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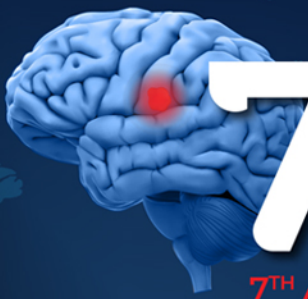

7ANOS

7TH ANNUAL NEURO-ONCOLOGY SYMPOSIUM

2ND - 4TH OCTOBER 2026

SPECIAL SUPPLEMENT - ABSTRACT BOOK

NEURO-ONCOLOGY IN THE REAL WORLD

CHALLENGES, INNOVATIONS AND IMPACT

THE AGA KHAN UNIVERSITY

brain tumour foundation of Pakistan

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ACKNOWLEDGEMENTS

It gives us immense pleasure to present this JPMA Special Supplement to our readers, published as an adjunct to the 7th Annual Neuro-Oncology Symposium (7ANOS) organized by the Pakistan Society of Neuro-Oncology (PASNO) and the Pakistan Academy of Neurological Surgery (PANS) being held from 2–4 October 2026 at Jinnah Postgraduate Medical Centre (JPMC), Karachi, Pakistan. The theme of the symposium, "Neuro-Oncology in the Real World: Challenges, Innovations, and Impact," serves as the guiding focus for the scientific content, and abstracts were invited with this theme in mind.

A total of 168 abstracts were received and reviewed in accordance with the Journal of the Pakistan Medical Association (JPMA) publication standards. All submissions underwent a rigorous double-blinded peer-review process following standard JPMA policy. Each abstract was independently reviewed by two reviewers, while complete confidentiality of both authors and reviewers was strictly maintained. Only those abstracts recommended for publication by both reviewers and found to be relevant to the conference theme were accepted for publication. Abstracts that did not meet the required publication standards or were not aligned with the conference theme were not considered for publication.

Following the peer-review process, 37 abstracts were accepted for publication in this Special Supplement. A few accepted abstracts were subsequently withdrawn by their authors. We would also like to acknowledge that several abstracts of good scientific quality could not be accepted because they fell outside the scope of the conference theme or could not be accommodated within the limited space and timeline available for this Special Supplement.

We take this opportunity to express our sincere gratitude to Prof. Syed Ather Enam, Founding President of PANS, PASNO, and PASBAN, for his visionary leadership and unwavering support. We also extend our sincere appreciation to Organizing Committee for their valuable contribution to the development of the scientific programme of the symposium.

We also extend our heartfelt appreciation to the Publication Committee of the 7th Annual Neuro-Oncology Symposium (7ANOS), led by Dr. Hafiza Fatima Aziz (Chair, Publication Committee), Dr. Shayan Sirat (Co Chair, Publication Committee) Members: Dr. Asim Hafeez, Dr. Adeeba Zaki, and Dr. Zanib Javed. Their dedication, meticulous review, and unwavering commitment have ensured a transparent, efficient, and high-quality peer-review process and have contributed significantly to the successful preparation of this JPMA Special Supplement.

Our sincere appreciation also goes to the management staff, Mr. Shariff Charania, whose dedicated and largely independent efforts in coordinating, and organizing this publication were instrumental in successful completion of this publication. We hope that the abstracts presented in this Special Supplement will contribute meaningfully to the advancement of neuro-oncology research and clinical practice, stimulate scientific discussion, and encourage future collaborations. We look forward to welcoming all participants to the 7th Annual Neuro-Oncology Symposium (7ANOS) and wish them a productive, successful, and enriching scientific meeting.

Publication Committee
7th Annual Neuro-Oncology Symposium (7ANOS)

EDITORIAL

Neuro-Oncology in the Real World: Challenges, Innovations, and Impact

Hafiza Fatima Aziz[1], Syed Ather Enam[2]

Neuro-oncology has advanced considerably over the past two decades through developments in molecular diagnostics, neuroimaging, microsurgical techniques, precision radiotherapy, systemic therapies, and artificial intelligence. These innovations have improved the diagnosis and management of primary and metastatic brain and spinal tumours, resulting in better patient outcomes and quality of life. However, translating these advances into routine clinical practice remains challenging, particularly in low- and middle-income countries (LMICs), where limited resources, inadequate infrastructure, and disparities in access to specialized care continue to affect patient outcomes.

Modern neuro-oncology relies on a multidisciplinary approach involving neurosurgeons, neurologists, medical and radiation oncologists, neuroradiologists, neuropathologists, rehabilitation specialists, palliative care teams, nurses, and allied health professionals. Close collaboration among these disciplines is essential to provide timely diagnosis, individualized treatment, comprehensive supportive care, and long-term follow-up. At the same time, expanding research capacity and improving access to advanced diagnostics and evidence-based therapies remain priorities for strengthening neuro-oncology services in resource-constrained settings.

Against this backdrop, the 7th Annual Neuro-Oncology Symposium (7ANOS), themed "Neuro-Oncology in the Real World: Challenges, Innovations, and Impact," provides a multidisciplinary platform for clinicians, researchers, educators, and trainees to exchange knowledge, share scientific advances, and discuss practical solutions to contemporary challenges in neuro-oncology. The symposium aims to bridge the gap between emerging evidence and real-world clinical practice by promoting innovation, collaboration, and evidence-based care while addressing the unique needs of healthcare systems in LMICs.

We hope this supplement will stimulate further research, strengthen multidisciplinary collaboration, and contribute to the development of sustainable, evidence-based neuro-oncology services across Pakistan and other LMICs. Ultimately, our shared goal is to ensure that advances in neuro-oncology translate into meaningful improvements in patient care and become accessible, effective, and impactful for all patients with brain and spinal tumours.

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ABSTRACT NO:01
RESEARCH ARTICLE

When Diagnosis Is Not Enough: Management Challenges and Outcomes of CNS Tumours in Children Under Three Years in the Largest Public-Sector Center in Pakistan

Rahat ul Ain [1], Laeeq ur Rehman [2], Rabia Qaiser [3], Mahvish Hussain [4], Amber Goraya [5], Mahwish Faizan[6]

Abstract

Objective: TCNS tumours in children under three years pose unique challenges, especially in resource-limited settings. The objective of this study was to evaluate the demographics, management challenges, and outcomes of these children at Pakistan's largest public-sector paediatric referral centre.

Methods: This prospective observational cohort study included all children under three years presenting with CNS tumours at The Children's Hospital Lahore, from January 2023 to December 2025. No formal sample size was calculated. Non-probability consecutive sampling technique was used Written informed consent was obtained from the parents/legal guardians of all participating children. The study was approved by the Institutional Review Board/Ethics Committee of CHL/UCHS, Data were analyzed using descriptive statistics (SPSS v26).

Results: A total of 115 children with radiologically suspected CNS tumours were included (mean age 1.92±0.90 years; male: female ratio being 1.4:1). The median monthly household income was USD 90,(IQR 58) and 27(24%) travelled >600 km for treatment. Median diagnostic delay was 2.0 months (IQR 1.0–4.0); 49(43%) were diagnosed within one month, while healthcare- and patient-related delays accounted for 24(21%) and 42(36%) of cases, respectively. Vomiting (n=41, 36%), focal neurological deficits (n=24, 21%), and motor regression (n=8, 7%) were the most common presenting features. Consanguinity was present in 42 (36%) patients. Tumours were infratentorial (n=56, 49%), supratentorial (n=53, 46%), or spinal (n=6, 5%), with the cerebellum the most common primary site in 48 (42%). Only 38 (33%) patients received definitive treatment (surgery and/or chemotherapy), while the remainder did not receive any tumour-directed therapy. Low-grade glioma was the most common diagnosis in 11(9.5%) followed by embryonal tumours in 9(7.8%), ependymoma in 8(6.9%), choroid plexus tumours in 6(5.2%), and high-grade glioma/DIPG in 3(2.6%) each. Median time to treatment initiation was 0.9 months (IQR 0.5–2.0). Median overall survival in treated vs untreated patients was 13.0 vs. 2.5 months (log-rank χ^2=8.13, p=0.004). Overall survival was in 25 (22%) patients,45(39%) were lost to follow-up, while 45(39%) patients died, including 17 postoperative deaths (50% of surgically treated patients) and 28 deaths from progressive disease while awaiting surgery. Survivors had a median Lansky score of 100 (IQR 80–100).

Conclusion: Despite relatively early diagnosis and referral, limited access to definitive treatment and substantial surgical mortality resulted in high loss to follow-up and poor survival. However, survivors achieved excellent functional outcomes.

Keywords: Central Nervous System Neoplasms; Infant; Treatment Outcome
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ABSTRACT NO:02
RESEARCH ARTICLE

Endoscopic Endonasal Versus Endoscopic Supraorbital Keyhole Surgery for Craniopharyngioma Resection: A 15-Year Single-Center Retrospective Cohort Study

Ajit Phuyal [1], Burhan Ul Haq [2], Hammad Nasir Malik [3], Simon John [4], Kanwal Ali [5], Siraj Ul Haq [6]

Abstract

Objective: To compare extent of resection and postoperative visual outcomes between endoscopic endonasal and endoscopic supraorbital keyhole approaches for craniopharyngioma, and to assess differences in CSF leakage, endocrine deficits, and recurrence.

Methods: This retrospective cohort study reviewed records of patients treated for craniopharyngioma at Mayo Hospital, Lahore, Pakistan, between 19 June 2007 and 7 September 2022; record review and analysis were conducted from 6 December 2025 to 14 March 2026. Of 67 patients assessed, 60 met eligibility criteria: 30 underwent endoscopic endonasal surgery (Group A), and 30 underwent endoscopic supraorbital keyhole craniotomy (Group B). Co-primary outcomes were gross-total resection (GTR) on 48-hour MRI and visual improvement at 3 months; CSF leak, endocrine deficits, and recurrence were assessed descriptively, with differences analysed using chi-square tests, relative risks (RR), and 95% confidence intervals (CI).

Results: Suprasellar/intrasellar lesions were present in 22 (73.3%) patients in Group A versus 10 (33.3%) in Group B, whereas retrochiasmatic/intraventricular tumours occurred in 4 (13.3%) versus 12 (40.0%), respectively. GTR was achieved in 25 (83.3%) patients in Group A versus 18 (60.0%) in Group B (p=0.045; RR 1.39, 95% CI 1.00–1.93). Visual improvement occurred in 26 (86.7%) versus 19 (63.3%) patients, respectively (p=0.037; RR 1.37, 95% CI 1.03–1.82). CSF leakage occurred in 4 (13.3%) patients in Group A versus 1 (3.3%) in Group B. Endocrine deficits and recurrence were not significantly different between groups.

Conclusion: The endoscopic endonasal approach was associated with higher GTR and visual improvement rates, partly reflecting preferential allocation of midline tumours to this group. Both approaches remain complementary, with strategy individualized according to tumour anatomy and surgeon expertise.

Keywords: (Craniopharyngioma; Endoscopic endonasal surgery; Supraorbital keyhole craniotomy)
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ABSTRACT NO:03
RESEARCH ARTICLE

Incidence and Molecular Marker Association with Drop Metastases in Ependymoma Patients -A 25-year Experience from a Tertiary Care Center

Ayesha Sohail [1], Aamina Ghaffar [2], Mehar Masroor [3], Zanib Javed [4], Muhammad Usman Khan[5], Munir Bosan [6], Syed Ather Enam[7].

Abstract

Objective: Ependymomas are neuroepithelial tumours capable of CSF dissemination, leading to spinal drop metastases. The incidence, risk factors, and clinical impact of this dissemination remain unclear. This study evaluated the incidence, predictors, and outcomes of drop metastases in patients with cranial and spinal ependymomas treated over a 25-year period.

Methods. A retrospective cross-sectional study was conducted at Aga Khan University Hospital, Karachi including all patients with histologically confirmed cranial or spinal ependymomas who underwent surgery between 1st June 2000 to 30th June 2025. Demographic, clinical, radiological, pathological, and follow-up data were reviewed. Drop metastases were identified by contrast-enhanced whole-neuroaxis MRI and/or positive CSF cytology. Univariable and multivariable logistic regression analyses were performed.

Results Preoperative spinal drop metastases were detected in 8/75 (10.7%) patients with available MRI. Detection was significantly higher with whole-neuroaxis MRI done in 5 out of 12 patients (41.7%) than spine-only MRI done in 3 out of 28 patients (10.7%) or brain-only MRI ($p < 0.001$). Tumour location was significantly associated with preoperative spinal drop metastases, with infratentorial and spinal tumours demonstrating higher dissemination rates than supratentorial tumours ($p = 0.045$). Histopathological subtype was also significantly associated with metastasis, with myxopapillaryependymoma showing a greater propensity for dissemination ($p = 0.049$). No significant associations were found with age, tumour volume, symptom duration, functional status, WHO grade, hydrocephalus, radiological characteristics, or neurological deficits (all $p > 0.05$). CSF cytology was available for 47 patients, of whom 10 (21.3%) had positive results. All positive cytology cases had corresponding MRI-confirmed metastases, and no additional metastases were identified by CSF cytology alone. No significant differences were observed in overall or progression-free survival

Conclusion: Drop metastases occurred in approximately 8/75 (10.7%) of patients and were detected more frequently with whole-neuroaxis MRI. Routine whole-neuroaxis MRI at initial staging may improve early detection of CSF dissemination and guide treatment planning.

Keywords: (Ependymomas, Drop Metastases, Neuro-axis imaging)
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ABSTRACT NO:04
RESEARCH ARTICLE

Integrative Cross-Population Multi-Database Analysis Reveals an Association Between GORASP2 and Autophagy in Glioblastoma

Yusra Iqbal[1] , Farina Hanif[2]

Abstract

Objective: Glioblastoma (GBM), IDH-wildtype WHO Grade IV, is the most aggressive primary brain tumour. Although temozolomide (TMZ) remains standard-of-care, ~50% develop resistance driven by cytoprotective autophagy. GORASP2, an autophagy regulator linked to hyperactivated mTOR signaling in GBM, remains largely unexplored. This study characterized the molecular significance of GORASP2 across independent Western and Eastern cohorts using an integrative multi-database approach.

Methods: This in silico study used GEPIA2 (TCGA, n=163; GTEx, n=207) and CGGA cohorts (mRNAseq_693, n=672; mRNAseq_325, n=329) for expression/prognosis; cBioPortal (n=592, 611) for genomic alterations; and UALCAN/CPTAC (normal, n=10; tumour, n=99) for protein expression. Co-expression, immune infiltration, single-cell, and pathway analyses used GEPIA2/CGGA, TIMER3.0, TISCH2, and STRING/GO, with significance via ANOVA, t-tests, log-rank tests, and Pearson correlation ($p<0.05$).

Results: GORASP2 mRNA and protein were overexpressed in GBM versus normal brain ($p<0.05$), elevated further in mTOR-altered tumours ($p=0.0109$). Expression rose with WHO grade in mRNAseq_325 ($p=0.00018$) but not mRNAseq_693 ($p=0.52$), with no difference between primary and recurrent GBM. GORASP2 was non-prognostic for survival, but showed strong correlation with Golgi-trafficking (RAB1A, RAB2A, GOLPH3) and autophagy-initiation genes (BECN1, UVRAG, STX17), and moderate-to-strong correlation with mTOR genes (MTOR, RPTOR, RICTOR); late autophagy markers (MAP1LC3B, LAMP2, SQSTM1) strengthened only in recurrent GBM. Immune profiling showed positive correlation with cytotoxic T-cells, negative with macrophages. GORASP2 was minimal in T-lymphocytes but enriched in malignant cells, found highest cell line expression of GBM in T98G/DK-MG and moderate in U-87MG/U-251MG (nTPM ~58–90). GO enrichment highlighted Golgi vesicle transport and autophagosome assembly; STRING placed GORASP2 within a 29-gene network.

Conclusion: Integrative cross-population multi-database analysis reveals an association between GORASP2 and autophagy-related pathways in glioblastoma. Although GORASP2 does not independently prognostic biomarker. GORASP2's consistent association with Golgi-trafficking, autophagy, and mTOR signaling supports its prioritization for in vitro validation and evaluation as a therapeutic target in TMZ-resistant glioblastoma.

Keywords: GORASP2, Glioblastoma, Cytoprotective Autophagy

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ABSTRACT NO:05
RESEARCH ARTICLE

Ten year retrospective cohort of primary Intracranial Germ cell tumour in children adolescents and young Adults at a tertiary centre in a Low- to middle-Income country: Prevalence, Treatment, and Outcomes

Farrah Bashir[1], Hafsah Shahzad[2], Ahsan Ahmad[3], Altaf Ali Laghari[4], Bilal Mazhar Qureshi[5], Shayan Sirat Maheen Anwar[6], Khurram Minhas[7], Naureen Mushtaq[8]

Abstract

Objective: To describe the demographic characteristics, clinical presentation, radiological findings, tumour characteristics, histological subtypes, and associated complications (including comorbidities, raised intracranial pressure, and obstructive hydrocephalus) among children, adolescents, and young adults diagnosed with intracranial germ cell tumours.

Methods: This retrospective cohort study included all patients up to the age of 25 years diagnosed with IGCTs, through tissue biopsy, MRI, CSF cytology, and serum/CSF tumour markers (AFP and β-hCG), at the Aga Khan University Hospital, Karachi. Data were collected on presenting complaints, tumour characteristics, surgical intervention, chemoradiotherapy regimen, and outcomes.

Results: Twelve patients were identified; 7 (58.3%) were male, with a mean age at diagnosis of 13.25 ± 6,78 years. Germinomas accounted for 7/12 (58.3%) cases and non-germinomatous germ cell tumours (NGGCTs) for 5/12 (41.7%), including immature and mature teratoma, yolk sac tumour, and mixed germ cell tumour. Most tumours were found in the pineal region 7/12 (58.3%). The most frequent presenting symptoms were headache 9/12 (75.0%), vomiting 8/12 (66.7%), and visual abnormalities 6/12(50.0%).Isolated AFP increase was seen in 5/12 (41.7%) patients and half were tumour marker negative. Chemotherapy was administered in 10/12 (83.3%) patients, most commonly carboplatin-etoposide7/12 (60%), followed by ICE-based regimens 4/12(30%). Radiotherapy was delivered in 5(41.7%), primarily using IMRT or VMAT, including whole-brain, ventricular, or craniospinal protocols with tumour-bed boost based on disease extent. Overall survival was 11/12 (91.7%), with one mortality in a patient with yolk sac tumour.

Conclusion: This study serves as the first comprehensive characterization of IGCTs in Pakistan, demonstrating favourable outcomes similar to international studies.

Keywords: Intracranial germ cell tumor (IGCT), Pediatric neuro-oncology,Germinoma
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ABSTRACT NO:06
RESEARCH ARTICLE

Peripheral Inflammatory Biomarkers and Their Relationship with Histopathological and Molecular Features in Glioma: A Single-Centre Interim Analysis from Pakistan

Alyna Hafeez[1], Kabir Jitender Kumar Uderani[2], Shahzadi Sundas[3], Yasmin Abdul Rashid[4], Adeeba Zaki[5]

Abstract

Objective: Gliomas are the most common primary malignant brain tumours in adults. Their prognosis is determined by both histopathological grade and molecular alterations. Peripheral blood inflammatory biomarkers, including neutrophil-to-lymphocyte ratio (NLR), derived NLR (dNLR), and platelet-to-lymphocyte ratio (PLR), have emerged as inexpensive prognostic markers, although their relationship with tumour biology remains incompletely defined. Evidence suggests that patients with higher NLR, dNLR and PLR are more likely to exhibit rapid tumour progression. Thus, this study aims to determine the association of inflammatory biomarkers (NLR, PLR, and dNLR) with defined histopathological and molecular features in glioma patients.

Methods: Fourty histologically confirmed glioma patients were enrolled at Aga Khan University Hospital, Karachi from July 2025 to April 2026. Histopathological and molecular data were obtained from surgical pathology reports. Pre-operative complete blood counts were used to calculate NLR, dNLR, and PLR, which were categorized using pre-specified cut-offs of >4, >1.3, and >200 respectively. Because biomarker distributions were non-normal, analyses were performed using Chi-square, Fisher's exact tests and Spearman correlation.

Results: Fourty patients were enrolled, of whom 25(62.5%) had WHO grade IV tumors. Median (IQR) NLR, dNLR and PLR were 6.25 (2.76–13.64), 3.44 (1.88–8.41) and 180.9 (110.5–288.6), respectively. WHO grade correlated strongly with IDH status (r_s=0.754, p<0.001). Elevated dNLR (>1.3) was significantly associated with WHO grade (χ^2=7.86, p=0.020), whereas NLR and PLR were not. Higher PLR was more frequent among ATRX-loss tumours {23 (57%) vs 14(35%)}, and IDH wild-type tumours demonstrated higher NLR and PLR, although these differences did not reach statistical significance.

Conclusion: Elevated preoperative dNLR demonstrated a significant association with WHO tumour grade, supporting its potential as an inexpensive biomarker of glioma biology. Although associations between NLR, PLR and molecular markers did not reach statistical significance in this interim analysis, the observed trends warrant validation in the completed cohort. Therefore, these inexpensive biomarkers may assist risk stratification in resource-limited settings while awaiting molecular profiling.

Keywords: Glioma, Neutrophil-to-lymphocyte ratio, risk stratification
DOI:https://doi.org/10.47391/JPMA-7ANOS-ABS-7
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ABSTRACT NO:07
RESEARCH ARTICLE

Anatomical Compartment-Associated Histopathological Phenotypes in Glioblastoma: Evidence for Location-Dependent Morphological Heterogeneity in a Five-Year Pakistani Cohort

Hasan Saeed[1] , Zafar Ali[2]

Abstract

Objective: Glioblastoma (GB) exhibits marked histopathological heterogeneity, yet the influence of neuroanatomical location on its morphological and immunohistochemical characteristics remains poorly understood. We aimed to evaluate whether GBs arising in different anatomical compartments of the brain exhibit distinct histopathological and immunohistochemical phenotypes.

Methods: A retrospective observational study was conducted in the Department of Histopathology of Shifa International Hospital, Islamabad. Histopathology records of patients diagnosed with GB from 1st June 2021 till 1st June, 2026 were retrieved and data was collected from 1st June, 2026 till 20th June, 2026. GBs were categorized according to the intracranial location. Histopathological and immunohistochemical characteristics were considered phenotype-defining variables.

Results: A total of 303 patients were included with 201(66.3%) males; having the mean age of 52.3±16.3 years. The temporal lobe was the commonest tumour location in 82(27.0%) cases. Nuclear atypia was identified in 297(98.0%), microvascular proliferation in 295(97.4%), hypercellularity in 223(73.6%), and pseudopalisading necrosis in 210(69.3%) cases. Distinct morphological patterns included spindle cell morphology in 79(26.1%), giant cell change in 55(18.2%), gemistocytic differentiation in 22(7.3%), epithelioid morphology in 16(5.3%), and clear-cell morphology in 11(3.6%) cases. A high Ki-67 labelling index was observed in 211(69.6%) tumours. Among the evaluated histopathological variables, fibrillary background demonstrated a significant association with anatomical compartment, occurring more frequently in temporal lobe glioblastomas than in tumours arising from other locations (p=0.020). Although tumours involving multiple cerebral lobes exhibited the highest frequency of a high Ki-67 labelling index in 46(88.5%) cases, the association between Ki-67 labelling index and anatomical compartment was not statistically significant (p>0.05).

Conclusion: GBs demonstrate compartment-specific histomorphological variation, with temporal lobe tumours showing a distinctive predilection for fibrillary background. The absence of significant regional differences in proliferative activity suggests that anatomical location primarily influences morphological phenotype rather than tumour proliferation. These findings provide insight into location-dependent histological diversity in GB and warrant further correlation with molecular alterations and clinical outcomes.

Keywords: Glioblastoma, Brain Neoplasms, Histology
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ABSTRACT NO:08
RESEARCH ARTICLE

Clinical Outcomes and Prognostic Factors Following Surgery for Supratentorial Intraventricular Tumours: A 15-year Experience

Mehar Masroor[1], Usama Abdul Ahad Memon[2], Osama Salar[3], Ahmad Hayat[4], Fareeha Nisar[5], Zanib Javed[6], Haran Innocent Bhatti[7], Muhammad Shahzad Shamim[8]

Abstract

Objective: Supratentorial intraventricular tumours (SIVTs) represent rare and surgically demanding subset of intracranial neoplasms, characterized by heterogeneous pathology, deep anatomical location, and significant perioperative risk. Due to their low prevalence, robust outcome-data and evidence-based surgical guidelines remain scarce. This study evaluated clinical characteristics, surgical outcomes, and predictors of adverse events in a large single-center cohort.

Methods: A retrospective study was conducted on patients operated for SIVTs between April 2010 – April 2025. The data was collected between November 2025 – January 2026. Presenting complaints, radiological and surgical details, and postoperative complications were analyzed. Functional outcomes were assessed using the modified Rankin Scale (mRS). Multivariate logistic regression identified predictors of gross total resection (GTR) and postoperative ventriculoperitoneal shunt (VPS) dependence. Survival analysis was performed using Kaplan-Meier methods.

Results: A total of 170 patients were included (mean age of 32.4 ± 15.7 years; 31(18.2%) were children). Headache 129(75.9%), nausea 68(40.0%), and vomiting 65(38.2%) were the most common presenting symptoms. Favourable preoperative mRS of 0-1 was noted in 133(79.6%) patients. Lateral ventricular tumours comprised 95(56%) of cases. GTR was achieved in 87/147(59.2%) patients. Postoperative complications occurred in 52/145(35.9%), including meningitis 9(6.2%), hydrocephalus 9(6.2%), and seizures 6(4.1%). No statistically significant predictors were identified for these complications. Multivariate logistic regression demonstrated that temporal transcortical–transventricular approach (OR 9.04; p=0.041) and low-grade tumours (OR 9.48; p=0.006) were independent predictors of GTR. Hydrocephalus at presentation showed a strong trend toward need of postoperative VPS (OR 7.68; p=0.054). During median follow-up of 13.8 months, recurrence was observed in 22.7% with a thirty-day mortality of 4.2%, both significantly worse in children and high-grade tumours.

Conclusion: Surgery for SIVTs carries meaningful risk but achieves favourable outcomes in most patients. Tumour grade and surgical approach are the strongest determinants of GTR, while preoperative hydrocephalus may guide anticipatory VP shunt planning. These findings can inform surgical decision-making and preoperative counselling in this rare tumour subset.

Keywords: Lateral and third ventricle tumours, Supratentorial ventricular tumours, Prognostic factors.
DOI:https://doi.org/10.47391/JPMA-7ANOS-ABS-9
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ABSTRACT NO:09
RESEARCH ARTICLE

Age and Sex-Specific Provincial Patterns of Brain and CNS Cancer Mortality in Pakistan: A Global Burden of Disease Study

Usama Yaseen[1], Syed Mubeen Ahmed[2]

Abstract

Objective: Brain and central nervous system (CNS) cancers represent a major cause of cancer-related mortality worldwide, with limited evidence describing subnational variation in Pakistan. This study aimed to evaluate age- and sex-specific provincial patterns of brain and CNS cancer mortality in Pakistan using Global Burden of Disease (GBD) 2023 estimates, spanning 1990 to 2023.

Methods: This ecological study used Global Burden of Disease (GBD) 2023 estimates of brain and central nervous system (CNS) cancer mortality in Pakistan from 1990 to 2023. Age-standardized mortality rates were analyzed by province (Punjab, Sindh, Khyber Pakhtunkhwa, Balochistan, Gilgit-Baltistan, Islamabad Capital Territory, and Azad Jammu & Kashmir), sex, and standard GBD age groups. Descriptive analyses were conducted to compare age-standardized mortality rates across provinces, sexes and age groups.

Results: Substantial geographic variation in CNS cancer mortality was observed across Pakistan. The highest mortality rate was recorded in Gilgit-Baltistan (0.154, 95% UI: −0.359 to 1.006), followed by Punjab (0.146, 95% UI: −0.276 to 0.701), while the lowest rates were observed in Azad Jammu & Kashmir (0.021, 95% UI: −0.405 to 0.627)and Sindh (0.025, 95% UI: −0.374 to 0.572) representing a more than 7-fold provincial difference. Females demonstrated higher modelled mortality rates than males across most provinces, particularly in Punjab (0.192 [95% UI: −0.360 to 1.119] vs. 0.092 [95% UI: −0.406 to 0.883]). Age-specific analysis revealed peak mortality in the 20–39-year age group, with a decline in older age groups. Marked spatial heterogeneity was observed across provinces, with higher burden in northern regions.

Conclusion: Brain and CNS cancer mortality in Pakistan exhibits marked provincial, age-specific and sex-based disparities with higher burden among young adults, females and northern provinces. These findings underscore the need for targetted cancer surveillance, equitable resource allocation and region specific prevention and healthcare planning to address geographic disparities.

Key words: Brain and central nervous system cancer; Mortality ;Pakistan;Global Burden of Disease ;Provincial disparities ;Sex differences ;Age-specific mortality

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ABSTRACT NO:10
RESEARCH ARTICLE

Predictors of Prolonged Hospital Stay After Craniotomy for Tumour Resection

Zanib Javed[1], Areej Khuwaaaja[2], Roha Sitwat[3], Ayesha Sohail[4], Hafiza Fatima Aziz[5], Nida Zahid[6], Saqib Kamran Bakhshi[7]

Abstract

Objective: Prolonged length of hospital stay (LOS) after craniotomy for tumour resection is associated with increased healthcare costs, postoperative complications, and resource utilization. Identifying predictors of prolonged LOS may facilitate perioperative optimization and improve patient outcomes.

Methods: A retrospective cross-sectional study was conducted on 390 adult patients who underwent craniotomy for brain tumour resection between January 2019 and December 2023 at a single tertiary care center, Aga Khan University Hospital, Karachi. Data was collected after ERC approval from May to July 2024. Prolonged LOS was defined as hospitalization for ≥8 days. Demographic, clinical, radiological, operative, and postoperative variables were analyzed using univariate and multivariable logistic regression to identify independent predictors of prolonged LOS.

Results: Of the 390 patients, 58 (14.9%) had prolonged hospitalization. On univariate analysis, prolonged LOS was associated with longer SCU/ICU stay, lower Karnofsky Performance Status (KPS), lower Glasgow Coma Scale (GCS), preoperative antiplatelet/anticoagulant use, greater blood loss, longer operative duration, perioperative transfusion, and general anaesthesia. On multivariable analysis, emergency admission (OR 2.85, 95% CI 1.33–6.07), transfer from another service (OR 6.07, 95% CI 1.04–35.43), and longer operative duration independently predicted prolonged LOS, while higher preoperative KPS was protective.

Conclusion: Emergency admission, inter-service transfer, prolonged operative duration, and poor preoperative functional status were independent predictors of prolonged hospital stay after craniotomy for tumour resection.

Recommendations:

Optimizing functional status, improving operative efficiency, and implementing enhanced recovery pathways may help reduce LOS and improve resource utilization.

Keywords: Craniotomy, Brain tumour, Length of hospital stay

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ABSTRACT NO:11
RESEARCH ARTICLE

Epilepsy as a Contributing Cause of Death Among Malignant Brain Tumour Patients in the United States, 1999–2024: A Multiple-Cause CDC WONDER Joinpoint Analysis with Relevance to the Epilepsy Treatment Gap in Pakistan

Muhammad Ahmad Baraakat[1], Hadi Ftouni[2], Noor Us-Sabah[3], Liza Osepashvili[4]

Abstract

Objective: Seizures are among the most disabling neurological manifestations in patients with malignant brain tumours. Pakistan faces a substantial epilepsy treatment gap and lacks integrated neuro-oncology surveillance data. This study aimed to evaluate temporal trends in epilepsy recorded as a contributing cause of death among malignant brain tumour decedents in the United States and to propose a transferable surveillance model for countries with limited epidemiological infrastructure.

Methods. A retrospective population-based ecological time-trend study was conducted using the CDC WONDER Multiple Cause of Death database from 1999 to 2024. Death certificates listing malignant brain tumours (ICD-10 C71) as the underlying cause and epilepsy or status epilepticus (ICD-10 G40–G41) as contributing causes were included. Annual proportions of malignant brain tumour deaths with epilepsy co-reported were calculated with binomial standard errors. Joinpoint regression was used to estimate Annual Percent Change (APC), Average Annual Percent Change (AAPC), and 95% confidence intervals. Reporting adhered to the STROBE guideline.

Results: The proportion of malignant brain tumour deaths with epilepsy or status epilepticus recorded as a contributing cause increased from 0.26% in 1999 to 1.45% in 2024, representing a 5.5-fold increase. No significant temporal change was observed between 1999 and 2005 (APC −7.36%; non-significant). This was followed by a significant increase between 2005 and 2020 (APC +13.05%; p=0.006), with a continued but non-significant rise from 2020 to 2024 (APC +5.13%). Overall, the average annual increase was significant (AAPC +6.53%; 95% CI 5.42–8.10; p<0.001).

Conclusion: Epilepsy was increasingly documented as a contributing cause of death among malignant brain tumour decedents in the United States over the 25-year study period, reflecting a persistent seizure burden in neuro-oncology. This reproducible population-based surveillance approach may help characterize epilepsy-related mortality and inform neuro-oncology surveillance strategies in countries lacking comprehensive registries, including Pakistan.

Keywords: Malignant brain tumour; Epilepsy; CDC WONDER
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ABSTRACT NO:12
RESEARCH ARTICLE

Temporal Trends and Disparities in Malignant Brain Neoplasms and Cardiac Arrest- Associated Mortality in the United States, 1999-2024: A Retrospective Analysis

Muhammad Owais Shaikh[1], Farkhanda Maqbool[2], Tunjeena Shaikh [3], Vishan Das[4], Kashf Younas[5], Hanozia Shah[6]

Abstract

Objective: Malignant brain neoplasms and cardiac arrest represent significant causes of mortality with potentially shared pathophysiological mechanisms and disparate population impacts. This study examines trends and disparities in mortality associated with these conditions in the United States from 1999 to 2024.

Methods: We obtained data for U.S. adults aged ≥45 using CDC WONDER spanning 1999 to 2024 with ICD-10 codes C71 (malignant brain neoplasms) and I46 (cardiac arrest). Age-adjusted mortality rates (AAMRs) per 100,000 individuals were categorized by overall, sex, race/ethnicity, census region, urbanization level, and age group. Joinpoint regression analysis was performed to calculate annual percent changes (APCs) and average annual percent changes (AAPCs) with 95% confidence intervals (CIs).

Results: A total of 28,117 deaths were identified. Overall AAMR declined from 1.13 in 1999 to 0.74 in 2024, with an overall AAPC of -1.39% (95% CI: -1.81 to -0.96). Males consistently exhibited higher rates (0.85 in 2024) compared to females (0.65 in 2024). Joinpoint analysis revealed a steep decline from 1999-2006 (APC: -3.61%, 95% CI: -4.93 to -2.26) followed by a slower decline from 2006-2024 (APC: -0.51%, 95% CI: -0.85 to -0.17). Hispanic or Latino populations showed the highest AAMR (1.06 in 2024) while Black or African American populations reported the lowest rates (0.53 in 2024). Geographically, the West had the highest mortality (1.60 in 2024) while the Midwest showed the lowest rates (0.35 in 2024). Mortality was higher in metropolitan areas (0.90 in 2020) compared to non-metropolitan areas (0.62 in 2020). Crude mortality rate was highest among those aged 85+ (2.04).

Conclusion: This study reveals critical disparities in mortality trends across sex, race, geography, and age. Urgent, equity-focussed place-based prevention strategies are required to dismantle persistent disparities in high-risk populations.

Keywords: Malignant brain neoplasms, Mortality, Epidemiology.

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ABSTRACT NO:13
RESEARCH ARTICLE

Place of Death Among Malignant Brain Tumour Decedents in the United States, 2003–2024: A CDC WONDER Joinpoint Analysis of End-of-Life Care Settings with Relevance to Palliative Capacity in Pakistan

Muhammad Ahmad Barakat [1], Hadi Ftouni [2], Haniah Noor Baqi [3], Ruham Fatima [4]

Abstract

Objective: Palliative and hospice care are essential for patients with malignant brain tumours. Pakistan has limited hospice infrastructure and lacks a national end-of-life surveillance system. This study aimed to evaluate temporal trends in the place of death among malignant brain tumour decedents in the United States and provide a reproducible surveillance model applicable to palliative care planning in Pakistan.

Methods: A retrospective population-based ecological time-trend study was conducted using the CDC WONDER Underlying Cause of Death database for malignant brain tumour (ICD-10 C71) deaths from 2003 to 2024, on 29. June 2026.. Place of death was categorized into home, hospice, hospital inpatient, nursing home, and other settings. Bridged-race mortality files (2003–2020) and single-race files (2021–2024) were analyzed using Joinpoint regression. Annual Percent Change (APC), Average Annual Percent Change (AAPC), and 95% confidence intervals were calculated. Pairwise tests of parallelism and coincidence assessed differences in temporal trends across care settings. Reporting followed the STROBE guideline.

Results: A total of 335,318 malignant brain tumour deaths were analyzed. Home remained the most common place of death, increasing from 45.1% in 2003 to 53.3% in 2024 (AAPC +0.83%; 95% CI 0.15–1.52), with the steepest increase between 2018 and 2021 (APC +6.56%) before declining from 2021 to 2024 (APC −3.70%). Hospice deaths increased from 0.7% to 13.3%, with the greatest rise occurring between 2003 and 2006 (APC +99.18%). Conversely, hospital inpatient deaths decreased from 22.5% to 13.0% (APC −3.60% through 2021), while nursing home deaths declined from 21.4% to 14.2%. Fourteen of fifteen pairwise comparisons demonstrated significantly different temporal trajectories between care settings (parallelism p=0.0007; coincidence p=0.0002).

Conclusion: The place of death among United States malignant brain tumour decedents has shifted substantially from hospital-based to home- and hospice-based care over the past two decades. This population-level analysis provides a scalable surveillance framework that may support the development of palliative care services, hospice infrastructure, and end-of-life monitoring in countries lacking comprehensive surveillance systems, including Pakistan.

Keywords: Malignant brain tumour; Palliative care; CDC WONDER
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ABSTRACT NO:14
RESEARCH ARTICLE

Temporal Trends in the Burden of Brain and Central Nervous System Cancer in Pakistan: A Global Burden of Disease Study, 1990–2023

Muhammad Bilal Aamir [1], Tehreem Tariq [2], Muhammad Aamir Saghir [3]

Abstract

Objective: Brain and central nervous system (CNS) cancers represent a significant source of mortality and morbidity worldwide, creating clinical and economic challenges. In Pakistan, the fifth most populous country, CNS tumours are the 13th most frequently diagnosed cancers, yet accurate nationwide data remain scarce, hindering policy-making for early detection and treatment. This study examines trends in incidence, prevalence, mortality, disability-adjusted life years (DALYs), years of life lost (YLLs), and years lived with disability (YLDs) of brain and CNS cancers in Pakistan from 1990 to 2023, along with sex-stratified analyses.

Methods: Data on brain and CNS cancers incidence, prevalence, mortality, DALYs, YLLs, and YLDs for Pakistan from 1990 to 2023 were extracted from the Global Burden of Disease 2023 database. The disease burden was quantified using age-standardized rates per 100,000 population. For temporal trends evaluation, we employed Joinpoint regression analysis to calculate the annual percent change (APC) and the average annual percent change (AAPC) with 95% confidence intervals (CIs). Data were stratified by sex to assess demographic disparities.

Results: Between 1990 and 2023, age-standardized incidence, mortality, DALYs, YLDs, and YLLs rates remained relatively stable, with non-significant AAPCs of 0.29, 0.09, 0.21, 0.28, and 0.21, respectively (all $p > 0.05$). In contrast, age-standardized prevalence increased significantly from 3.59 to 4.49 per 100,000 (AAPC: 0.60; 95 % CI: 0.20–1.00; $p = 0.003$). Joinpoint analysis showed significant increases during 1990–2006 (APC: 0.18) and 2009–2021 (APC: 1.39), while the increase during 2006–2009 (APC: 2.95) was non-significant. A significant decline occurred during 2021–2023 (APC: –4.14). Males had higher mortality, DALYs, and YLLs rates, whereas females had slightly higher incidence, prevalence, and YLDs rates.

Conclusion: Despite stable age-standardized incidence, mortality, and disability trends, brain and CNS cancer prevalence increased significantly in Pakistan from 1990 to 2023, highlighting the need for continued surveillance and healthcare planning.

Keywords: Pakistan; Brain and Central Nervous System Cancer; Global Burden of Disease
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ABSTRACT NO:15
RESEARCH ARTICLE

Transcriptomic Analysis Identifies the PVT1-miR-34a Axis as a Novel Non-Coding RNA Therapeutic Target in Diffuse Intrinsic Pontine Glioma

Ayesha Farooq[1], Hurmat Haroon[2], Faisal Khan[3]

Abstract

Objective: Diffuse intrinsic pontine glioma (DIPG) is a lethal paediatric brainstem tumour with a median survival under one year and no effective therapy. Although non-coding RNAs (ncRNAs) regulate tumour progression, their regulatory networks in DIPG remain poorly characterised. This study aimed to identify dysregulated lncRNA–miRNA–mRNA axes in DIPG through integrated transcriptomic analysis, computationally validate these networks, and investigate their downstream impact on cancer-related pathways to reveal novel therapeutic targets for RNA-based precision medicine.

Methods: This study was conducted at the Precision Medicine Lab, National Centre in Big Data and Cloud Computing (NCBC), Peshawar, from 1st July to 22nd August 2025. RNA-seq datasets comprising 25 DIPG and 45 normal brain samples were obtained from GEO. Following normalization and differential expression analysis (padj < 0.05, $|\log_2 FC| > 2$), dysregulated lncRNAs, miRNAs, and mRNAs were integrated into a ceRNA network using LncBase and miRTarBase. KEGG pathway enrichment, STRING protein–protein interaction analysis, Cytoscape network visualization, and Spearman correlation analysis were performed to identify and validate functionally relevant regulatory interactions.

Results: PCA demonstrated clear separation between DIPG and control transcriptomes. PVT1 was significantly upregulated ($\log_2 FC = 3.44$), whereas miR-34a was downregulated ($\log_2 FC = -3.66$). Eleven oncogenic mRNAs, including NOTCH1, PDGFRA, CDK4, SOX2, and MYC, were identified as predicted targets and formed a highly connected STRING interaction network. KEGG enrichment highlighted "MicroRNAs in cancer," while correlation analysis supported an inverse PVT1–miR-34a relationship and positive associations with these oncogenes, consistent with a ceRNA regulatory mechanism.

Conclusion: The PVT1–miR-34a axis appears to promote oncogenic pathways in DIPG. Targetting PVT1 or restoring miR-34a may represent potential RNA-based therapeutic strategies, warranting further experimental validation through reporter and knockdown assays.

Keywords: Diffuse Intrinsic Pontine Glioma; Non-coding RNA; Transcriptomics
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ABSTRACT NO:16
RESEARCH ARTICLE

Temporal Trends in the Age-Standardised Incidence of Brain and Central Nervous System Cancers in Pakistan: A Global Burden of Disease Study (1990–2021)

Wania Moeen[1], Muhammad Sohaib Khan[2], Aswah Moeen[3], Hafsa Rais[4], Muhammad Salif Moeen[5]

Abstract

Objective: The primary objective of this study was to analyze long-term trends in the age-standardized incidence of brain and CNS cancers in Pakistan utilizing GBD data from 1990 to 2021.

Methods:Age-standardized incidence rates (ASIRs) of brain and CNS cancers per 100,000 population were extracted on 29th July 2026 from the Global Burden of Disease database (Institute for Health Metrics and Evaluation; https://vizhub.healthdata.org/gbd-results/) for Pakistan, covering the period 1990–2021. Data were obtained for the overall population and stratified by sex to assess sex-specific patterns. Temporal trends in ASIR were evaluated using Joinpoint Regression software. For each identified segment, the annual percentage change (APC) was calculated, and the average annual percentage change (AAPC) was computed across the full study period to summarize the overall trend. All estimates were reported with 95% confidence intervals (CIs). P value of <0.05 was considered statistically significant.

Results: The ASIR demonstrated a consistent upward trajectory, rising from 1.69 per 100,000 in 1990 to 2.18 per 100,000 in 2021 (AAPC: 0.84; 95% CI: 0.74–0.91). From 1990 to 2018, the ASIR increased gradually from 1.69 to 2.02 (APC: 0.59; 95% CI: 0.52–0.65), followed by a marked acceleration between 2018 and 2021, during which the ASIR climbed from 2.02 to 2.18 (APC: 3.2; 95% CI: 1.7–5.4). Gender-stratified analysis revealed that male ASIRs exceeded female rates during the earlier decades; however, from 2013 onwards, females demonstrated consistently higher ASIRs, reaching 2.30 per 100,000 by 2021 compared to 2.09 per 100,000 in males.

Conclusion: The age-standardized incidence of brain and other CNS cancers in Pakistan increased steadily from 1990 to 2021, with a marked acceleration after 2018 and an emerging female predominance from 2013 onwards. These findings underscore the urgent need for strengthened cancer surveillance infrastructure, enhanced early detection programmes, and expanded neuro-oncology services to effectively address this growing public health burden.

Keywords: Brain Cancer, Incidence Trends, Pakistan
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ABSTRACT NO:17
RESEARCH ARTICLE

Microsurgical resection of skull base meningioma Operative Nuances, Challenges, and Outcome.

Md. Ruhul Kuddus [1], Robert Ahmed Khan [2], Md. Hasanur Rahman [3], Ferdousi Tabassum [4]

Abstract

Objective: Skull base meningiomas represent a distinct subgroup of intracranial tumours because of their proximity to cranial nerves, major vascular structures, and the brainstem. Although advances in imaging, neuroanaesthesia, and skull base approaches, marked improvement in illumination devices, provision of improved haemostatic agents, greater availability of more precise surgical instruments, and better modalities for skull base reconstruction have led to an inevitable evolution of safe skull base neurosurgery, complete resection remains technically demanding. This study evaluates operative nuances, intraoperative challenges, and clinical outcomes following microsurgical resection of skull base meningiomas.

Methods: A retrospective analysis was performed on 55 patients who underwent microsurgical resection of skull base meningiomas of different location in Bangladesh Medical University from 01st April, 2018 to 30th June 2026. Tumour location, extent of resection, operative strategies, cranial nerve preservation, vascular management, postoperative complications, and functional outcomes were reviewed. Surgical techniques included tailored skull base approaches with microsurgical dissection under high magnification. Outcome was assessed using MRC grading, GOS and House- Brackmann scale where applicable.

Results: Gross total or near-total resection was achieved in the majority of patients. The principal operative challenges included tumour adherence to the internal carotid artery and its branches, encasement of cranial nerves, hypervascularity, and limited surgical corridors in petroclival lesions. Key operative nuances included early devascularization, internal debulking before arachnoid plane dissection, preservation of perforating vessels, and meticulous cranial nerve handling. Postoperative neurological status was stable or improved in most patients. Out of 55 patients 3 patients died due to post-operative complications. Hemiparesis developed in 2 patients. New cranial nerve deficits, tumour bed haematoma and cerebrospinal fluid leakage were the most common complications.

Conclusion: Skull base tumours pose a management challenge given their complex location and, as a result, the tumours and surgery can result in significant morbidity. Careful preoperative planning, individualized skull base approaches, and meticulous microsurgical technique are essential to maximize safe resection while preserving neurological function.

Key words: Meningioma; vascular invasion; Skull base.
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ABSTRACT NO:18
RESEARCH ARTICLE

Trends in Mortality Due to Brain and Other Central Nervous System Cancers in Pakistan, 1980–2021: A Global Burden of Disease Analysis

Muhammad Sohaib Khan [1], Wania Moeen [2], Muhammad Jansher [3], Wajeeh Ahmed Khan [4], Hafsa Rais [5]

Abstract

Objective: Brain and Central Nervous System (CNS) cancers are rare but highly lethal malignancies associated with substantial neurological morbidity and mortality. In 2019, approximately 246,000 deaths were attributed to these tumours globally. Our study aims to assess Brain and CNS cancer mortality trends in Pakistan from 1980 to 2021.

Methods: We utilized mortality data from the Global Burden of Disease (Institute for Health Metrics and Evaluation; https://vizhub.healthdata.org/gbd-results/) to examine mortality trends of brain and other CNS cancers in Pakistan from 1980 to 2021. Age-standardized mortality rates (ASMRs) per 100,000 population were extracted for the overall population and by sex. Temporal trends were analyzed using Joinpoint Regression software, and annual percentage changes (APCs) or average annual percentage changes (AAPC) with 95% confidence intervals were calculated.

Results: Between 1980 and 2021, an estimated 74,235 deaths due to brain and other CNS cancers occurred in Pakistan. Overall, the ASMR increased from 1.16 in 1980 to 1.67 in 2021 (AAPC: 0.98; 95% CI: 0.91 to 1.04). From 1980 to 1994, the ASMR increased greatly from 1.16 to 1.42 (APC: 1.63; 95% CI: 1.47 to 1.81). However, from 1994 to 2018, ASMR growth slowed down and ASMR reached 1.57 from 1.42 (APC: 0.42; 95% CI: 0.31 to 0.49). From 2018 onwards, there was a dramatic increase in ASMR from 1.57 to 1.67 (APC: 2.47; 95% CI: 1.1 to 4.28). Gender stratification showed that male mortality rates were higher than female rates until 2014, after which females showed slightly higher ASMRs. Both sexes demonstrated an upward trend over the study period.

Conclusion: Mortality due to brain and other CNS cancers in Pakistan increased significantly between 1980 and 2021, with a slowing of the upward trend after the mid-1990s followed by renewed acceleration after 2018. These findings underscore the need for improved surveillance, earlier diagnosis, and strengthened neuro-oncology services to reduce the burden of disease.

Keywords: Mortality, Pakistan, Brain Cancer

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ABSTRACT NO:19
RESEARCH ARTICLE

Effect of False Memories on Episodic and Semantic Memory and Amnesia in Patients with Hippocampal Lesions

Khansa Furqan[1], Muhammad Aqeel[2], Hamid Shafiq[3]

Abstract

Objective: The hippocampus plays a crucial role in the formation of episodic memory, spatial navigation, and emotional regulation. Damage to hippocampus may lead to cognitive and emotional deficits, particularly episodic and semantic memory impairments. Previous researches have done extensive research on hippocampal dysfunction, but the role of multimodal false memory induction in individuals with acute hippocampal lesions is yet to be explored.This study explored the effects of sequential (first and second order) false memory induction (visual, auditory, and combined modalities) on episodic memory retrieval, semantic association and recognition, and amnesiac symptoms in patients with acute hippocampal damage as compared to healthy individuals.

Methods: This study used a temporal, double-blind, mixed within-group and between-group randomized block design with event-related tasks. Sixty participants were recruited, with 30 having Hippocampal damage and 30 healthy individuals with ages between 18 to 65 years, from multiple hospitals. Thirty participants with acute hippocampal damage were recruited from the neurology department of Fauji Foundation Hospital, Pakistan, where the experiment was conducted using the Psychopy Software. The thirty healthy participants were recruited at the Cognitive and Neuroscience Lab within the psychology department of the Foundation University School of Science and Technology (FUSST). Three standardized cognitive tasks were used to examine episodic and semantic memory and amnesia in patients with acute hippocampal lesions. Both groups participated in a set of computerized cognitive exercises intended to measure episodic and semantic memory alterations, induce multisensory false memories, and track the effects of the multi-sensory false memory induction in both groups using the advance version of PsychoPy software. These questionnaires were used to assess general false memory tendencies, episodic memory recall, and semantic memory retrieval and amnesic symptoms.

Results: The findings revealed that individuals with hippocampal lesions showed heightened susceptibility to false memories, especially with combined auditory-visual stimuli. Particularly in episodic memory retrieval, whereas semantic memory tasks suggested potential regulatory factors. Whereas, healthy individuals depicted consistent decline in performance across tasks during false memory induction.

Conclusion: These findings highlight the hippocampus' critical role in defying false memory formation and focus its interactions with other neural systems in memory reconstruction.

Keywords: Multisensory False Memory, Episodic Memory, Semantic Memory, Amnesia, Hippocampal Damage, Healthy Individual

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ABSTRACT NO:20
RESEARCH ARTICLE

Trends and Disparities in Mortality Due to Secondary Malignant Neoplasm of the Brain and Cerebral Meninges in the United States (1990–2020)

Vishan Das [1], Kaneez Fatima [2], Muhammad Owais Shaikh [3], Suneel Kumar [4], Kashf Younas [5], Tunjeena Shaikh [6]

Abstract

Objective: Secondary brain cancer is a serious condition associated with poor outcomes and high mortality. However, long-term mortality trends in the United States have not been well described. This study assessed national mortality trends from 1999 to 2020.

Methods: Using data from the CDC WONDER Multiple Cause of Death database (1999–2020) for U.S. adults aged ≥25 years, we analyzed age-adjusted mortality rates (AAMRs) per 100,000 population using ICD-10 code C79.3 for secondary brain cancer Mortality rates were stratified by year, sex, race/ethnicity, census region, urbanization level, and age group. Joinpoint regression analysis was used to estimate annual percent changes (APCs) and average annual percent changes (AAPCs) with 95% confidence intervals (CIs). The CDC WONDER database was searched, and the relevant data were extracted and analyzed on June 24, 2026.

Results: A total of 358,435 deaths due to secondary brain cancer were identified during the study period. Overall AAMRs declined from 9.65 in 1999 to 7.63 in 2020 (AAPC: −1.16; 95% CI: −1.54 to −0.77; $p < 0.001$). A significant decline was observed from 1999–2007 (APC: −4.42; $p < 0.001$), followed by a significant increase from 2013–2017 (APC: 3.72; $p = 0.0002$). Males consistently exhibited higher mortality than females (8.10 vs. 7.06).The highest AAMRs was observed among adults aged ≥85 years (0.84). Non-Hispanic (NH) Whites had the highest average AAMR (7.96), whereas NH Asians had the lowest (4.16). Regionally, the Midwest had the highest average AAMR (7.98), while the Northeast had the lowest (6.49). Mortality was higher in non-metropolitan areas (9.12) than in metropolitan areas (7.12).

Conclusion: Secondary brain cancer mortality was highest among males, Non-Hispanic Whites, adults aged ≥85 years, and residents of the Midwest and non-metropolitan areas, highlighting the need for targeted interventions and equitable access to specialized cancer care.

Keywords: Secondary brain cancer, Brain metastases, Cancer mortality

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ABSTRACT NO:21
RESEARCH ARTICLE

Single-cell Transcriptomic Characterization of DPP8 and DPP9 Expression Across Malignant Transcriptional States in Glioblastoma

Malaika Khan [1], Paras Jawaid [2], Azhar Hussain [3], Syed Ather Enam [4]

Abstract

Objective: Glioblastoma (GBM) is a grade IV astrocytoma characterized by extensive intratumoral heterogeneity, with malignant cells existing in distinct malignant transcriptional states within the same tumour. DPP8 and DPP9 are intracellular serine proteases implicated in tumour progression and regulated cell death; however, their cell state-specific expression in GBM remains poorly understood. This study aimed to characterize the expression of DPP8 and DPP9 across malignant transcriptional states in GBM using single-cell RNA sequencing and to identify biological pathways associated with DPP8-high malignant cells

Methods: Single-cell RNA sequencing data (GSE131928) generated by Neftel et al. was retrieved from Gene Expression Omnibus (GEO). This study was conducted from June to August 2026. All analysis was performed in R (v4.6.1) using Seurat (v5.5.1). Following quality control and preprocessing, malignant cells were classified into four established transcriptional states (AC-like, MES-like, NPC-like, and OPC-like) using published meta-module gene signatures. DPP8 and DPP9 expression was evaluated across these cellular states. Differential expression analysis between DPP8-high and DPP8-low malignant cells, followed by Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway enrichment to identify the biological processes associated with DPP8-high malignant cells.

Results: Malignant cells were successfully classified into four transcriptional cellular states: astrocyte-like (AC), mesenchymal-like (MES), neural progenitor-like (NPC), and oligodendrocyte progenitor-like (OPC) . DPP8 and DPP9 expression differed significantly across these cellular states. AC-like cells demonstrated the highest DPP8 expression followed by MES-like cells, while NPC-like and OPC-like cells exhibited comparatively lower expression. Cell-cycle analysis demonstrated significant differences across transcriptional states, with DPP8-high malignant cells showing enrichment of G2/M-associated signatures while largely comprising non-cycling cells. Differential expression identified distinct transcriptional programmes associated with DPP8-high cells. Functional enrichment analyses revealed significant enrichment of extracellular matrix organization, cell adhesion, and multiple signaling pathways.

Conclusion: Single-cell transcriptomic analysis demonstrates that DPP8 exhibits transcriptional state-specific expression of DPP8 in glioblastoma, with predominant expression in AC-like malignant cells. The identified molecular programmes provide biologically relevant hypotheses for the mechanisms underlying DPP8 function.

Key Words: Glioblastoma, Gene Expression Omnibus, Gene Ontology

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ABSTRACT NO:22
RESEARCH ARTICLE

Quantifying the surgical mediation of income-based survival disparities in glioblastoma: a SEER causal four-way decomposition (2007–2022)

Abdul Rafay Khan[1], Sara Khan[2], Komal Khan[3], Mohammad Shahmir Waqas[4], Arslan Ali[5]

Abstract

Objective: Socioeconomic survival disparities in glioblastoma (GBM) are documented, but whether they operate through differential receipt of surgical resection is unquantified. We estimated the proportion of the county income–based survival disparity in GBM transmitted through receipt of surgical resection, using causal four-way decomposition.

Methods: We analysed a population-based SEER 17-registry cohort of adults aged 18–64 with histologically confirmed GBM (ICD-O-3 9440/3) diagnosed from 2007 to 2022. The exposure was county-level median household income, lowest (Q1) versus highest (Q4) quartile. The mediator was receipt of surgical resection versus none or biopsy. The outcome was overall survival. We applied the VanderWeele four-way decomposition with a Cox survival estimator and an exposure–mediator interaction, adjusting for age, sex, diagnosis year, race/ethnicity, marital status, and rurality, with 1000 bootstrap replications. Robustness to unmeasured confounding was assessed using E-values.

Results: Among 19,051 patients, median overall survival rose from 12 months (Q1) to 15 months (Q4), whereas resection rates were near-identical (Q1 66.0%, Q4 68.9%). The lowest-income quartile carried a higher hazard of death than the highest (total-effect HR 1.23, 95% CI 1.17–1.30). Surgery mediated almost none of this gap (proportion mediated 2.6%, 95% CI −2.7 to 7.6%; pure indirect HR 1.00). The controlled direct effect persisted (HR 1.19, 95% CI 1.13–1.25), with a significant income–surgery interaction (proportion eliminated 28.0%, 95% CI 10.9–44.6%). E-values were 1.58 (total effect) and 1.50 (direct effect).

Conclusion: The income-based survival disparity in GBM is substantial but operates predominantly through non-surgical pathways; equalizing receipt of surgery alone would not close it. Unmeasured clinical confounders of moderate strength could account for the residual direct effect.

Keywords: Glioblastoma; Healthcare disparities; Mediation analysis

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ABSTRACT NO:23
RESEARCH ARTICLE

Contribution of Unspecified Brain Malignancies to Overall Brain Cancer Mortality Trends in the United States: A 26 years CDC WONDER Analysis

Aqsa Memon[1], FNU Venjhraj[2], Rajesh Kumar[3], Meva Ram[4], Aizah Khadim[5], Ravi Das[6]

Abstract

Objective: Brain cancer mortality trends in the United States may be affected by deaths recorded as unspecified brain malignancies, affecting epidemiological interpretation. We aimed to evaluate the impact of unspecified brain malignancies on overall brain cancer mortality trends patterns over time.

Methods: Mortality data were extracted in June 2026 from the CDC WONDER as multiple causes of deaths with ICD-10 codes (C71.9 and C71), respectively, from 1999 to 2024. The age-adjusted mortality rate (AAMR) per 100,000 persons, by sex, race, census, 2013 urbanization, state, and place of death, as well as the (CMR) by age, were reported and analyzed using Joinpoint regression software to evaluate (APC) and (AAPC) and corresponding 95 % confidence intervals (CIs).

Results: From 1999 to 2024, 359,859 deaths occurred among patients with unspecified brain malignancies and overall brain cancer. The overall AAMR declined from 6.53 per 100,000 in 1999 to 5.69 per 100,000 in 2024. The largest decline was observed between 2015 to 2024, corresponding to APC of -1.1657 (95% CI: -1.42 to –0.91; $p < -0.000001$). The AAPC throughout the period was -0.516 (95% CI: -0.34 to-0.64; $p < 0.000001$). Men (7.55) had higher average AAMRs than women (4.95), adult aged >75+ years had a higher burden (CMR:19.41), Non-Hispanic whites had highest mortality (7.02) while, Non-Hispanic Asian or Pacific islander had the lowest mortality (2.81). Midwest had the greatest mortality (6.45) and the Northeast had the lowest (5.87). Non-metropolitan areas showed average higher AAMR then the Metropolitan areas (6.60 vs 6.13). South Dakota was highest mortality state during 2019-2020, while Vermont was highest mortality state during 2021 to 2024.

Conclusion: Analysis reported higher burden of brain malignancy among the males, older ages, and Non-Hispanic white populations, Midwest, Non metropolitan areas highlighting diagnostic precision and targetted intervention.

Keywords: Brain tumour, Malignancy, Cancer

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ABSTRACT NO:24
RESEARCH ARTICLE

Hybrid Quantum-Classical Predictive Modelling for Glioblastoma Survival: Addressing Data Scarcity in Resource-Constrained Neuro-Oncology

Wajeeh Ahmed Khan [1], Mubashir Amjad [2], Arsalan Khan [3], Fawad Sarwar [4], Haroon Ahmed [5].

Abstract

Objective: A hybrid quantum-classical machine learning framework was proposed to evaluate whether quantum mechanics could extract high-dimensional patterns from small, localized patient registries, bypassing the small-data bottleneck entirely.

Methods: An algorithmic pipeline bridging classical preprocessing with quantum state manipulation was designed. Eight core features comprising four structural MRI parameters (tumour volume, oedema index, necrotic core ratio, and perfusion intensity) and four molecular markers were mapped into a low-dimensional Hilbert space using quantum amplitude encoding. A parameterized quantum circuit utilizing entangling layers (CNOT gates) was implemented to capture complex, non-local feature interactions simultaneously. The architecture was evaluated on a simulated retrospective cohort of fifty patients (N=50), computationally derived using open-access anonymized neuro-oncology repositories (The Cancer Imaging Archive / TCGA-GBM database), to mirror local clinical constraints.

Results: While standard classical models (multi-layer perceptrons and random forests) failed to generalize due to severe overfitting on the small training sample, the HQCNN pipeline demonstrated robust convergence. The quantum-enhanced model achieved an evaluation area under the receiver operating characteristic curve (AUC-ROC) of 0.94 in classifying 1-year survival rates and potential chemotherapy resistance.

Conclusion: This framework demonstrates that shifting the clinical focus from massive data accumulation to quantum-inspired algorithmic efficiency offers a scalable, low-cost path to personalized neuro-oncological care. By deploying such models via cloud-based quantum networks, local institutions across Pakistan can leverage existing, small-scale patient volumes to generate accurate, personalized treatment pathways.

Keywords: (Glioblastoma Prognosis ,Quantum Machine Learning ,Data Scarcity In Resource Constrained Settings)
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ABSTRACT NO:25
RESEARCH ARTICLE

Urban–Rural Disparities in Malignant Brain Tumour Mortality in the United States, 1999–2020: A CDC WONDER Join point Analysis with Relevance to Neurosurgical Access in Pakistan

Muhammad Barakat [1], Hadi Ftouni [2], Maryam Ali Ahmed [3], Ruham Fatima [4], Madona Akhobadze [5]

Abstract

Objective: Outcomes for malignant brain tumours depend on timely access to neurosurgery and specialized oncology, which are concentrated in urban centers. Whether mortality differs along the urban–rural gradient is rarely quantified at population scale. Pakistan, where neurosurgical capacity is heavily urban and national surveillance is absent, lacks such data. We examined United States brain tumour mortality by urbanization, 1999–2020, as a transferable model.

Methods: Serial cross-sectional, ecological analysis was carried out on CDC WONDER with Underlying Cause of Death data (1999–2020, bridged-race) for decedents with ICD-10 C71.Age-adjusted mortality rates (AAMR; 2000 US standard) per 100,000 were computed across thesix-level 2013 NCHS urbanization classification, from Large Central Metro to Noncore(nonmetropolitan) on 29-June-2026. Join point regression (version 6.0.1) estimated APC and AAPC with 95% CIs,and pairwise tests of parallelism and coincidence compared trajectories. Reporting followed STROBE/RECORD.

Results: Across 1999–2020, 315,538 deaths were recorded. Mortality increased along the urban-to-rural gradient: in 1999 AAMR was lowest in Large Central Metro (4.34) and highest innonmetropolitan areas (Noncore 4.81; Micropolitan 4.80), a gradient that persisted to 2020(Large Central Metro 4.08; Noncore 4.71). Most strata showed a significant decline to themid-2000s then a plateau or modest rise (e.g. Large Central Metro: 1999–2006 APC −1.49%,2006–2020 +0.22%; AAPC −0.35%), while Medium Metro and Micropolitan areas stayed essentially flat (0 join points). Trajectories were largely parallel (13 of 15 pairwise comparisons failed to reject parallelism) but differed in level (coincidence rejected, $p<0.001$), so the urban–rural gap did not close.

Conclusion: US malignant brain tumour mortality followed a persistent urban-to-rural gradient from 1999 to 2020, where it was lowest in large metropolitan cores and highest in nonmetropolitan areas, with parallel trends that left the gap intact. As an ecological analysis, it cannot establish causation. This reproducible CDC WONDER Join point method offers a template for mapping neurosurgical-access disparities in settings such as Pakistan.

Keywords: CDC WONDER, Malignant brain tumours, Urban to Rural disparities.

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ABSTRACT NO:26
RESEARCH ARTICLE

Preoperative identity Threat and Illness Perception in Patients Undergoing Resection of Intracranial Tumours: A Multidimensional Cross-sectional Study Using Validated Psychometric Instruments.

Haseeb Mehmood Qadri [1], Fajar Saqib [2], Waleed Qasim Bashir [3], Faiqa Ijaz Khan [4], Asif Bashir [5]

Abstract

Objective: Patients awaiting intracranial tumour resection frequently experience substantial psychological distress that may influence treatment-related decision-making. Although illness perception and psychological distress have been investigated but evidence regarding their association with preoperative decisional conflict remains limited. We aimed to evaluate preoperative illness perception, psychological distress, perceived social support, and decisional conflict in patients undergoing intracranial tumour resection, and to determine the associations between them using validated psychometric instruments.

Methods: The initial results of an on-going prospective cross-sectional analytical study being conducted at the Department of Neurosurgery, Unit-1 at Punjab Institute of Neurosciences, Lahore from May to June 2026 are presented. Radiologically confirmed patients, scheduled for elective craniotomy for intracranial tumours with age >18 years were recruited. Informed consent was obtained and in-person interviews using validated psychometric instruments were conducted along with a standardized clinical and demographic data sheet. Descriptive analysis was done using measures of central tendency. With an anticipated prevalence of 21.7%, calculated sample size was 262. As the results submitted in abstract were preliminary, the data collection is ongoing and we have recruited 45 patients till now.

Results: A total of 45 patients between the ages 18—73 years (mean age 44.13 ± 15.51 years,) with 37(82.2%) being married, were included. Participants demonstrated high psychological distress, with mean Hospital Anxiety and Depression Scale of 15.69 ± 2.56 and 14.60 ± 2.73, respectively. The adapted Decision Conflict Scale showed excellent internal consistency (Cronbach's $\alpha = 0.956$). Spearman's rank correlation was performed to analyze decisional conflict. Illness perception demonstrated a significant negative correlation with decisional conflict ($\rho = -0.443$, $p = 0.002$), indicating that stronger illness perceptions were associated with lower decisional conflict.

Perceived social support (MOS-SSS) demonstrated a weak negative and non-significant relationship with decision conflict (Spearman's $\rho = -0.065$, $p = .673$). When anxiety and depression symptoms were combined into a total HADS score, no significant association was found with decision conflict (Spearman's $\rho = -0.155$, $p = .310$)

Conclusion: Among patients undergoing intracranial tumour resection, stronger illness perception was associated with lower preoperative decisional conflict. However, anxiety, depression, perceived social support were not significantly related to decisional conflict.

Keywords: (Intracranial tumours; Illness Perception; Decisional conflict)
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ABSTRACT NO:27
RESEARCH ARTICLE

Clinical Pattern And Surgical Outcomes Of Meningioma

Hamid Akbar Shaik[1], Abdul Razzaque Mari[2], Sajid Ali Bhatti[3], Muhammad Ali Jamali[4], Muzamil Dilber[5], Muzafar Bhand[6], Naimat Ullah Shar[7], Azhar Khoso[8]

Abstract

Objective: To determine the clinical pattern and surgical outcomes of patients with meningioma.

Methods: A retrospective observational study was conducted among 51 patients in the Department of Neurosurgery, People's University of Medical and Health Sciences, Nawabshah. Data were retrospectively collected of the period June 1, 2024, to May 31, 2025 by the authors from 16 July 2025 to 15th September 2025. Patients of all ages and both sexes diagnosed with meningioma and scheduled for surgery were included. Patients with a history of previous meningioma surgery or recurrent tumours were excluded. The minimum sample size was calculated as 50 using a 95% confidence level, an expected proportion of 20%, and a margin of error of 11%; 51 patients were included in the study. Ethical approval was obtained from the Institutional Review Board (IRB No. PUMHS/SBA/DME/543) on 15/07/2025.

Results: The study included 51 patients, comprising 37 (72.5%) females and 14 (27.5%) males, with a mean age of 44.5 ± 16.53 years (range, 30–70 years). According to the reported Simpson grading, 17 (33.3%) patients underwent grade 0 resection, 6 (11.8%) grade 1, 19 (37.3%) grade 2, 8 (15.7%) grade 3, and 1 (2.0%) grade 4 resection. At 10-month follow-up, 39 (76.5%) patients had good surgical outcomes. Postoperative wound infection occurred in 5 (9.8%) patients. Thirty-seven (72.5%) patients had no postoperative neurological deficit, while 7 (13.7%) developed a neurological deficit. Seven (13.7%) patients were lost to follow-up. Thirteen (25.5%) patients who initially presented with weakness showed improvement over time.

Conclusion: Most patients with meningioma had favourable surgical outcomes following resection. Postoperative wound infection and new neurological deficits occurred in a minority of patients. Careful surgical planning and appropriate postoperative management remain important for optimizing outcomes.

Keywords: Meningioma; Surgical outcome; Gross total resection

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ABSTRACT NO:28
META-ANALYSIS

Survival Impact of Supramarginal Resection According to MGMT Promoter Methylation Status in Glioblastoma: A Systematic Review and Meta-analysis

Simon John[1], Tehniat Khaliq[2], Jahan Khan[3]

Abstract

Objective: To evaluate the association between supramarginal resection (SMR) and survival in IDH-wildtype glioblastoma and determine whether MGMT promoter methylation status modifies this association.

Methods: A PROSPERO-registered (CRD420261417230) systematic review and meta-analysis was conducted in accordance with PRISMA 2020. PubMed/MEDLINE, Embase, Web of Science, Cochrane Library, and ClinicalTrials.gov were searched through January 2025. Studies comparing SMR with conventional resection in predominantly IDH-wildtype glioblastoma reporting survival outcomes by MGMT status were included. Random-effects meta-analysis pooled hazard ratios (HRs) for overall survival (OS) and progression-free survival (PFS). Risk of bias was assessed using the Newcastle–Ottawa Scale and RoB2.

Results: Fifteen studies (34,006 patients) met the inclusion criteria, and 13 studies (32,780 patients) were meta-analyzed. SMR was associated with improved OS (HR 0.62, 95% CI 0.54–0.71) and PFS (HR 0.63, 95% CI 0.51–0.78). Improved OS was observed in both MGMT-methylated (HR 0.52, 95% CI 0.40–0.67) and MGMT-unmethylated tumours (HR 0.71, 95% CI 0.60–0.85), with no significant interaction by MGMT status (p=0.09). Most included studies were observational.

Conclusion: SMR was associated with improved survival irrespective of MGMT promoter methylation status. However, the evidence is predominantly observational and susceptible to confounding. Randomized controlled trials are required before SMR can be recommended as routine surgical practice.

Keywords: (Glioblastoma; Supramarginal resection; MGMT promoter methylation)
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ABSTRACT NO:29
META-ANALYSIS

Comparative Analysis of Prognostic Scoring Systems for Survival Prediction in Patients Undergoing Surgery for Spinal Metastases: A GRADE-approached Systematic Review and Meta-Analysis

Kanchan Chaudhary[1], Mohammad A Zaied[2], Abdallah Shawwa[3], Hamza Ahabbane[4], Mira alnaser Khashman[5], Moath Naser[6]

Abstract

Objective: Accurate estimation of survival is fundamental to guiding surgical decision-making in patients with spinal metastases. Several prognostic scoring systems have been developed, yet their relative accuracy remains uncertain. This review aimed to compare the discriminatory performance of six widely used models, Revised Tokuhashi, Tomita, Modified Bauer, Skeletal Oncology Research Group (SORG) Machine Learning, SORG Classic, and SORG Nomogram, in predicting postoperative survival.

Methods: This review adhered to the PRISMA 2020 guidelines and was prospectively registered with PROSPERO (CRD420251056914). PubMed, Scopus, and Web of Science were systematically searched to identify studies from 2014 until July/2025 and researched on 26th/January/2026, involving adults with spinal metastases treated surgically that reported time-specific AUROC or concordance index (C-index) for at least two of the aforementioned prognostic models. Data extraction and quality assessment were independently performed using the QUADS-2 tool. Random-effects meta-analyses (REML) of logit-transformed AUROCs were conducted at 3, 6, and 12 months intervals.

Results: Seventeen studies encompassing 4465 patients published between 2014 and 2025 were included. Tomita, Revised Tokuhashi, Modified Bauer scores demonstrated moderate discriminatory performance (pooled AUROC 0.60–0.69) across all time intervals, while the SORG Nomogram achieved the highest pooled performance with AUROC values of 0.72 (95% CI, 0.68–0.76) at 3 months and 0.73 (95% CI, 0.68–0.79) at 12 months while high heterogeneity (I^2 = 52–96%) indicated variable performance across studies.

Conclusion: As prognostic models exhibit only moderate accuracy in survival prediction, with the SORG Nomogram performing best. Integration of such models within multidisciplinary frameworks like LMNOP may improve individualized surgical planning and optimize patient outcomes with metastatic spine disease.

Keywords: Spine metastases, Surgery, Survival Predication, AUROC.

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ABSTRACT NO:30
NARRATIVE REVIEW

Childhood and Adolescent Central Nervous System Tumour Mortality in the United States, 1999– 2024: A CDC WONDER Joinpoint Analysis and Surveillance Model for Pakistan

Muhammad Ahmad Barakat[1], Hadi Flouni[2], Reena Bai[3], Fatima Hazimeh[4], Prem Chand[5]

Abstract

Objective: Central nervous system (CNS) tumours are the leading cause of cancer-related mortality among children and adolescents worldwide, surpassing leukaemia. Pakistan has a predominantly young population but lacks a national cancer mortality registry. This study aimed to characterize temporal trends and sex disparites in childhood and adolescent CNS tumour mortality in the United States and propose a reproducible surveillance model applicable to registry-lacking settings such as Pakistan.

Methods: A retrospective population-based ecological ti me-trend study was conducted using CDC WONDER mortality data for individuals aged 0–19 years from 1999 to 2024, including race-bridged files (1999– 2020) and single-race files (2021–2024). Crude mortality rates per 100,000 population were analyzed by sex using Joinpoint regression. Annual Percent Change (APC), Average Annual Percent Change (AAPC), and 95% confidence intervals were calculated. Tests of parallelism and coincidence assessed sex-specific trend differences. Reporting followed the STROBE guideline.

Results: A total of 13,901 CNS tumour-related deaths were identified, including 7,547 males and 6,354 females. Overall mortality declined from 0.68 to 0.63 per 100,000, demonstrating a single- segment trend without joinpoints (AAPC −0.31%; 95% CI −0.61 to −0.01; p=0.044). No significant sex-specific differences in temporal decline were observed (female AAPC −0.25%; male AAPC −0.32%). Mortality trends were parallel (p=0.82); however, male mortality remained consistently higher than female mortality throughout the study (coincidence p=0.0002), with an overall period rate ratio of 1.13 (0.69 vs. 0.61 per 100,000).

Conclusion: Childhood and adolescent CNS tumour mortality in the United States demonstrated a modest but significant decline between 1999 and 2024, while maintaining a persistent male predominance. This population-based analysis provides an evidence-based framework for monitoring paediatric neuro-oncology outcomes and offers a scalable surveillance model for countries without national cancer mortality registries, including Pakistan.

Keywords: Central nervous system tumours; Pediatric oncology; CDC WONDER

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ABSTRACT NO:31
SCOPING REVIEW

Real-World Barriers to Molecular Biomarker Testing in Neuro-Oncology Clinical Trials in Resource-Limited Settings: A Scoping Review

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Abstract

Objective: Molecular biomarkers are crucial for the diagnosis, prognosis, and enrollment in biomarker-driven neuro-oncology clinical trials, but their inequitable availability in low- and middle-income countries (LMICs) hinders uptake of the 2021 WHO Classification of CNS tumours. This scoping review reports an analysis of existing evidence concerning challenges to molecular biomarker testing within the context of neuro-oncology clinical trial recruitment in resource-limited settings.

Methods: An Arksey and O'Malley-based scoping review was conducted from May to July 2026 across PubMed, Scopus, and Web of Science (January 2021–April 2026). This review included articles on molecular diagnostic infrastructure, biomarker testing, clinical trial enrollment, and the management of neuro-oncologic patients in resource-restricted settings.

Results: Seventeen studies met the inclusion criteria. Restricted access to next-generation sequencing (NGS), DNA methylation profiling, and fluorescence in situ hybridization (FISH) preclude WHO CNS5-compliant diagnoses, thus often resulting in "not otherwise specified" (NOS) and less eligibility to access molecularly stratified trials. Of the 223 LMIC clinicians surveyed, lack of investigator-initiated funding and personal time allocation were the key systemic barriers. Diagnostic delay, limited neuropathology skills, and non-standardized biomarker reporting hindered clinical trial enrollment. Emerging liquid biopsy technologies including CSF cell-free DNA, showed high rate (82.5% of glioma cases) in ctDNA detection, however was restricted due to invasiveness and costs for sequencing. Collaborative capacity-building, virtual molecular tumour boards and modified consensus guidelines, all appear to be effective and evidence-based solutions.

Conclusion: Biomarker testing facility gaps constitute a major, modifiable obstacle to LMIC participation in neuro-oncology trials. Implementing a collaborative and structured approach to investment in diagnostics, standardized reporting, and international collaboration is essential for LMIC engagement with trials. Future trial designs should incorporate multi-tiered approaches to biomarkers reflecting available laboratory capacity in different locations.

Keywords: Neuro-oncology; Molecular biomarker testing; Resource-limited setting

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ABSTRACT NO:32
NARRATIVE REVIEW

Glymphatic dysfunction following traumatic brain injury: Mechanism of waste clearance and Emerging therapeutic targets.

Rameen Suhail[1] , Tooba Imran[2], Zainab Mehtab[3], Nimra Shabeer[4]

Abstract

Objective: Traumatic brain injury (TBI) affects millions annually, contributing to mortality and neurological deficits. The glymphatic system, the brain's perivascular waste-clearance network, has been implicated in injury mechanisms following TBI. This narrative review expands current evidence on the mechanisms of glymphatic dysfunction, imaging biomarkers and therapeutic targets.

Method: We conducted a literature search in PubMed to screen relevant studies on glymphatic dysfunction following TBI. Of 114 initially identified articles, 45 met the inclusion criteria. Following the exclusion of 13 articles due to unavailable full text, a total of 32 articles were included in the final review.

Result: The reviewed literature demonstrated that TBI leads to glymphatic dysfunction, which may be associated with complications such as oedema, neuroinflammation and persistent neurological deficits.

Initial studies established the glymphatic system's role in the clearance of exogenous molecules, however, recent evidence has expanded this role to clearance of endogenous proteins and TBI-associated biomarkers including GFAP, NfL, tau and amyloid-β.

TBI-induced alterations in AQP4 polarization were associated with impaired clearance of excess fluid and neurotoxic metabolites. Emerging evidence suggests its role in astroglial migration and identifies it as a potential therapeutic target; experimental omega-3 supplementation shows potential in partially restoring AQP4 polarity.

Poor sleep quality was linked with an enlarged perivascular space (ePVS) burden in patients with mTBI, as the system shows marked efficiency during sleep.

Promising non-invasive methods include advanced MRI techniques, such as intrathecal (IT) contrast-enhanced MRI and DTI-ALPS.

Therapeutic strategies targetting adrenergic regulation, cerebral oedema, and sleep may be beneficial in enhancing glymphatic function.

Conclusion: Our review highlights the disruption of glymphatic function as part of TBI pathophysiology and focusses on diagnostic tools and emerging treatment modalities. Further human studies are required, as most evidence comes from murine models. Moreover, studies are needed to assess therapeutic interventions involving hypothermia and aquaporin-4 on TBI-induced glymphatic dysfunction.

Keywords: Glymphatic dysfunction; traumatic brain injury; waste clearance.

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ABSTRACT NO:33
CASE REPORT

Paediatric Scalp Squamous Cell Carcinoma With Suspected Intracranial Extension Mimicking Cerebral Abscesses in a Patient With Xeroderma Pigmentosum: A Case Report and Literature Review Abstract

Marya Hameed[1], Kainat Sohail[2], Iqra Memon[3]

Abstract

Objective: Squamous Cell Carcinoma (SCC) is among the most frequently reported malignancies in XP; however, intracranial extension is exceedingly rare and may pose a significant diagnostic challenge when radiologic findings mimic those of cerebral abscess.

Methods: The case of a 7-year-old male child with XP who developed an ulcerative lesion on the scalp and underwent surgical excision is reported. Xeroderma Pigmentosum (XP) is a rare autosomal recessive genodermatosis characterized by extreme sensitivity to ultraviolet radiation and an increased predisposition to cutaneous malignancies.

Result: The excised tissue from the Histopathology confirmed moderately differentiated SCC with lymphovascular invasion and involvement of the deep margins. He subsequently presented with fever, vomiting, and seizures at National Institute of Child Health (NICH), Karachi, on 3rd March 2026. Contrast-Enhanced Computed Tomography (CECT) revealed bone destruction with an overlying mass and multiloculated intracranial lesions with a "bunch of grapes" appearance. The differential diagnosis included cerebral abscess and tumour extension. The family declined further evaluation and treatment, and the patient Left Against Medical Advice (LAMA). The patient deteriorated clinically and subsequently died as informed by his parents

Conclusion: XP-associated scalp SCC may behave aggressively and extend intracranially, even in children. In patients with a history of malignancy, intracranial lesions with an apparent infectious appearance should prompt careful consideration of tumour extension in the differential diagnosis. Recognition of suspicious neuroimaging features, careful radiologic-pathologic correlation, early multidisciplinary evaluation, and timely management are essential to optimize outcomes.The parents consented to publish the child's report in detail.

Keywords: (Xeroderma pigmentosum, Scalp squamous cell carcinoma, Intracranial extension,)

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ABSTRACT NO:34
CASE REPORT

En Bloc Resection of a Giant Sacrococcygeal Chordoma Presenting with Urinary Bladder Distension to the L4 Level: A Case Report

Simon John [1], Tehniat Khaliq [2], Ghulam Brohi [3], Jahan Khan [4], Izhan Masood [5], Maryam Ilyas [6]

Abstract

Objective: To report a previously undescribed sacrococcygeal chordoma presentation with massive bladder distension to L4 from mechanical outlet obstruction, managed with nerve-sparing en bloc resection.

Methods: A 54-year-old male presented on 10th June 2025 at JPMC, Karachi, with 5 months of progressive urinary retention and back pain. MRI, ultrasound KUB, and image-guided biopsy with immunohistochemistry were performed. Multidisciplinary planning preceded posterior en bloc sacral resection with S2–S3 osteotomy under continuous neuromonitoring, preserving bilateral S1–S2 nerve roots. Written informed consent was obtained from the patient for publication of his case.

Results: MRI showed a 6.3×8.0×7.1 cm S3–S5 mass with bladder distension to L4. Biopsy confirmed brachyury-positive chordoma. Blood loss was 1,800 mL; operative time 310 minutes. Histopathology confirmed R0 resection. Voiding was restored (residual <50 mL) with preserved bowel and limb function. One-year follow-up showed no recurrence.

Conclusion: This is the first reported sacrococcygeal chordoma with L4-level bladder distension from mechanical obstruction. Nerve-sparing en bloc R0 resection achieved full functional recovery, highlighting multidisciplinary planning and intraoperative neuromonitoring.

Keywords: (Sacrococcygeal chordoma, urinary retention, en bloc resection)

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ABSTRACT NO:35
CASE REPORT

Beyond the brain and barrier: high-grade astrocytoma with distant metastases in a young patient — a rare presentation

Muneer Ahmed[1] , Muhammad Irtiza Irshad[2] , Adeeba Zaki[3] , Aisha Hassan Memon[4] , Tamana Asghari[5]

Abstract

Objective: High-grade astrocytic gliomas rarely spread outside the central nervous system, held back by the blood–brain barrier, the absence of CNS lymphatics, and short survival. We describe a young adult who developed osseous and hepatic metastases from an IDH-wildtype grade 4 astrocytic glioma.

Method: A 26-year-old man had maximal safe resection on 17 April 2025 (diffuse astrocytoma, NOS, CNS WHO grade 4, IDH-wildtype), at the Aga Khan University Hospital, Karachi, Pakistan. This was followed by chemoradiotherapy that finished on 16 July 2025, maintenance temozolomide, and later bevacizumab with irinotecan. On 28 May 2026 he reported new pain; whole-spine MRI found osseous metastases through the spine and pelvis and hepatic deposits, without leptomeningeal disease, and FDG PET/CT on 2 June 2026 showed these lesions were hypermetabolic. A liver biopsy was performed.

Consent of the patient was obtained for publishing his case.

Results: The liver biopsy results showed a rhabdoid high-grade tumour whose profile matched the primary (GFAP positive, IDH1 negative, p53-mutant).

Conclusion: Immunophenotyping separates true metastasis from a second cancer.

Keywords: Glioblastoma; extracranial metastasis; IDH-wildtype astrocytoma

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ABSTRACT NO:36
CASE REPORT

Carboplatin and Etoposide as Effective Fourth-Line Treatment in a patient with Recurrent Oligodendroglioma Complicated by Therapy-Related Acute Myeloid Leukaemia

Alyna Hafeez[1], Nabiha Saeed[2], Yasmin Abdul Rashid[3], Adeeba Zaki[4]

Abstract

Objective: A case of recurrent anaplastic oligodendroglioma treated with carboplatin and etoposide as fourth-line chemotherapy is presented. The efficacy of carboplatin and etoposide is highlighted as a salvage regimen and the risk of therapy-related acute myeloid leukaemia (t-AML) as a long-term complication of prolonged alkylating agent exposure.

Methods: The case report is of a 44-year-old female who initially presented in 2020 with seizures and headache. Imaging revealed a frontal lobe lesion, for which she underwent craniotomy with resection; histopathology confirmed anaplastic oligodendroglioma. Following residual disease on post-operative imaging, she received concurrent chemoradiotherapy (CCRT) with temozolomide (TMZ), followed by maintenance TMZ. On disease progression, she was sequentially treated with three further lines of therapy: bevacizumab/irinotecan, then PCV (procarbazine, lomustine, vincristine), and subsequently carboplatin and etoposide, initiated in April 2022 as fourth-line therapy, continued for a total of 40 cycles. Clinical and radiological response, as well as treatment-related toxicity, were assessed throughout the course of therapy.

Results: The patient achieved an excellent response to fourth-line carboplatin and etoposide, with a survival benefit of approximately 40 months on this regimen. Despite this favourable disease control, she subsequently developed therapy-related acute myeloid leukaemia (t-AML), a rare but recognized complication of prolonged alkylating agent exposure, and ultimately succumbed to this secondary malignancy.

Conclusion: Carboplatin and etoposide may be considered a viable salvage treatment option for heavily pretreated patients with recurrent oligodendroglioma who have progressed through multiple prior lines of therapy, offering meaningful survival benefit even in the fourth-line setting. However, this case underscores the importance of vigilant long-term monitoring for serious late toxicities, particularly Acute Myeloid Leukaemia.

Keywords: Oligodendroglioma; Recurrent glioma; Therapy-related acute myeloid leukaemia

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ABSTRACT NO:37
CASE SERIES

Intracranial Metastasis From Medullary Thyroid Carcinoma Mimicking As Invasive Meningioma: A Case Series

Badar Uddin Ujjan [1], Asma Batool Zaidi [2], Salman Ahmed Niaz Mangrio [3], Raazia Ramzan [4], Aijaz Ali [5]

Abstract

Objective: To describe the clinical presentation, radiological findings, and surgical management of intracranial metastasis from medullary thyroid carcinoma, an exceedingly rare occurrence not previously reported in Pakistan.

Method: This case series describes three patients who presented to the neurosurgery outpatient clinic at Dow University Hospital, Karachi, in November 2024, June 2025, and January 2026 respectively, with scalp swellings and persistent headaches unresponsive to analgesics. Two patients also had seizures. Contrast-enhanced MRI in each case demonstrated an enhancing lesion extending from the intracranial compartment through the skull into the scalp, initially raising suspicion of an aggressive or invasive meningioma. All three underwent craniectomy with gross excision of the lesion, duraplasty, and cranioplasty, with tissue sent for histopathological analysis.

Results: Histopathology in all three cases confirmed metastatic medullary thyroid carcinoma rather than meningioma. Postoperative recovery was uneventful, with resolution of headaches and seizures. On follow-up, patients remained clinically stable with no recurrence of symptoms.

Conclusion: Medullary thyroid carcinoma can metastasize to the brain and mimic primary CNS tumours such as meningioma on imaging, despite this being rare. A high index of suspicion and thorough metastatic workup are warranted whenever an intracranial lesion is encountered, and whole-body screening should be considered whenever a primary malignancy is identified, regardless of how uncommon its metastatic spread may be.

Keywords: Medullary thyroid carcinoma, meningioma, intracranial metastasis, case series

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