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Letter to the Editor

Adaptive driving after brain surgery: The hidden costs of neurological disability

Proprioceptive deficits are a recognized consequence of parietal lobe lesions, yet their impact on a patient's daily autonomy—including the ability to drive—remains underrecognized in neuro-oncology care and survivorship.[1,2] After 4 craniotomies over 15 years for recurrent grade 2 astrocytoma, I recently experienced what happens when the medical system clears one to return to life but not to the road (Table 1).[3]

After my most recent surgery, my biggest challenge wasn't in the clinic: it was in the garage. When I was told it was safe to return to the wheel, I was surprised to find my right foot didn't land where I expected. After several near misses, I was forced to admit something was seriously wrong: I could no longer navigate the space between the gas and brake pedal in my car. And despite needing a car to get to school, run errands, and maintain a social life, I voluntarily pulled myself off the road.

My neuro-oncologist still deemed me cognitively fit to drive, and reporting requirements to the Department of Motor Vehicles were unnecessary because I was not experiencing seizure activity. I was referred to an oncology social worker who suggested I seek the services of a driver rehabilitation specialist. In the United States, there are approximately 350 such specialists, but neither evaluations nor equipment are covered by insurance.

My adaptive driving process became something of an adventure. After waiting months for my first evaluation by the only certified driver rehabilitation specialist in my city, I learned my proprioceptive losses extended beyond my foot onto my right hand and arm, thus making it difficult to grip a steering wheel. Working with the rehab specialist, I was prescribed a custom setup in which my left hand controlled the gas and brake, while my right hand, fitted with a pocket grip, could help steer. After months spent practicing in my instructor's vehicle, I was then tasked with conducting a competitive bid among 3 equipment installers to retrofit my own car. The whole process took 14 months and cost $10 800 out of pocket.

The first time I drove to the post office I celebrated in the parking lot. It wasn't about the destination; it was about the act. I got back on the road, but it came at a steep financial cost. It made me think about the thousands who cannot afford the process.

Brain tumors are among the most expensive diagnoses in all of healthcare, with financial toxicity extending well beyond direct medical care.[4–7] Yet insurance and safety nets stop at the clinic door. Adaptive driving evaluations and equipment, despite being essential for independence, are rarely covered. Where I live in California, limited funding for driving accommodations exists through the Department of Rehabilitation, but eligibility is restricted to people actively seeking employment. Patients who are already employed, retired, caregiving, or enrolled in school are typically excluded from benefits.

This gap has safety implications. Patients who lack access to adaptive driving resources may continue driving despite impairment—to keep jobs, care for kids, get to treatment—risking their safety and others'. Legally, driving is a privilege and not a right, but its loss feels like a penalty for being sick and disabled.

Table 1. Case context: author's neuro-oncologic history

Tumor type	Diffuse astrocytoma, grade 2 with gemistocytic features
Location	Left parietal lobe
Age (age at diagnosis)	46 (29)
Handedness	Ambidextrous (writes with left hand, but does most other tasks with right hand)
Treatment history	• July 25, 2008: Presented with generalized seizure. Imaging revealed left parietal mass. • September 17, 2008: Resection of left parietal mass. Pathology: grade 2 astrocytoma with gemistocytic features. • February 06, 2009: Further resection of left parietal mass with new enhancement. Pathology: recurrent grade 2 astrocytoma with gemistocytic features. • February 2009-April 2011: 24 cycles of adjuvant temozolomide (TMZ), followed. • October 20, 2021: Repeat operation for gross total resection of gradual non-enhancing tumor progression. Pathology: grade 2 astrocytoma; UCSF500 with only IDH1-mutant, ATRX and TP53 mutations; followed. • May 17, 2022: Repeat operation relatively rapid regrowth of faintly enhancing lesion. Pathology still grade 2 astrocytoma. • June 15-July 28, 2022 Radiation therapy (RT). • August 26, 2022-February 2023: Adjuvant temozolomide (TMZ) × 6 cycles, then followed.

Source: Adapted from the author's medical record.

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Not all individuals with brain tumors will wish to pursue adaptive driving. However, for patients with non-progressive deficits and prolonged disease stability (similar to survivors of stroke or traumatic brain injury) referral to driving assessment and rehabilitation should be considered a reasonable option, not an exception. Neuro-oncology clinics could offer support by understanding patients' and family workflows for driver rehabilitation and include details in survivorship plans.[8] This includes educating patients about the functional impact of neurological deficits, understanding local licensing requirements, and establishing referrals to rehabilitation specialists with expertise in neurological disability. Depending on country-specific regulations and tumor location, neuro-oncology clinicians should discuss the potential for driving restrictions related to neurological deficits. These discussions should occur before and after surgery and be revisited over time.

For a long time I didn't see myself as disabled. Even with a brain tumor I saw myself as a person who would eventually "get better." We need a system that supports patients long after the last scan or surgery by recognizing the full arc of brain tumor survivorship.

Just as we don't question a cancer patient's right to chemotherapy or a stroke survivor's access to physical therapy, we should not treat driver rehabilitation as an elective luxury for those with stable brain tumors. For many, it is an essential bridge to employment, caregiving, and participation in daily life.

I don't know if there will be a fifth brain surgery, but if there is, I'll be ready. Getting back on the road isn't just about driving. It's about reclaiming my life.

Keywords

driver rehabilitation | financial toxicity | left parietal lobe | proprioception | survivorship

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References

1. Ruis C, Smits A, Robe P, Dijkerman C, van Zandvoort M. "I had lost the sense of direction on my left body part", proprioception and awake brain surgery: a case report. *Cortex*. 2019;121:482-484. https://doi.org/10.1016/j.cortex.2019.07.001
2. Mandonnet E, Margulies D, Stengel C, et al. "I do not feel my hand where I see it": causal mapping of visuo-proprioceptive integration network in a surgical glioma patient. *Acta Neurochir*. 2020;162:1949-1955. https://doi.org/10.1007/s00701-020-04399-2
3. Salmi L. Deciding on my dimples. *N Engl J Med*. 2022;387:2110-2111. https://doi.org/10.1056/nejmp2210638
4. Patel MP, Affronti ML, Buckley ED, et al. Financial toxicity of oral chemotherapy in patients with primary brain tumors. *Neurooncol Pract*. 2025;12:153-159. https://doi.org/10.1093/nop/npae073
5. Terrell D, Camarano J, Whipple S, Guthikonda B, Beyl R, Newman WC. Financial toxicity in patients with glioblastoma. *J Neurooncol*. 2025;171:75-83. https://doi.org/10.1007/s11060-024-04835-8
6. Koenig JL, Sandhu N, Sborov K, et al. Financial toxicity in patients with brain and spine metastases. *World Neurosurg*. 2021;151:e630-e651. https://doi.org/10.1016/j.wneu.2021.04.103
7. Haider SA, Asmaro K, Kalkanis SN, et al. The economic impact of glioma survivorship: the cost of care from a patient perspective. *Neurology*. 2020;95:E1575-E1581. https://doi.org/10.1212/WNL.0000000000010263
8. Leeper HE, Acquaye AA, Bell S, et al. Survivorship care planning in neuro-oncology. *Neurooncol Pract*. 2018;5:3-9. https://doi.org/10.1093/nop/npx034

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