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EFFECTIVENESS OF ANTI-EPILEPTIC DRUGS IN PROPHYLAXIS OF POST TRAUMATIC EPILEPSY

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ABSTRACT: Effectiveness of anti-epileptic drugs in prophylaxis of post traumatic epilepsy. **AIM:** To determine the incidence of epileptic seizure after traumatic brain injury in case with or without antiepileptic prophylaxis and to determine the role of AEDs after 7 days of trauma. **METHODS:** This study represents a randomized case control study. The sample of patient. Considered was of adult patients >13yrs age of both sexes with severe brain injury admitted in Hamidia Hospital Bhopal. On admission a detailed history of any previous episode of seizure before trauma was taken. If prior seizures were present then patient was excluded from study. Every patient of head injury having brain injury or skull fracture was given a loading dose of anticonvulsants (phenytoin) of dose 20mg/kg body weight then continued anticonvulsants for coming 7 days in maintenance dose of 5mg/kg/day and then stopped. Patient & attendants are explained about the seizure. **RESULT:** Out of total 300 study eligible patients, 15 have late post traumatic seizure, all with GCS at the time of admission was <8. In this 15 cases, 9 were in group who were given antiepileptic drug prophylaxis & in rest of 6 patients antiepileptic drug prophylaxis was given for period of 7 days only after traumatic brain injury and then stopped. Maximum cases are seen in age group 20-29 yr and mostly are males. Of all 15 patients, 7 were operated & 8 were kept on conservative treatment, the non-operative patients as well as operated case had post traumatic seizure. **CONCLUSION:** On basis of our study analysis we conclude that continued phenytoin treatments cannot reduce the late post traumatic seizure but is effective in first week of significant traumatic brain injury.

KEYWORDS: Epilepsy, Head Injury, Trauma, GCS, PTSD, Ictal palsy, Aura, Hyponatremia, Hypernatremia.

INTRODUCTION: Post traumatic epilepsy is recurrent episodes of seizure occurring after 24 hours of brain injury, up to the 1st week of injury (early PTE) or after 1st week of injury (late PTE). The use of ANTI-EPILEPTICS to treat patients who have developed post-traumatic epilepsy is standard.⁽¹⁾ However, the important question of whether to use ANTI-EPILEPTICS prophylactically after TBI to prevent the development of post-traumatic seizures is unanswered. Seizures that occurs within 7 days of traumatic brain injury are defined as provoked and anti-epileptics effectively reduces risk of these but it is controversial whether antiepileptic drugs reduces risk of late post traumatic seizure <unprovoked seizure> or not.⁽²⁾ The development of seizures is both physically and psychologically debilitating, complicates acute management and subsequent rehabilitation, and contributes to the substantial cost associated with the care of the head-injury patient. However, the prophylactic use of ANTI-EPILEPTICS carries with it the risk of adverse effects that may be especially disabling in this population. There is substantial variability among clinicians in the practice of post-traumatic seizure prophylaxis. In this study we determined the effect of ANTI-EPILEPTICSs on traumatic brain injury pts.

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AIMS AND OBJECTIVE:

1. To determine the incidence of epileptic seizure after traumatic brain injury in case with or without antiepileptic prophylaxis.
2. To determine the role of ANTI-EPILEPTICS after 7 days of trauma.

MATERIAL AND METHOD: The present study was conducted in Dept of Surgery Hamidia Hospital Bhopal from July 2005 to July 2011 for 6 years duration. This study represents a randomized case control study. The diagnosis of post traumatic epilepsy was made based on reviewing the available patient data. The sample of patient considered was of adult pts >13yr age of both sexes with severe brain injury admitted in Hamidia Hospital Bhopal.

Any patient who developed contusion, depressed skull fracture, Subdural hematoma, Extradural hematoma, intracerebral hematoma, penetrating head injury within 24 hr of injury or seizure occurring subsequent to head injury i. e. After 7 days of head injury with no previous neurosurgical operation, no h/o seizure prior to injury are included in study.

On admission a detailed history of any previous episode of seizure before trauma was taken. If h/o prior seizure present then patient was excluded from study. Every patient of head injury having brain injury or skull fracture was given a loading dose of anticonvulsants (phenytoin) of dose 20mg/kg body weight. Patient was then given anticonvulsants for coming 7 days in maintenance dose of 5mg/kg/day and then stopped. The possibility of further seizure activity is explained to the patient and the attendants. Patients who developed seizures within 7 days are investigated & reasons other than head injury found are treated accordingly.

All study included patients were followed up for next 2 yrs & the patients presented with an episode of late post traumatic seizure are investigated. Detailed history for type of seizure, number of episodes & any associated illness was asked and serum electrolyte, blood sugar, CT scan head was done.

OBSERVATION: Total 500 patients of significant brain injury were taken for study of which 300 pts were found eligible for study. 72 patients died and 42 lost the follow up. It was observed that maximum cases are seen in age group 20-29 yr and maximum number of head injury found in males.

Unconsciousness was the commonest positive finding in cases of traumatic brain injury that is followed by vomiting & headache. The symptoms most common in posttraumatic brain injury were unconsciousness & vomiting.

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It is found that frontal & parietal lobe are most vulnerable part of brain involved in traumatic brain injury but in cases of Post-Traumatic Epilepsy, parietal lobe was more common.

Contusion was the most common radiological traumatic brain injury found. In our study the incidence of early post traumatic seizure is 2% & incidence of late PTE is 6.92% in phenytoin treated group.

DISCUSSION: After head injury, secondary brain damage results in increased metabolic demands raised Intra-Cranial Pressure & increased neurotransmitter release; these may precipitate a seizures & many other clinical signs & symptoms. Control of early seizures occurring in first week of injury is mandatory. If recurrent, they may lead to secondary brain damage. Seizures occurring weeks or months after injury are called late seizure & recurrent late seizures make up the clinical syndrome of post traumatic epilepsy.

The mechanism for this recurrent seizure is unknown. The mechanical force of head injury causes the brain to accelerate with induction of rotation or shearing of neuronal tracts and blood vessel and contusion (s).⁽³⁾ It seems to be due to cascade of events beginning with haemorrhage, haemolysis, iron as haem compound liberation, free radical formation, per oxidation & cell death < iron hypothesis>.⁽⁴⁾ After Traumatic brain injury abnormality exist in the release of neurotransmitter, may play role in PTE development.⁽⁴⁾ Also structural changes that lead to epilepsy may occur in the brain.⁽⁵⁾ Neurons that are in hyper excitable state due to trauma may create an epileptic focus in the brain that may lead to seizure.⁽⁶⁾ Post-Traumatic Seizures have an incidence of about 10 % in severe head injury.⁽⁷⁾ Post-Traumatic Seizure develops over time suggesting a period of maturation of focus over which certain pathological processes are evolving in the injured brain.

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Here, prophylaxis should mean that drug given for more or less prolonged period of time blocks permanently the ripening of epileptogenic foci avoiding the occurrence of seizure.⁽⁷⁾ In many circumstances antiepileptic drugs are used in patients who have never presented with any clinical epileptic seizures. These drugs are administered on the assumption of potential risk for the patients of developing acute or delayed chronic seizure after brain injury such as trauma, stroke, haemorrhage or even neurosurgical intervention. But this antiepileptic have usually narrow therapeutic margin & well documented toxicity even in neurologically stable patient.⁽⁸⁾

In our study out of total 300 patients, 15 had seizures after 7 days of trauma & found to have PTE. In all those patients GCS at the time of admission was <8. In these 15 cases, 9 were in group who were given antiepileptic drug prophylaxis & in remaining 6 patients antiepileptic drug prophylaxis was given for period of 7 days after traumatic brain injury and then stopped. Patients who had immediate or early post traumatic epilepsy were excluded from study therefore all these Post traumatic epilepsy were of severe head injury with GCS <8. These 15 patients with Post traumatic epilepsy were investigated for other cause of seizure & were given antiepileptic drug prophylaxis for a longer period than usual.

In our study the age distribution clearly shows the predominance of age group 20-29 yrs, which is consistent with other studies on the same. Middle age person were involved in high speed accidents & had more brain injury.

Maximum number of head injury occurred in males as in our circumstances mainly males are involved in occupations like travelling while females are less exposed to speed injuries.

All patients with Post-Traumatic Epilepsy presented with altered level of consciousness followed by vomiting & bleeding from ear, nose or throat.

In our study, the incidence of early POST TRAUMATIC EPILEPSY is above 2% which is consistent with the findings of Annegers JF, Hauser WA & Coons in 1998.⁽⁹⁾

Incidence of late POST TRAUMATIC EPILEPSY is much less in our study 6.92% in phenytoin treated group & 3.52% in non-phenytoin treated group after 2 years of trauma & 3.52% in phenytoin treated group & 2.35% in non-phenytoin treated group after 1 years of trauma, which are less than the incidence which is shown in Young et al & Tempkin et al & other.⁽¹⁰⁾⁽¹¹⁾ This may be because of short duration of study & small study group.

The chance of developing PTE differ by the location of brain lesion, brain contusion that occurs on in one or the other frontal lobe has been found to carry 20% risk, while contusion in one of parietal lobe carries a 10% risk & one of temporal lobe carries 16% risk.⁽¹²⁾ Among the 15 Post traumatic epilepsy developing PTE CT scan showed injury over multiple areas of brain with involvement of parietal region in all 15 Post traumatic epilepsy with variable presence of frontal region injury which suggest that involvement of parieto-frontal region is associated with the development of POST TRAUMATIC EPILEPSY.

Of all 15 patients, 7 were operated for brain injury & 8 were kept on conservative treatment. The fact that non operative patients also had post traumatic seizure explains that opening of dural layer does not make a head injury pt. more vulnerable to POST TRAUMATIC EPILEPSY.

CONCLUSION: On basis of our study analysis we conclude that phenytoin cannot reduce the late post traumatic seizure but is effective in first week after traumatic brain injury.

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