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# Effect of Pre-Operative Antiepileptic Drugs on Post-Operative Seizure Incidence and Recovery in Brain Tumor Resections: Levetiracetam vs. Valproate

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## ABSTRACT

**Background:** Postoperative seizures resulting from brain tumor resections negatively impact patient recovery. Among currently widely used antiepileptic drugs (AEDs) for seizure prophylaxis, are Levetiracetam and Valproate, however there seem to be varied efficacy and safety profiles. This study contrasts the effectiveness of Levetiracetam to Valproate in reducing post operative seizures and evaluating their influence on cognitive recovery and liver function.

**Objective:** The aim is to compare postoperative seizure incidence between patients taking either Levetiracetam or Valproate preoperatively, and also to assess functional recovery through cognitive and neurologic endpoints as well as drug related side effects, particularly liver enzyme levels.

**Method:** This is a prospective, randomized, controlled trial of 100 brain tumor resection patients, who were randomly assigned to Levetiracetam, or Valproate groups. Seizure occurrence postoperatively was followed at 24 hours, 7 days, 1 month, and 3 months in these patients. The functional recovery was assessed using the modified Rankin Scale (mRS), and cognitive function was assessed using the Montreal Cognitive Assessment (MoCA). The serum liver enzyme levels are ALT, AST and GGT were monitored at specific intervals to see changes in liver function. T tests and chi square tests were used to compare between the two groups.

**Results:** Seizure incidence was lower consistently in the Levetiracetam group at all time points, but did not achieve statistical significance. MoCA indicated significant improvement in cognitive recovery in the Levetiracetamgroup at 24 h, 7 days, 1 and 3 months after surgery; ($p < 0.05$). Functional recovery scores (mRS) were not significantly different between the two groups. Nevertheless, liver enzyme values were significantly higher ($p < 0.05$) postoperatively in the Valproate group than that of Levetiracetam Group.

**Conclusion:** Levetiracetam did not result in significantly less (compared with Valproate) postoperative seizure incidence, however, it was associated with significantly better cognitive recovery and a safer liver function profile. For patients at risk of seizures for brain tumor resection, particularly those concerned about liver toxicity, levetiracetam may be a better choice.

**Keywords:** Levetiracetam , Valproate, Postoperative, significant

## INTRODUCTION

Management of the risk of postoperative seizures associated with brain tumor treatment is complex and may negatively impact recovery (Medikonda et al., 2020). Tumor resection in patients is concerned about seizure control because post-operative seizures are associated with poor outcome (Rudà et al., 2020). This is commonly utilised with antiepileptic drugs (AEDs) of which Levetiracetam and Valproate are the most used (Pathak et al, 2023). A recent study has compared their safety and efficacy and some find Levetiracetam to be better tolerated (Faghihjouibari et al., 2023). However, Valproate remains often used widely, especially in patients with behavioral complications (Gilliam et al., 2023). The hepatotoxicity observed with Valproate has been of concern (Ganesh et al., 2023). Studies like those of Watanabe et al (2022) point to Levetiracetam, especially in combination with sodium channel blockers, having better postoperative seizure control (Watanabe et al., 2022). In addition, results from several randomised trials need to be taken into account in assessing the long term effect of AED use in this patient group (Jenkinson et al. 2020). Finally, the AED to be selected should be personalized based on both efficacy and side effects in the individual (Rahman et al., 2022).