthoastrocytoma
- C Oligodendroglioma
- D Diffuse astrocytoma, grade 2
- E Glioblastoma, IDH-wildtype, grade 4

Q39. Glioma An IDH-mutant astrocytoma with no necrosis has homozygous CDKN2A/B deletion. Its CNS WHO grade is:

- A 4
- B 1
- C 2
- D 3
- E Grade not assigned

Q40. Glioma Immunohistochemistry for IDH1 R132H is negative in a grade 2 diffuse glioma in a 35-year-old. What next?

- A Treat as glioblastoma
- B Test MGMT and stop
- C Repeat IHC on the same block
- D Diagnose IDH-wildtype glioma
- E Sequence IDH1 codon 132 and IDH2 codon 172

Q41. Glioma In an IDH-mutant glioma, retained ATRX expression and no p53 overexpression suggest:

- A Ependymoma
- B H3 K27M glioma
- C Glioblastoma
- D IDH-mutant astrocytoma
- E 1p/19q codeletion (oligodendroglioma)

Q42. Glioma In the EORTC/NCIC trial, about how much did temozolomide improve 2-year survival in glioblastoma?

- A From 1% to 2%
- B From 50% to 90%
- C No difference
- D From 27% to 11%
- E From about 11% to 27%

Q43. Glioma In MGMT-methylated glioblastoma (Hegi analysis), median survival with RT + temozolomide versus RT alone was about:

- A 21.7 vs 15.3 months
- B 48 vs 31 months
- C 9 vs 8 months
- D 12.7 vs 11.8 months
- E 60 vs 15 months

Q44. Glioma A 74-year-old with glioblastoma, KPS 80, MGMT methylated. Which first-line option has randomised support?

- A Bevacizumab alone
- B Nivolumab with RT
- C RT 60 Gy alone only
- D Short-course RT (40 Gy in 15) with temozolomide
- E Whole-brain RT

Q45. Glioma A 78-year-old with unmethylated glioblastoma, KPS 60, lives far away. A reasonable plan is:

- A RT 60 Gy with temozolomide and lomustine
- B Bevacizumab first line
- C Temozolomide alone
- D Short-course RT alone (25 Gy in 5 or 40 Gy in 15) or best supportive care
- E Tumour-treating fields alone

Q46. Glioma Bevacizumab in newly diagnosed glioblastoma (AVAgllo, RTOG 0825):

- A Prolonged overall survival by 6 months
- B Prolonged PFS but not overall survival
- C Was better tolerated than placebo
- D Had no effect on any endpoint
- E Is the standard of care

Q47. Glioma A patient on daily temozolomide during RT is taking dexamethasone and has lymphopenia. What prophylaxis is suggested?

- A Prophylactic antifungal fluconazole
- B Pneumocystis jirovecii prophylaxis
- C Routine G-CSF
- D Routine antibacterial ciprofloxacin
- E Antiviral acyclovir for all

- Q48. Glioma** Ten weeks after chemoradiation for MGMT-methylated glioblastoma, MRI shows new enhancement at the cavity rim. The patient is well. Best approach?
- A Urgent re-resection
 - B Hospice referral
 - C Start whole-brain RT
 - D Stop temozolomide and start bevacizumab
 - E Continue adjuvant temozolomide and repeat MRI in 4–8 weeks
- Q49. Glioma** A 32-year-old has a residual, non-enhancing IDH-mutant astrocytoma (grade 2) after surgery; seizures are controlled. Which option has phase 3 evidence of delaying progression?
- A Vorasidenib
 - B Bevacizumab
 - C Lomustine alone
 - D Whole-brain radiotherapy
 - E Nivolumab
- Q50. Glioma** In RTOG 9802 (high-risk low-grade glioma), adding PCV to radiotherapy changed median overall survival from about:
- A 13.3 to 7.8 years
 - B 15 to 16 months
 - C 2 to 3 years
 - D 7.8 to 13.3 years
 - E No change
- Q51. Glioma** In CATNON, which component improved survival in IDH-mutant grade 3 astrocytoma?
- A Concurrent daily temozolomide only
 - B Twelve cycles of adjuvant temozolomide after RT
 - C Bevacizumab
 - D Whole-brain RT
 - E Lomustine maintenance
- Q52. Metastases** Which approach is recommended for dexamethasone in a patient with a brain metastasis and no neurological symptoms?
- A 16 mg daily until RT ends
 - B 4 mg daily lifelong
 - C Steroids only during SRS, always
 - D Methylprednisolone pulses
 - E No steroid
- Q53. Metastases** A fit 55-year-old with controlled breast cancer has a single 3.8 cm cerebellar metastasis with fourth-ventricle compression. Best initial local treatment?
- A Surgical resection followed by cavity SRS
 - B SRS alone in a single fraction
 - C Whole-brain RT alone
 - D Observation
 - E Steroids alone
- Q54. Metastases** After complete resection of a brain metastasis, observation without radiotherapy leads to local recurrence at 12 months in about:
- A All patients
 - B 1% of patients
 - C It cannot recur
 - D Half of patients
 - E 10% of patients

- Q55. Metastases** A patient needs WBRT for 30 metastases. Which measures reduce cognitive decline?
- A Steroids for 1 year
 - B Prophylactic levetiracetam
 - C Adding temozolomide
 - D Higher dose per fraction
 - E Hippocampal-avoidance IMRT plus memantine
- Q56. Metastases** A never-smoker with EGFR exon 19-deleted lung cancer has three asymptomatic 5–9 mm brain metastases. Which plan is reasonable?
- A Prophylactic phenytoin and chemotherapy
 - B Osimertinib with MRI in 6–8 weeks, SRS if lesions grow or cause symptoms
 - C Upfront whole-brain RT then gefitinib
 - D Dexamethasone and observation only
 - E Craniotomy for all three
- Q57. Metastases** A patient with a glioblastoma has a pulmonary embolism. CT head shows no bleeding. Which anticoagulant is suggested?
- A IVC filter only
 - B Aspirin
 - C Warfarin as first choice
 - D A direct oral anticoagulant (or LMWH if unsuitable)
 - E No anticoagulation
- Q58. Metastases** Which brain metastases carry a higher risk of spontaneous haemorrhage, so anticoagulation needs extra caution?
- A Ovarian and bladder
 - B Melanoma, renal cell, thyroid and choriocarcinoma
 - C Lymphoma and myeloma
 - D Small cell lung and colorectal
 - E Breast and prostate
- Q59. Metastases** A patient with a glioma has been seizure-free for 2 years on levetiracetam and asks to stop. Approximately what proportion of glioma patients relapse after withdrawal?
- A About 90%
 - B About 2%
 - C All
 - D About a quarter
 - E None
- Q60. Metastases** A 40-year-old with HIV has a single ring-enhancing basal ganglia lesion. Which conditions top the differential?
- A Colloid cyst and craniopharyngioma
 - B Oligodendroglioma and DNET
 - C Toxoplasmosis and primary CNS lymphoma
 - D Meningioma and schwannoma
 - E Pilocytic astrocytoma and ependymoma
- Q61. Glioma** A 45-year-old on antituberculous treatment for 3 months for a "tuberculoma" has a growing periventricular, homogeneously enhancing, diffusion-restricting lesion. She is stable. What should be done?
- A Extend antituberculous treatment to 18 months
 - B Gross total resection
 - C Withhold steroids if possible and arrange stereotactic biopsy for suspected lymphoma
 - D Double the steroid dose
 - E Whole-brain RT empirically

- Q62. Glioma** Which feature favours neurocysticercosis over a metastasis?
- A Dural-based enhancement
 - B A thick irregular ring with necrosis
 - C A small cyst with an eccentric dot (scolex) and calcified lesions elsewhere
 - D Multiple large lesions with extensive oedema in a smoker
 - E Lesions at the grey–white junction that grow over weeks
- Q63. Glioma** Which MRI feature best distinguishes a pyogenic abscess from a necrotic tumour?
- A Mass effect
 - B Surrounding oedema
 - C Restricted diffusion in the cavity centre
 - D Enhancement
 - E T2 hyperintensity
- Q64. Glioma** Which is the best option at first recurrence of glioblastoma in a fit patient with a small, focal recurrence 14 months after diagnosis?
- A Whole-brain RT
 - B Bevacizumab plus lomustine because it prolongs survival
 - C High-dose dexamethasone only
 - D Consider re-resection and/or re-irradiation, or a single agent such as lomustine, after MDT review; offer a trial
 - E Nivolumab because it beat bevacizumab
- Q65. Paediatric** A 7-year-old has a progressive unresectable hypothalamic low-grade glioma with BRAF V600E. Compared with carboplatin–vincristine, dabrafenib plus trametinib gave:
- A Shorter PFS
 - B Identical outcomes
 - C More grade 3–4 toxicity
 - D No responses
 - E Higher response (47 vs 11%) and longer PFS (20.1 vs 7.4 months)
- Q66. Paediatric** For a child with progressive low-grade glioma and a KIAA1549–BRAF fusion, which targeted drug has single-arm phase 2 evidence (FIREFLY-1)?
- A Tovorafenib
 - B Vorasidenib
 - C Osimertinib
 - D Imatinib
 - E Larotrectinib
- Q67. Paediatric** Long-term overall survival in paediatric low-grade glioma is about:
- A 50% at 1 year
 - B 30% at 5 years
 - C 100% with no progression
 - D 10% at 5 years
 - E 90% at 20 years, though about half progress at some point
- Q68. Paediatric** Which staging is needed after surgery for medulloblastoma?
- A Bone marrow biopsy only
 - B MRI of the whole spine and lumbar CSF cytology
 - C No staging
 - D Chest X-ray only
 - E PET-CT only
- Q69. Paediatric** A 2-year-old has a completely resected malignant embryonal tumour. Why is radiotherapy usually delayed or avoided?
- A Children do not tolerate MRI
 - B Embryonal tumours do not recur
 - C Cranial RT in very young children causes severe neurocognitive and endocrine harm
 - D RT does not work in children
 - E Chemotherapy is never used in infants

- Q70. Paediatric** Hypofractionated radiotherapy for DIPG (39–45 Gy over about 3 weeks):
- A Was non-inferior to conventional RT in a randomised trial of 253 children
 - B Doubled survival
 - C Was inferior
 - D Replaces the need for steroids
 - E Is never used
- Q71. Paediatric** After gross total resection of a posterior fossa ependymoma in a 6-year-old, what is suggested?
- A Craniospinal RT plus maintenance chemotherapy
 - B Observation alone
 - C Bevacizumab
 - D Focal conformal radiotherapy
 - E Temozolomide alone
- Q72. Paediatric** Loss of H3K27 trimethylation on immunohistochemistry in a posterior fossa ependymoma indicates:
- A Medulloblastoma
 - B Supratentorial ZFTA fusion ependymoma
 - C Posterior fossa group A (PFA), the higher-risk group
 - D Subependymoma
 - E Myxopapillary ependymoma
- Q73. Paediatric** In SHH-activated medulloblastoma in a 10-year-old, which germline test is particularly important?
- A HER2
 - B IDH1
 - C TP53 (Li-Fraumeni)
 - D APC
 - E BRCA1
- Q74. Metastases** A patient with glioblastoma on dexamethasone needs gastric protection. Which choice is suggested by recent pooled data?
- A High-dose omeprazole
 - B An H2 blocker rather than a proton pump inhibitor
 - C Sucralfate with PPI
 - D Pantoprazole for life
 - E No protection ever
- Q75. Glioma** Which follow-up schedule is appropriate after chemoradiation for glioblastoma?
- A CT every 2 years
 - B PET-CT monthly
 - C MRI about 4 weeks after RT, then every 2–3 months for 2–3 years
 - D MRI only at symptoms
 - E No imaging after 6 months
- Q76. Glioma** India records about how many new malignant brain and CNS tumours a year (GLOBOCAN 2022)?
- A About 32,000
 - B About 3,200
 - C About 1.5 million
 - D About 320,000
 - E About 1,000

Level 3 · Challenging

- Q77. Glioma** A 45-year-old with MGMT-methylated glioblastoma, KPS 90, asks whether lomustine plus temozolomide is better than standard temozolomide. Which statement is most accurate?
- A It is the standard for unmethylated tumours
 - B CeTeG/NOA-09 suggested longer survival, but the trial was small and toxicity higher; it is an option, not the standard
 - C It removes the need for radiotherapy
 - D It doubled PFS in a large phase 3 trial
 - E It is inferior and should not be used

Q78. Glioma Which first-line strategy WORSENE survival compared with temozolomide in MGMT-unmethylated glioblastoma?

- A Short-course RT in the elderly
- B Lomustine–temozolomide
- C Radiotherapy plus temozolomide
- D Radiotherapy plus nivolumab (CheckMate 498)
- E Tumour-treating fields

Q79. Glioma A patient with glioblastoma is stable after 6 adjuvant temozolomide cycles and asks to continue to 12. The best evidence shows:

- A Better survival only if unmethylated
- B A 6-month survival gain
- C No survival benefit from extending beyond 6 cycles, with more toxicity
- D That 24 cycles are standard
- E That stopping causes immediate relapse

Q80. Glioma In EF-14, which limitation is most important when interpreting the survival gain with tumour-treating fields?

- A Survival was worse
- B It tested RT dose escalation
- C It enrolled only unmethylated patients
- D No sham device; open-label design
- E Too few patients

Q81. Glioma A 29-year-old with a grade 3 IDH-mutant astrocytoma (CDKN2A/B intact) after resection. Best evidence-based adjuvant plan?

- A Temozolomide alone without RT
- B Vorasidenib alone
- C Observation
- D RT (about 59.4 Gy) followed by 12 cycles of temozolomide
- E RT alone

Q82. Glioma For a newly diagnosed codeleted grade 3 oligodendroglioma, the evidence for RT plus PCV is strongest for which outcome?

- A Seizure control only
- B Progression-free survival only, no OS data
- C Quality of life only
- D Response rate only
- E Overall survival nearly doubled with long-term follow-up

Q83. Glioma A 50-year-old with a bihemispheric, multilobar codeleted oligodendroglioma would need near whole-brain RT. A reasonable initial approach is:

- A Resection of both hemispheres
- B No treatment ever
- C Chemotherapy first (PCV or temozolomide), deferring RT
- D Bevacizumab
- E Whole-brain RT immediately

Q84. Glioma INDIGO enrolled patients with residual grade 2 IDH-mutant glioma. Which patient was outside its eligibility?

- A A patient with an enhancing tumour on steroids with uncontrolled symptoms
- B A patient with an oligodendroglioma after surgery only
- C A 40-year-old with measurable non-enhancing residual tumour
- D A 16-year-old with an astrocytoma
- E A patient with KPS 90

- Q85. Glioma** A 22-year-old has a thalamic diffuse glioma with H3 K27M. Which statement is correct?
- A Surgery is usually curative
 - B IDH testing defines it
 - C It is a diffuse midline glioma, CNS WHO grade 4, regardless of histology
 - D It is grade 2 if there is no necrosis
 - E It responds to vorasidenib
- Q86. Glioma** An adult with a recurrent BRAF V600E-mutant glioma. Which treatment showed responses in a basket trial?
- A Cetuximab
 - B Osimertinib
 - C Imatinib
 - D Dabrafenib plus trametinib (ROAR)
 - E Vorasidenib
- Q87. Glioma** Dose escalation of radiotherapy above 60 Gy for glioblastoma:
- A Halves toxicity
 - B Has not improved survival with photons
 - C Is standard with brachytherapy
 - D Is required for MGMT-unmethylated tumours
 - E Doubles survival
- Q88. Glioma** Why is a margin of about 2 cm used around the gross tumour in glioblastoma radiotherapy?
- A To treat the spinal cord
 - B To cover the other hemisphere
 - C 80–90% of recurrences arise within 2 cm of the original tumour
 - D Because glioblastoma metastasises to bone
 - E Because steroids shrink the tumour
- Q89. Glioma** A woman on concurrent temozolomide has platelets of $60 \times 10^9/L$ in week 3. What is appropriate?
- A Switch to lomustine immediately
 - B Stop RT and temozolomide permanently
 - C Hold temozolomide, continue RT, monitor counts
 - D Continue temozolomide unchanged
 - E Give G-CSF
- Q90. Metastases** In the randomised trial of SRS vs hippocampal-avoidance WBRT for 5–20 brain metastases (Aizer 2026), which was found?
- A Better symptom scores with SRS and similar survival; more new lesions but less progression of treated lesions
 - B Better survival with WBRT
 - C SRS was not feasible beyond 10 lesions
 - D More fatigue with SRS
 - E Identical rates of new lesions
- Q91. Metastases** In QUARTZ, adding WBRT to dexamethasone and supportive care in NSCLC patients unsuitable for surgery or SRS:
- A Increased survival by 6 months
 - B Was only tested in breast cancer
 - C Improved quality of life markedly
 - D Doubled survival
 - E Did not improve survival or quality-adjusted life
- Q92. Metastases** Which variables feed the lung adenocarcinoma Graded Prognostic Assessment?
- A Histological grade only
 - B Tumour size only
 - C CEA and LDH
 - D Sex and smoking only
 - E KPS, age, extracranial metastases, number of brain metastases and EGFR/ALK status

Q93. Metastases After radiosurgery for melanoma brain metastases on immunotherapy, new enhancement appears at 6 months with low perfusion. The patient is well. Likely diagnosis?

- A Abscess
- B New primary glioma
- C Definite progression requiring WBRT
- D Radiation necrosis
- E Haemorrhage

Q94. Metastases A meta-analysis comparing DOACs and LMWH in primary brain tumours found intracranial haemorrhage rates of about:

- A 15% with DOACs vs 1% with LMWH
- B Higher with DOACs
- C Equal at 50%
- D 3% with DOACs vs 26% with LMWH
- E 0% with both

Q95. Metastases For which patient is pharmacological VTE prophylaxis recommended?

- A Every outpatient with glioblastoma
- B A patient in the immediate postoperative period after craniotomy
- C Nobody, ever
- D All patients receiving temozolomide
- E All patients with brain metastases on SRS

Q96. Metastases A patient on a CYP3A-metabolised TKI has a seizure from a brain metastasis. Which drug would you avoid?

- A Lamotrigine
- B Lacosamide
- C Brivaracetam
- D Carbamazepine
- E Levetiracetam

Q97. Metastases Which statement about postoperative SRS versus WBRT after metastasis resection (N107C) is correct?

- A Neither was better on any measure
- B SRS reduced cognitive deterioration but had lower surgical-bed control
- C WBRT caused less cognitive decline
- D SRS improved survival
- E Both had identical local control

Q98. Paediatric A 14-year-old with a hemispheric high-grade glioma has café-au-lait spots, consanguineous parents and a sibling with lymphoma. The tumour is hypermutated. Which approach is suggested after RT?

- A Dabrafenib plus trametinib
- B Vorasidenib
- C Observation
- D Anti-PD-1 therapy, with germline testing for constitutional MMR deficiency
- E High-dose methotrexate

Q99. Paediatric For a 5-year-old with a hemispheric H3-wildtype/IDH-wildtype high-grade glioma after maximal resection, which post-operative approach is most used outside a trial?

- A Observation
- B Craniospinal irradiation alone
- C Bevacizumab added to RT and temozolomide
- D Vincristine and carboplatin only
- E Focal RT with temozolomide, then adjuvant temozolomide and lomustine

Q100. Paediatric A child with DIPG asks about chemotherapy with RT. What does the evidence show?

- A Temozolomide doubles survival
- B High-dose chemotherapy with stem cell rescue cures most
- C Bevacizumab is standard
- D No systemic therapy has improved survival; trials are encouraged
- E Chemotherapy replaces RT

Q101. Paediatric Which radiation-related late effect is most strongly associated with young age at treatment and larger fields?

- A Hair greying only
- B Cataract only
- C Skin cancer only
- D Neurocognitive decline (falling IQ)
- E Cardiomyopathy

Q102. Paediatric In COG A9952 (young children with progressive LGG), carboplatin–vincristine versus thioguanine–procarbazine–lomustine–vincristine (TPCV) showed:

- A TPCV doubled overall survival
- B Similar overall survival (86–87% at 5 years), with CV better tolerated
- C Both arms had 20% survival
- D Neither drug regimen was tolerated
- E CV was clearly inferior

Q103. Paediatric An NF1-associated optic pathway glioma is enlarging slightly on MRI but vision is stable. The best approach is:

- A Start carboplatin for size increase alone
- B Continue surveillance with regular ophthalmology; treat for visual decline
- C Immediate radiotherapy
- D Biopsy now
- E Resection of the optic nerve

Q104. Paediatric Which statement about BRAF V600E paediatric low-grade glioma is correct?

- A It is best treated with vorasidenib
- B It responds poorly to chemotherapy and better to BRAF/MEK inhibitors
- C It never transforms
- D It predicts cure with surgery alone in all cases
- E It is the commonest alteration in cerebellar pilocytic astrocytoma

Q105. Glioma A 26-year-old with a glioma has multiple café-au-lait macules and a sister with colon cancer at 30. The glioma is IDH-wildtype and hypermutated after no prior therapy. Which germline condition should be considered?

- A MEN1
- B Familial hypercholesterolaemia
- C Lynch syndrome or constitutional mismatch-repair deficiency
- D Hereditary spherocytosis
- E BRCA2

Q106. Glioma Dordaviprone was approved for recurrent H3 K27M-mutant diffuse midline glioma on the basis of:

- A IDH inhibition
- B Efficacy in DIPG only
- C A randomised phase 3 survival benefit
- D Responses in all patients
- E A pooled analysis of selected patients with response rate about 20%; confirmatory randomised trial ongoing

Q107. Glioma In RTOG 1205, adding re-irradiation to bevacizumab for recurrent glioblastoma:

- A Was tested only in children
- B Improved PFS but not overall survival
- C Improved overall survival by a year
- D Had no effect on PFS
- E Worsened survival

Q108. Metastases Which feature best predicts benefit from surgical resection of a single brain metastasis in Patchell-era trials?

- A Active widespread metastases
- B Controlled extracranial disease and good performance status
- C Age over 70
- D Multiple brain lesions
- E Low Karnofsky score

Q109. Metastases Within what distance of the hippocampi do metastases make hippocampal-avoidance WBRT inappropriate?

- A 2 cm
- B 10 cm
- C 5 mm
- D 5 cm
- E Any distance

Level 1 · Basics

Q110. Glioma Mutant IDH1/2 enzymes produce which oncometabolite?

- A Succinate
- B Alpha-ketoglutarate
- C Citrate
- D Lactate
- E 2-hydroxyglutarate

Q111. Glioma Loss of nuclear ATRX staining in an IDH-mutant diffuse glioma indicates:

- A Pilocytic astrocytoma
- B Glioblastoma, IDH-wildtype
- C Oligodendroglioma
- D A failed stain only
- E Astrocytic lineage (IDH-mutant astrocytoma)

Level 2 · Applied & innovative

Q112. Glioma Which marker is diagnostic, prognostic AND predictive in oligodendroglioma?

- A Chromosome 7 gain
- B EGFR amplification
- C ATRX loss
- D Ki-67 index
- E 1p/19q codeletion

Q113. Glioma FISH shows 1p/19q "codeletion" but IDH sequencing is wild-type in a 64-year-old with an enhancing tumour. What is the most likely explanation?

- A Metastasis
- B Oligodendroglioma, IDH-wildtype
- C Pilocytic astrocytoma
- D Partial 1p/19q losses in an IDH-wildtype glioma such as glioblastoma
- E A false-negative IDH test, so treat as oligodendroglioma

Q114. Glioma A 17-year-old has a hemispheric high-grade glioma with ATRX loss and strong p53, but IDH1 R132H is negative and IDH sequencing is wild-type. Which test is most important next?

- A BRAF fusion
- B MGMT methylation
- C EGFR amplification
- D H3 G34 mutation
- E 1p/19q codeletion

Q115. Glioma A pathology report reads "Diffuse astrocytoma, NOS". What does NOS mean?

- A Benign tumour
- B Molecular testing was not done or failed, so the integrated diagnosis cannot be made
- C No residual tumour
- D Not of glial origin
- E Testing was done and the tumour fits no defined type

Level 3 · Challenging

- Q116. Glioma** A recurrent glioblastoma treated with temozolomide is now hypermutated with MSH6 loss. Which statement is correct?
- A Treatment-induced hypermutation does not reliably predict benefit from checkpoint inhibitors, and MSH6 loss confers temozolomide resistance
 - B Pembrolizumab is the standard of care
 - C It indicates a new IDH mutation
 - D It proves Lynch syndrome
 - E It predicts response to more temozolomide
- Q117. Glioma** An IDH1 R132C (not R132H) mutation is found in a 30-year-old with an astrocytoma whose mother had breast cancer at 32. What should be offered?
- A BRCA testing only
 - B Vorasidenib is contraindicated
 - C Germline TP53 testing for Li-Fraumeni syndrome
 - D Repeat IDH IHC
 - E No further action
- Q118. Glioma** Which statement about MGMT testing is correct?
- A It is not useful in older adults
 - B Assays vary and there is no universal cut-off; if the result is unavailable, fit patients still receive temozolomide
 - C It defines oligodendroglioma
 - D It is tested by IHC for IDH
 - E Unmethylated tumours should never receive temozolomide
- Q119. Paediatric** Why should first-generation BRAF inhibitors be avoided in KIAA1549-BRAF fusion-positive pilocytic astrocytoma?
- A They can paradoxically activate MAPK signalling in fusion-positive tumours
 - B Fusions are always benign
 - C They cause DIPG
 - D They do not cross the blood-brain barrier at all
 - E They are only licensed in adults

Level 1 · Basics

- Q120. Glioma** Which is the earliest (founding) genetic event in IDH-mutant astrocytoma and oligodendroglioma?
- A PTEN loss
 - B MGMT methylation
 - C CDKN2A/B deletion
 - D IDH1 or IDH2 mutation
 - E EGFR amplification
- Q121. Glioma** Which three core pathways are altered in nearly all glioblastomas (TCGA 2008)?
- A Mismatch repair, base excision and nucleotide excision repair
 - B WNT, Hedgehog and Notch
 - C RTK/RAS/PI3K, p53 and RB
 - D BRCA, ATM and PALB2
 - E JAK-STAT, NF-κB and TGF-β

Level 2 · Applied & innovative

- Q122. Glioma** How does mutant IDH lead to widespread DNA hypermethylation?
- A It deletes the MGMT gene
 - B It causes 1p/19q loss
 - C 2-hydroxyglutarate inhibits alpha-ketoglutarate-dependent TET demethylases
 - D It directly methylates CpG islands
 - E It activates DNMT3A transcription

Q123. **Glioma** How is the whole-arm 1p/19q codeletion of oligodendroglioma generated?

- A Gradual point deletions over many years
- B Chromothripsis of chromosome 7
- C Viral integration
- D Loss of the whole of chromosomes 1 and 19
- E An unbalanced t(1;19) translocation followed by loss of the derivative chromosome

Q124. **Glioma** Why do IDH-wildtype glioblastomas often lie next to the lateral ventricles?

- A They appear to arise from subventricular-zone neural stem cells carrying low-level driver mutations
- B Radiotherapy targets the ventricles
- C They are metastases
- D Ependymal cells always transform
- E CSF carries tumour cells from elsewhere

Q125. **Glioma** Why does bevacizumab shrink enhancement and oedema quickly in glioblastoma without prolonging survival?

- A It kills all tumour cells within days
- B It normalises leaky VEGF-driven vessels without eliminating the infiltrating tumour cells
- C It reverses MGMT methylation
- D It repairs TP53
- E It blocks IDH

Level 3 · Challenging

Q126. **Glioma** Single-cell RNA sequencing of glioblastoma (Patel 2014) showed:

- A Mesenchymal cells are absent
- B Glioblastoma cells are genetically identical
- C Several expression subtypes coexist within one tumour
- D Each tumour has a single uniform subtype
- E All cells carry EGFRvIII

Q127. **Paediatric** How does the histone H3 K27M mutation drive diffuse midline glioma?

- A It produces 2-hydroxyglutarate
- B It inhibits PRC2, causing global loss of H3K27 trimethylation
- C It amplifies EGFR
- D It activates BRAF
- E It silences MGMT

Answer key

1-B 2-A 3-B 4-B 5-A 6-C 7-C 8-E 9-B 10-C 11-D 12-C 13-B 14-B 15-D 16-C 17-D 18-A 19-B 20-A 21-C
22-C 23-C 24-E 25-D 26-C 27-B 28-E 29-B 30-E 31-E 32-D 33-A 34-C 35-A 36-B 37-A 38-E 39-A 40-E
41-E 42-E 43-A 44-D 45-D 46-B 47-B 48-E 49-A 50-D 51-B 52-E 53-A 54-D 55-E 56-B 57-D 58-B 59-D
60-C 61-C 62-C 63-C 64-D 65-E 66-A 67-E 68-B 69-C 70-A 71-D 72-C 73-C 74-B 75-C 76-A 77-B 78-D
79-C 80-D 81-D 82-E 83-C 84-A 85-C 86-D 87-B 88-C 89-C 90-A 91-E 92-E 93-D 94-D 95-B 96-D
97-B 98-D 99-E 100-D 101-D 102-B 103-B 104-B 105-C 106-E 107-B 108-B 109-C 110-E 111-E 112-E 113-D
114-D 115-B 116-A 117-C 118-B 119-A 120-D 121-C 122-C 123-E 124-A 125-B 126-C 127-B

Explanations

- Q1 · B** Metastases outnumber all primary brain tumours combined in middle-aged and older adults; lung and breast cancer and melanoma are the commonest sources.
- Q2 · A** Glioblastoma is the commonest malignant primary brain tumour in adults, with a median age near 64. Meningioma is the commonest primary tumour overall but is usually benign.
- Q3 · B** Cranial irradiation (for example childhood leukaemia treatment) raises the risk of meningioma, glioma and nerve sheath tumours decades later. Mobile phones and power lines have not been shown to cause brain tumours.
- Q4 · B** Seizures affect most patients with low-grade and IDH-mutant gliomas and are often the first symptom; focal deficits and raised pressure are uncommon at diagnosis.
- Q5 · A** The classic triad (morning, vomiting, severe) is seen in only about 5%. Tumour headache is usually tension-like and accompanied by other neurological features; isolated long-standing headache is seldom a tumour.
- Q6 · C** New or changed headache, especially over 50, and headache with neurological signs, worsening on Valsalva or lying down, fever or a cancer history are red flags.
- Q7 · C** Contrast MRI (with FLAIR, diffusion and susceptibility sequences) is the test of choice. CT is used in emergencies or when MRI is contraindicated; lumbar puncture is dangerous with mass effect.
- Q8 · E** Oligodendroglioma needs both an IDH1/2 mutation and whole-arm 1p/19q codeletion. ATRX loss and TP53 mutation mark IDH-mutant astrocytoma.
- Q9 · B** MGMT repairs alkylator damage; when its promoter is methylated the gene is silenced and temozolomide works better (Hegi 2005).
- Q10 · C** The EORTC/NCIC trial established chemoradiation with temozolomide followed by adjuvant temozolomide: median 14.6 vs 12.1 months and 5-year survival 10 vs 2%.
- Q11 · D** Rounded nuclei with clear perinuclear haloes, delicate branching capillaries and microcalcifications are the classic histology of oligodendroglioma; the diagnosis is confirmed molecularly.
- Q12 · C** Pseudopalisading necrosis and microvascular proliferation are the histological hallmarks of glioblastoma.
- Q13 · B** Prophylaxis does not prevent first seizures and adds side effects; SNO/EANO guidance recommends against it outside the perioperative period in high-risk cases.
- Q14 · B** Levetiracetam does not induce liver enzymes, so it avoids interactions with chemotherapy, targeted drugs and steroids; it can be titrated quickly.
- Q15 · D** Dexamethasone reduces vasogenic oedema with minimal salt retention. It does not treat the tumour (except lymphoma) and causes hyperglycaemia, myopathy and infection.
- Q16 · C** Multiple lesions at the grey-white junction in a smoker strongly suggest metastases; look for the primary and biopsy the easiest site.
- Q17 · D** SRS controls most treated lesions; adding WBRT reduces new lesions but does not improve survival and harms cognition (N0574, EORTC 22952).
- Q18 · A** Most brain tumours do not prohibit anticoagulation; a non-contrast CT excludes bleeding first. DOACs or LMWH are used.

- Q19 · B** Paediatric low-grade gliomas (pilocytic astrocytoma above all) make up 30–40% of childhood CNS tumours; medulloblastoma is the commonest malignant one.
- Q20 · A** Between a third and a half are infratentorial: pilocytic astrocytoma, medulloblastoma, ependymoma and DIPG.
- Q21 · C** Morning vomiting, ataxia and head tilt suggest a posterior fossa tumour with raised pressure; image urgently.
- Q22 · C** Medulloblastoma, an embryonal tumour of the cerebellum, is the commonest malignant paediatric brain tumour.
- Q23 · C** About 10–15% of children with NF1 develop optic pathway gliomas; most NF1 patients with OPG need treatment only for visual loss.
- Q24 · E** SEGA occurs in 6–9% of people with tuberous sclerosis and responds to mTOR inhibitors.
- Q25 · D** Bilateral vestibular schwannomas, seen in 90–95% of NF2-related schwannomatosis, are diagnostic.
- Q26 · C** Cyst with a mural nodule in the cerebellum of a child is classic pilocytic astrocytoma; complete resection usually cures it.
- Q27 · B** An expansile, diffusely infiltrating pontine lesion in a child with a short history of cranial nerve palsies, long tract signs and ataxia allows a clinical diagnosis; biopsy is for atypical cases or trials.
- Q28 · E** DIPG is inoperable; focal RT relieves symptoms and is the only proven treatment; hypofractionated courses are non-inferior.
- Q29 · B** Resection provides tissue for an integrated diagnosis and, when safe, prolongs survival in all molecular groups.
- Q30 · E** Early MRI measures the extent of resection before postoperative enhancement confuses the picture.
- Q31 · E** Large studies and a 2024 WHO-commissioned review found no causal link; incidence has not risen in line with phone use.
- Q32 · D** N0574 and EORTC 22952 showed better intracranial control but more cognitive decline and no survival gain.
- Q33 · A** Steroids cause weight gain and hyperglycaemia, not hypoglycaemia. Plan a taper to the lowest effective dose.
- Q34 · C** The device is worn at least 18 hours a day on a shaved scalp; EF-14 showed median survival 20.9 vs 16.0 months.
- Q35 · A** A thick irregular ring with necrosis and mass effect in an older adult is typical of glioblastoma; metastasis, lymphoma and abscess are the main alternatives, and tissue confirms it.
- Q36 · B** The T2–FLAIR mismatch sign is highly specific for IDH-mutant, non-codeleted astrocytoma; oligodendrogliomas lack it.
- Q37 · A** Calcification and cortical involvement in a frontal glioma suggest oligodendroglioma, though molecular testing confirms it.
- Q38 · E** TERT promoter mutation, EGFR amplification or +7/-10 in an IDH-wildtype adult diffuse astrocytic glioma establishes glioblastoma even without necrosis.
- Q39 · A** CDKN2A/B homozygous deletion makes an IDH-mutant astrocytoma grade 4 regardless of histology.
- Q40 · E** IHC finds about 90% of IDH mutations; non-canonical IDH1 and IDH2 mutations need sequencing, especially under 55 or in grade 2–3 tumours.
- Q41 · E** ATRX loss and p53 mutation are typical of astrocytoma and mutually exclusive with 1p/19q codeletion; confirm codeletion when possible.
- Q42 · E** 2-year survival 27 vs 11%, and 5-year 10 vs 2%: modest median gains but a meaningful tail.
- Q43 · A** Methylated tumours gained substantially; unmethylated tumours only 12.7 vs 11.8 months.
- Q44 · D** Perry 2017: adding temozolomide to short-course RT in patients ≥65 improved survival, most clearly if methylated; temozolomide alone is also reasonable for methylated frail patients.
- Q45 · D** Temozolomide adds little when unmethylated; short RT or supportive care respects function and travel burden.
- Q46 · B** A classic lesson: an imaging-based PFS gain from an antiangiogenic drug did not translate into longer life and added toxicity.
- Q47 · B** PJP risk rises with steroids and lymphopenia; prophylaxis is suggested in these patients (labelling recommends it for all during concurrent RT).

- Q48 • E** Early in-field enhancement within 3–6 months, especially with MGMT methylation, is often pseudoprogression; continue and re-image.
- Q49 • A** INDIGO: vorasidenib vs placebo gave median PFS 27.7 vs 11.1 months and delayed next intervention; survival benefit not yet shown.
- Q50 • D** RT + PCV improved median survival from 7.8 to 13.3 years with long follow-up, establishing RT plus chemotherapy for low-grade gliomas needing treatment.
- Q51 • B** Adjuvant temozolomide improved survival (HR 0.54) in IDH-mutant tumours; concurrent temozolomide added little; IDH-wildtype tumours did not benefit.
- Q52 • E** Asymptomatic oedema does not need steroids; when needed, use the lowest effective dose (Vecht 1994: 4 mg as effective as 16 mg for many patients).
- Q53 • A** Large, symptomatic posterior fossa lesions with mass effect need resection; cavity SRS then reduces local recurrence (Mahajan) and preserves cognition versus WBRT (N107C).
- Q54 • D** In the Mahajan trial local control at 12 months was 43% with observation vs 72% with cavity SRS.
- Q55 • E** NRG CC001 showed hippocampal avoidance plus memantine preserved cognition better than WBRT plus memantine.
- Q56 • B** CNS-active TKIs control small brain metastases in most patients; keep SRS for symptomatic or progressing lesions.
- Q57 • D** DOACs were associated with less intracranial haemorrhage than LMWH in glioma cohorts (Carney 2019); anticoagulation is long-term for glioblastoma.
- Q58 • B** These histologies bleed spontaneously more often; individualise anticoagulation decisions.
- Q59 • D** In observational data about 26% relapsed after withdrawal vs 8% who continued; tapering is a shared decision after long seizure freedom with stable disease.
- Q60 • C** In HIV, toxoplasmosis and EBV-related CNS lymphoma are leading causes; the CD4 count, toxoplasma serology and response to treatment guide the work-up.
- Q61 • C** Growth on treatment needs tissue; the imaging suggests primary CNS lymphoma, which steroids can mask. Lymphoma is not resected.
- Q62 • C** The scolex and coexisting calcified cysts are typical of NCC, a common cause of seizures in India; serology and follow-up imaging help.
- Q63 • C** Pus restricts diffusion; necrotic tumour centres usually do not. Spectroscopy can also help.
- Q64 • D** No agent clearly prolongs survival at recurrence; lomustine ± bevacizumab improved PFS only (EORTC 26101), and nivolumab did not beat bevacizumab (CheckMate 143). Local therapy helps selected focal relapses.
- Q65 • E** Bouffet 2023 established BRAF/MEK inhibition as first-line therapy for BRAF V600E paediatric LGG, with fewer severe side effects.
- Q66 • A** Tovorafenib, a type II RAF inhibitor, gave a response rate of about 67% in relapsed BRAF-altered paediatric LGG.
- Q67 • E** Survival is excellent but many children need several lines of therapy; preserving vision, endocrine function and cognition is central.
- Q68 • B** Leptomeningeal spread changes risk group and craniospinal dose; CSF is sampled about 2 weeks after surgery.
- Q69 • C** Chemotherapy-based strategies in young children aim to avoid or delay RT because of its effect on the developing brain.
- Q70 • A** Zaghloul 2022 showed non-inferiority; shorter courses reduce anaesthesia sessions, travel and cost for families.
- Q71 • D** Focal RT after complete resection is standard; post-RT maintenance chemotherapy did not improve outcomes (ACNS0831).
- Q72 • C** PFA tumours (infants and young children) lose H3K27me3 and carry a worse prognosis, especially with 1q gain or 6q loss.
- Q73 • C** Germline TP53 variants occur in a substantial minority of SHH medulloblastomas in older children and change RT planning and family screening.

- Q74 · B** A pooled analysis of five trials linked PPI use with shorter survival in glioblastoma (association, not proof); avoiding routine PPIs is a cautious approach.
- Q75 · C** NCCN suggests early post-RT MRI and frequent MRI during adjuvant therapy and the first 2–3 years.
- Q76 · A** About 32,000 new cases and 28,000 deaths in 2022; benign tumours are not counted in these estimates.
- Q77 · B** CeTeG/NOA-09 enrolled 141 patients; median survival 48 vs 31 months in the prespecified analysis, with more haematological toxicity and nausea.
- Q78 · D** CheckMate 498: median OS 13.4 vs 14.9 months (HR 1.31) with nivolumab; checkpoint inhibitors have not worked in unselected glioblastoma.
- Q79 · C** GEINO 14-01 and a pooled EORTC/RTOG analysis found no OS benefit from extended temozolomide.
- Q80 · D** The 695-patient trial was unblinded without sham control; the 5-month OS difference is unlikely to be explained by placebo alone, but the design matters.
- Q81 · D** CATNON supports adjuvant temozolomide after RT for IDH-mutant grade 3 astrocytoma (median about 12.5 years). Vorasidenib has no data in grade 3 disease.
- Q82 · E** RTOG 9402 (13.2 vs 7.3 years) and EORTC 26951 (14.2 vs 9.3 years) in codeleted tumours; about a third alive at 20 years with RT + PCV.
- Q83 · C** When the RT field would be very large, chemotherapy alone is a reasonable start because of neurocognitive risk, accepting that it is inferior to combined therapy in trials.
- Q84 · A** INDIGO required measurable non-enhancing disease, no prior treatment except surgery, KPS ≥ 80 and no steroids; patients with uncontrolled symptoms need RT plus chemotherapy.
- Q85 · C** H3 K27-altered diffuse midline gliomas are grade 4; dordaviprone has activity at recurrence (pooled response about 20%).
- Q86 · D** ROAR showed durable responses in BRAF V600E high-grade and low-grade gliomas; tumour-agnostic approval followed.
- Q87 · B** Stereotactic boosts, brachytherapy and photon IMRT escalation (NRG BN001) did not improve survival; proton escalation is in trials.
- Q88 · C** Infiltration beyond visible enhancement explains in-field and marginal relapses; trials are testing smaller margins with adaptive MRI.
- Q89 · C** Hold temozolomide when platelets fall below $100 \times 10^9/L$ in the concurrent phase; RT can continue through mild-moderate thrombocytopenia. Women have 2–3 times more haematological toxicity.
- Q90 · A** SRS improved symptom control and fatigue, with similar overall intracranial progression and survival (8.3 vs 8.5 months).
- Q91 · E** Median survival was about 2 months in both arms; for poor-prognosis patients, supportive care alone is reasonable.
- Q92 · E** The disease-specific GPA uses performance status, age, extracranial disease, number of lesions and genotype; prognosis now varies widely by cancer type.
- Q93 · D** Radiation necrosis occurs in 10–25% after SRS, more with immunotherapy or targeted therapy; perfusion imaging, MRS or tissue helps. Symptomatic necrosis can be treated with steroids or bevacizumab.
- Q94 · D** In primary brain tumours bleeding was markedly lower with DOACs (RR about 0.2); in brain metastases the difference was not significant.
- Q95 · B** Outpatient prophylaxis (PRODIGE) did not show clear benefit and trended to more bleeding; postoperative prophylaxis is standard.
- Q96 · D** Carbamazepine, phenytoin and phenobarbital induce CYP3A and lower levels of many TKIs, chemotherapy drugs and dexamethasone.
- Q97 · B** Cognitive deterioration at 6 months 52 vs 85%; surgical-bed control was lower with single-fraction SRS, partly because large cavities got low doses (hence fractionated SRS today).
- Q98 · D** Biallelic (constitutional) MMR deficiency causes hypermutant gliomas that can respond to checkpoint inhibitors; family counselling and cancer surveillance follow.

- Q99 · E** ACNS0423 supports temozolomide with RT followed by temozolomide plus lomustine; HERBY showed no benefit from bevacizumab.
- Q100 · D** Decades of trials have not improved survival beyond RT; median survival remains under a year. Dordaviprone is being studied in H3 K27M gliomas.
- Q101 · D** IQ decline, endocrine deficits (growth hormone first), hearing loss (with cisplatin), vasculopathy and second tumours are the major late effects of cranial RT in children.
- Q102 · B** Five-year EFS 39 vs 52% (not significant) and OS 86 vs 87%; CV became the common first-line chemotherapy.
- Q103 · B** NF1 optic pathway gliomas are often indolent; treatment is guided by vision. RT is avoided in NF1 because of second tumours and vasculopathy.
- Q104 · B** BRAF V600E LGG (especially with CDKN2A deletion) has worse outcomes with chemotherapy; KIAA1549–BRAF fusion is the usual cerebellar alteration.
- Q105 · C** MMR deficiency is enriched in early-onset gliomas (about 12% at 18–39 in one series); check MMR proteins and refer for germline testing.
- Q106 · E** Approval was conditional on the ongoing ACTION trial; the pooled analysis selected 50 of over 400 patients, so comparison with historical controls is difficult.
- Q107 · B** PFS improved (HR 0.73) without OS benefit (10.1 vs 9.7 months); re-irradiation is individualised.
- Q108 · B** In the Dutch trial, benefit was confined to patients with stable extracranial disease (median 12 months); active systemic disease abolished the gain.
- Q109 · C** Lesions within 5 mm of the hippocampi need conventional WBRT so that the avoidance region does not underdose tumour.
- Q110 · E** Mutant IDH converts alpha-ketoglutarate to 2-hydroxyglutarate, which inhibits TET DNA demethylases and histone demethylases, producing the CpG-island hypermethylated phenotype. 2-HG can be detected by MR spectroscopy.
- Q111 · E** ATRX loss and strong p53 staining mark IDH-mutant astrocytoma and are mutually exclusive with 1p/19q codeletion; vessels retain ATRX and serve as the internal control.
- Q112 · E** 1p/19q codeletion defines oligodendroglioma, predicts long survival and predicts marked benefit from PCV with radiotherapy (EORTC 26951/RTOG 9402).
- Q113 · D** True whole-arm 1p/19q codeletion is essentially always accompanied by IDH mutation. FISH probes cannot distinguish partial losses; look for EGFR, TERT and +7/-10.
- Q114 · D** Diffuse hemispheric glioma, H3 G34-mutant, mimics IDH-mutant astrocytoma (ATRX loss, p53) but is IDH-wildtype and grade 4.
- Q115 · B** NOS = information missing (ask for the tests); NEC = tests done but the tumour does not fit a WHO type (consider methylation profiling).
- Q116 · A** Touat 2020 found that temozolomide-induced hypermutation did not translate into checkpoint-inhibitor responses, unlike germline constitutional MMR deficiency.
- Q117 · C** Non-canonical IDH1 R132C is enriched in Li-Fraumeni-associated gliomas; the family history strengthens the case for germline TP53 testing.
- Q118 · B** MGMT is prognostic and predictive in glioblastoma and guides therapy in older or frail patients, but methods (MSP, pyrosequencing, arrays) and thresholds differ.
- Q119 · A** Type I BRAF inhibitors act on V600E monomers and may enhance signalling through BRAF fusions; type II RAF inhibitors (tovorafenib) or MEK inhibitors are used instead.
- Q120 · D** IDH mutation is truncal: present in every tumour cell and retained at recurrence. 1p/19q codeletion, TP53/ATRX changes and CDKN2A/B loss come later.
- Q121 · C** Growth signalling (EGFR, PDGFRA, PTEN, NF1), the p53 pathway (TP53, MDM2/4, p14ARF) and the RB cell-cycle pathway (CDKN2A/B, CDK4, RB1).
- Q122 · C** Mutant IDH gains a new function, producing 2-HG, which competitively blocks TET DNA demethylases and histone demethylases, creating the glioma CpG-island methylator phenotype.

Q123 · E A single translocation event between 1q and 19p, with loss of the der(1;19) chromosome, removes 1p and 19q together.

Q124 · A Lee 2018 found driver mutations in astrocyte-like stem cells of the subventricular zone that migrated to form the tumour.

Q125 · B Hypoxia → HIF → VEGF drives leaky microvascular proliferation; blocking VEGF tightens vessels (less enhancement and oedema) but infiltrative, non-enhancing tumour continues.

Q126 · C Intratumoural heterogeneity helps explain why single-pathway targeted drugs have failed in glioblastoma.

Q127 · B K27M acts as an oncohistone that blocks the EZH2-containing PRC2 complex; loss of H3K27me3 on immunohistochemistry is a diagnostic surrogate. It is mutually exclusive with IDH mutation.