



# Prophylactic Anticonvulsants after Neurosurgery

Jens Peter Witt\*

Six prospective, controlled trials have examined the effects of antiepileptic drugs (AEDs) given to prevent the occurrence of seizures following neurosurgery. Some studies have concentrated on specific reasons for the neurosurgery (brain tumor) while others have included people with a variety of indications for surgery.

Phenytoin (PHT) has been studied most, but carbamazepine (CBZ) and phenobarbital (PB) have also been evaluated to some extent. Studies of people with traumatic brain injury (some of whom were operated on) provide some, but less direct, evidence of the prophylactic effects of AEDs after neurosurgery.

Despite considerable variation in reasons for the neurosurgery, AEDs given, and study design, the overall conclusions are remarkably consistent. The seizure risk is reduced about 40%–50% for the first week after neurosurgery in those given the older AEDs compared with those given placebo or no treatment.

After the first few weeks, none of the drugs has been proven to reduce the incidence of seizures and in most situations the best estimate is essentially no effect, but effects on the order of a 25%–50% reduction in late (epileptic) seizures cannot be ruled out.

The new generation of AEDs has not been tested as prophylactic agents after neurosurgery. Although there are no guidelines for prophylaxis following neurosurgery in general, these results are consistent with the guidelines of professional organizations for subsets of neurosurgery cases.

Those guidelines consider prophylaxis, especially using PHT, to be an option for the first week after surgery but that the routine use of prophylactic anticonvulsants after the first week is not warranted.

Craniotomies, especially supratentorial ones, are associated with a high risk of subsequent seizures. Depending on the reason for the surgery, about 20%–50% of patients have at least one seizure post-operatively. Several groups have evaluated whether prophylactic administration of antiepileptic drugs (AEDs) can

reduce this high seizure rate.

The strongest evidence comes from randomized clinical trials. Six prospective, controlled trials have been reported, two restricted to patients operated on for brain tumors and four including patients operated on for a variety of conditions.

Phenytoin (PHT) has been evaluated most extensively; carbamazepine (CBZ), valproate (VPA), and phenobarbital (PB) have also been tested.

Two of the studies considered only seizures occurring during the first week after surgery (early seizures, generally considered to be provoked), while the others considered both early and late seizures (after one week, generally considered to be unprovoked or epileptic seizures). Five of these studies have been included in meta-analyses.

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### Author Affiliation

Top

Division of Neurosurgery A, Department of neurology and Psychiatry, Sapienza University of Rome, Italy

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\*Corresponding author: Dr. Jens Peter Witt, MD, Department of Neurosurgery, University of Colorado, USA, Tel: +1 658 2546198; Fax: +1 249 2546198; E-mail: [wittjean.p@gmail.com](mailto:wittjean.p@gmail.com)

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