

Received: 27th September 2013 Accepted: 1st February 2014 Conflict of Interest: None

Original Research

Source of Support: Nil

Assessment of oral side effects of Antiepileptic drugs and traumatic oro-facial injuries encountered in Epileptic children

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How to cite the article:

Ghafoor PA, Rafeeq M, Dubey A. Assessment of oral side effects of Antiepileptic drugs and traumaticoro-facial injuries encountered in Epileptic children. J Int Oral Health 2014;6(2):126-8.

Abstract:

Background: Epilepsy is a chronic disorder with unpredictably recurring seizure. Uncontrolled attacks can put patients at risk of suffering oro-facial trauma. Antiepileptic drugs (AED) provide satisfactory control of seizures in most of the patients with epilepsy. However use of AED has been found to cause many side effects inclusive of side effects in the oral cavity also.

Materials & Methods: This study was conducted on 150 epileptic children, who were on anti epileptic medication for one year.

Results: Gingival over growth was seen as common side effect of the AED drugs. Lip and cheek biting were the most common soft tissue injury, while tooth fracture was the most common hard tissue dental injury.

Conclusion: General physicians, physicians & dentists should be well aware of the potential side effects of AED. A Dentist should be well versed and trained to manage oro-facial injuries in the emergency department.

Key Words: AED, epilepsy, gingival hyperplasia, nocturnal tongue biting, phenytoin, seizure

Introduction

Epilepsy is a condition in which patient experiences seizures, where behaviour and mental activity is disturbed. The patient has no control on muscle tonicity and may transiently lose consciousness. There is abnormal electrical transmission of impulses in the brain which affects neurological activity. Patient tends to have repeated attacks of seizures, however they are reversible.¹ A person is

considered to have epilepsy when two or more unprovoked seizures can't be explained by a medical condition such as fever or substance withdrawal.²

Earlier people thought that epileptic people were under the influence of spiritual powers. However, Hippocrates stated that the reason for this was the involvement of higher nervous centre.² Seizures are divided on the basis of clinical manifestation. Seizures initiated in distinct areas of outer layers of cerebrum are called partial seizures. Seizures in which two halves of cerebral hemisphere is involved are called generalized seizures. These conclusions are based on the reading of EEG.^{1,3}

The need for a diagnosis of epilepsy is usually precipitated by a first seizure. The physician must decide whether a seizure is in fact a real seizure or some another condition such as fainting. There are three primary steps in the diagnosis of epilepsy: health history taking, neurological examination, and laboratory testing. A health history will include information about the facts surrounding the seizure. Sometimes the neurological examination will be done to identify areas of abnormal brain electrical activity, as well as assess, the patient's motor and sensory skills, the functioning cranial nerves, hearing and speech, vision, coordination and balance, mental status, and changes in mood or behaviour. Depending on the health history and examination findings, laboratory work may be ordered. This might include blood tests and special diagnostic tests such as EEG, CT, MRI, PET, neuro sonography, and lumbar puncture.⁴

Initially single AED was used to manage AED but nowadays a combined regimen is used thereby making the treatment intricate and ensuring better results. The classical AED are Phenytoin, phenobarbital, sodium valproate, carbamazepine, ethosuximide and the diazepam family. AED act at cellular level altering the Na⁺ and Ca⁺⁺ channels, modifying GABA and glutamate receptors.³ Not much information is available in literature as how routine dental procedures can be influenced by epilepsy. Most of the literature stresses only on Phenytoin and its effects on

tooth supporting structures. The overall oral health status of epileptic patients is poor than the healthy individuals. Furthermore the oral health worsens with the severity of epilepsy.⁴

Materials and Methods

The study population was 150 children (12 to 17 year old), who were registered in our dental OPD from December 2009 to December 2013. All the children were known cases of epilepsy and were under anti epileptic medication for one year. Epileptic patients who were currently not taking any medication or had started medication less than a year before were excluded from the study.

Informed consent was taken from patients/guardians in English/local language (Hindi). The patients were examined by the physician and neurologist along with their medical records to document the exact cause for epilepsy. Physician also recorded the different AED that the patients were taking. The sample size in all the patients was examined by a single investigator using mouth mirror and CPI probe for oral side effects of AED, mucosal and dental traumatic injuries, and TMJ injury.

Results

The cause of epilepsy in most of the children with epilepsy in the present study was unknown. Few had developed the disease due to traumatic injury (Table 1). Mono AED drug therapy was mostly prescribed by the physicians, few were on dual AED therapy. Rarely three or four drug regimen was prescribed (Table 2).

Table 1: Cause of Epileptic seizures.

Etiology	n	%
Idiopathic	15	10
Crptogenic	120	80
Traumatic head injury	9	6
Infection	6	4

Table 2: AED drug regimen consumed by patients.

AED drug regimen	n	%
Mono therapy	111	74
Dual therapy	30	20
Three Drugs	6	4
Four Drugs	3	2

Xerostomia, gingivitis and gingival over growth was seen as common side effect of the AED drugs. Few children even had glossitis (Table 3). Lip and cheek biting were the most common soft tissue injuries involving the oral region, while tooth fracture was the most common hard tissue dental

Table 3: Oral side effects seen in Epileptic children on AED.

Oral side effect of AED	n	%
Xerostomia	84	56
Gingivitis	93	62
Gingival hyperplasia	69	46
Glossitis	39	26

Table 4: Dentofacial traumatic injuries in epileptic patients.

Traumatic injuries	n	%
Lip/Cheek biting	111	74
Tongue injuries	84	56
Tooth fracture	18	12
Avulsion	9	6

Table 5: Assessment of TMJ injuries in epileptic patients.

TMJ abnormality	n	%
Tenderness	33	22
Clicking	18	12
Subluxation	6	4

injury (Table 4). Few patients had developed TMJ Tenderness. TMJ luxation and clicking was also found in some cases (Table 5).

Discussion

Dentist's frequently come across epileptic patients in their practice. In fact Chapman et al has reported it to be the second most medical condition to be seen in dental operatory. Overall prevalence of epilepsy in general population is 0.9%.¹

Gingival over growth was seen as a common side effect of the AED drugs in 46% of patients. Presently, the etiology of drug-induced gingival overgrowth is not clear but it is multifactorial. Also, the effect of age, sex, duration and dosage of the drug in the pathogenesis of gingival overgrowth is not clearly understood.⁶

Singh NA et al has found a positive correlation between decreased level of serum folate and increasing severity of gingival enlargement due to consumption of AED. They have even come to the conclusion that reduced serum folate level can even lead to early onset of oral side effects of AED.⁷

Tongue biting was seen in 56 % of the children who had an epileptic attack. Previously if a patient would come with a bitten tongue, it was considered as a specific finding which hinted epilepsy. However tongue biting is also be seen in

patients with psychogenic seizure or syncope. Biting on lateral surface of tongue is more commonly seen in epilepsy while biting on lateral surface of tongue and lip is seen in syncope and psychogenic seizures. Frontal lobe seizures are characterized by nocturnal biting of tongue and this might be the only complaint of the patient.^{8,9}

Tooth fracture was the most common hard tissue dental injury in our study. Greater prevalence of injuries to the front teeth because of falls relating to seizures has been reported previously.

Trauma, especially involving the front teeth, has an unfavourable effect on individuals' functioning, symptomatology and physical activities. It also affects their self-esteem, which in turn interferes in behaviour and personal success.¹⁰

Saengsuwan J et al have reported that epileptic seizures lead to moderate to severe injuries. The main reason for an epileptic attack was that the patient was not following the drug regimen properly. They stressed the need for counselling of such individuals so that they avoid risky activities and follow proper AED medication.¹¹

Very few cases of TMJ luxation were recorded in the present study. In a retrospective study of TMJ dislocation in 96 Nigerian cases, 10 patients (10.4%) had an underlying systemic disease, the most common being epilepsy (four cases).¹²

The cost involved in the treatment of side effects has been found to affect the economy of the nation. Reina JA et al calculated societal cost of treatment of common side effects of AED per patient per year in Netherlands. The medical expenditure on the treatment of side effects was found to be an economic burden for the society.¹³

Conclusion^{1,4}

Overall quality of life, general and dental health is hampered by epilepsy. It is imperative that dentists should be well aware of the different grades of epilepsy, precipitating factors for seizures and oral side effects of different AED being prescribed by medical practitioners. Further studies can be undertaken to evaluate the oral side effect of each AED, based on the dosage and the time duration of which the drug is being taken. Studies can also be undertaken to evaluate caries, periodontal and oral hygiene status in Epileptic children.

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