

Imaging Timeline Pre and Post Glioblastoma Multiforme (GBM) ResectionMuhammad Ahmed¹, Ceemal Khan², Saad Akhtar Khan³

The Editor, Glioblastoma multiforme (GBM) is one of the most aggressive primary brain tumour, with a median overall survival being 12–15 months despite multimodal treatment.¹ Timely and appropriate imaging ensures extent of tumour, extent of tumour removal, need for adjuvant therapy all of which are of paramount importance in dictating clinical approach and ultimately clinical outcomes.² MRI performed within 48 hours after surgery is considered as the gold standard for identifying residual tumour while minimising the confounding influence of postsurgical changes and contrast leakage.³

Van der Hoorn et al., in their study, demonstrated that postoperative MRI not performed within 48 hours in patients with GBM reduces the sensitivity and accuracy of detecting residual tumour.³ However, it is challenging to execute in many low- and middle-income countries (LMICs), where structural and systemic limitations prevent timely imaging. In many LMIC settings, MRI scanners are not readily available in public and private hospitals and if they are available, yet there are long waiting times and also cause significant financial strain on patient's end.

According to Dewan et al., There is a major global disparity in access to neurosurgical and radiological services with more than 5 million essential neurosurgical operations going unperformed each year, with the greatest gaps are found to be in South Asia and sub-Saharan Africa.⁴ In LMICs, there is a shortage of skilled radiologists, poor maintenance of equipment, and prolonged MRI wait times even for urgent cases.

A recent multi-centre cohort study by Loughrey et al. also highlighted that scheduled MRI follow up is instrumental in detecting early recurrence.⁵ Patients having regular postoperative scans were more likely to receive timely salvage therapies, which improve patient outcomes and overall survival. This is often not feasible in LMICs due to financial constraints and logistical challenges.

Novel technological advancement like artificial intelligence

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(AI)-driven tumour segmentation and cloud-based diagnostic platforms are showing great promise in high-income countries, their implementation in LMICs is a real challenge. These technologies typically rely on high-speed internet connections, advanced computers with high processing power, and datasets curated to local population resources that are limited in LMICs.

We propose a multidimensional holistic strategy, including policymakers and healthcare administrators, regional referral and collaborations between regional and international partners facilitating knowledge exchange. Furthermore, subsidising imaging costs and developing LMIC-specific protocols for imaging timing and frequency are essential for sustainability.

To sum it up, Clinical guidelines show the importance of early postoperative MRI and follow up imaging for GBM. Implementation of such protocols remains a challenge for healthcare administrators and policymakers across the globe. To improve GBM outcomes in LMICs, it is crucial to bridge this gap.

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References

1. Thakkar JP, Dolecek TA, Horbinski C, Ostrom QT, Lightner DD, Barnholtz-Sloan JS, et al. Epidemiologic and molecular prognostic review of glioblastoma. *Cancer Epidemiol Biomarkers Prev* 2014;23:1985-96. doi: 10.1158/1055-9965.EPI-14-0275.
2. Lescher S, Schniewindt S, Jurcoane A, Senft C, Hattingen E. Time window for postoperative reactive enhancement after resection of brain tumors: less than 72 hours. *Neurosurg Focus* 2014;37:E3. doi: 10.3171/2014.9.FOCUS14479.
3. Rykkje AM, Larsen VA, Skjøth-Rasmussen J, Nielsen MB, Carlsen JF, Hansen AE. Timing of Early Postoperative MRI following Primary Glioblastoma Surgery-A Retrospective Study of Contrast Enhancements in 311 Patients. *Diagnostics (Basel)* 2023;13:795. doi: 10.3390/diagnostics13040795.
4. Dewan MC, Rattani A, Fieggen G, Arraez MA, Servadei F, Boop FA, et al. Global neurosurgery: the current capacity and deficit in the provision of essential neurosurgical care. Executive Summary of the Global Neurosurgery Initiative at the Program in Global Surgery and Social Change. *J Neurosurg* 2018;130:1055-64. doi: 10.3171/2017.11.JNS171500.
5. Loughrey C, Zhang J, Lane H, O'Halloran PJ, McKenna G, McInerney N, et al. MRI surveillance and survival outcomes in glioblastoma patients: results from the UK and Ireland multi-center cohort. *Neurooncol Pract.* 2024;11:70-80.

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