

Ethical Dilemma in Glioma Surgery; How to Opt for the Holy Grail?

The prognosis of glioma has been improved and upgraded during the latter part of the last century, which can be attributed to the advances in pathological classification, microsurgical techniques, and further advances fostered in adjuvant therapies.^[1] Glioma and its surgical management have always remained as the Holy Grail for the neurosurgeons, worldwide. Thus, to opt for the best and optimal treatment, despite recent advances, has always been a subject of debate and controversy.

The authors truly implied that maximal resection and safety are the main goals of surgery which improve natural history of lesions and outcome. Frequent surgical resources are required to achieve such a coveted goal. It seems that well-equipped centers are more qualified to conduct such surgeries. However, the limitation of resources and its distribution challenges routine practice of glioma surgery. Moreover, experienced surgeons are mostly active in well-equipped centers, and other surgeons working in not so renowned centers face voluminous challenges.

It is always necessary to balance optimal management and treatment setup. Such an optimistic approach regarding maximal and safe resection requires advanced technical skills and seems really challenging in the eloquent area. One should consider resources, staff, medical condition of the patient, goal of treatment, appliances, and the quality of lesion (including grade and recurrence). The treatment modality should be chosen wisely suffice it to say that there is no short cut to experience, and wisdom comes with experience.

The optimal approach should be carefully tailored for every case, considering preoperative, intraoperative, and postoperative facilities coupled, of course, with the surgeon's experience. In tackling glioma cases, it is pertinent that the following questions are answered well in advance. Whether to perform awake craniotomy or not? Are there facilities for brain mapping and preoperative planning (functional Magnetic Resonance Imaging (fMRI), tractography, etc.)? Is optimal neuro-monitoring provided?

Moreover, a qualified neuro-anesthesiologist is necessary. Sometimes, the surgeon would switch from awake surgery to general anesthesia under the duress of circumstances in which case a close cooperation with the anesthetic team

becomes obligatory. Such situations would occur during resection of high-grade glioma. The anatomical knowledge of the surgeon is another variant. In the failure or absence of neuro-navigation system or after removal of large mass (especially, insular glioma), the surgeon should rely on the anatomical landmarks and knowledge, even in the presence of intraoperative magnetic resonance imaging (iMR).

According to the recent paper, about one-tenth of gliomas are treated at nonmetropolitan sites in the USA. Key differences exist among patient/glioma characteristics based on metropolitan status. Overall, metropolitan status appears to influence short-term mortality and long-term observed survival for gliomas.^[2] Moreover, the dilemma also exists in developing countries. However, lack of resources in underdeveloped and developing countries should not prevent suboptimal surgical planning in small and nonreferral centers, considering recent improvements in adjuvant therapy. The goal of maximal resection has been challenged in several database studies, including cases of oligodendroglioma as well as favorable genetic biomarkers. In these cases, extent of resection could be limited without significant change in outcome, which is mostly due to sensitivity to adjuvant therapies.

Neurosurgeons require expertise, wisdom, and resources to make optimal decisions in treatment planning of patients. Such a holistic approach would result in selection of correct surgical approach, leading the surgeon to correctly choose the Holy Grail.

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