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Case Report

Phenytoin Induced Cerebral Atrophy: A Case Report

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Abstract

Phenytoin is the most common drug prescribed in patient diagnosed with seizure. Cerebral atrophy is an observed complication in phenytoin exposed patients. The side effects related to phenytoin administration include sedation, dizziness, swaying, rash and gum hypertrophy. In the following case report a 50-year-old male patient with complaints of poor response to oral commands, slurred speech, limited upper limb movements and neck rigidity, the patient is a known epileptic since 1 year on prescription and is alcoholic. Upon CT scan of brain, the impression was mild diffuse cerebellar atrophy probably due to long term phenytoin use. Hence frequent phenytoin level monitoring in patient prescribed with the same is mandatory.

Keywords: phenytoin, epilepsy, cerebral atrophy

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INTRODUCTION

Phenytoin is an anti-epileptic medicine that has been around for a long time. It primarily operates by blocking sodium channels, resulting in a reduction in the formation of quickly repeated action potentials. It can be used to treat both generalized tonic-clonic seizures and partial seizures. Phenytoin intoxication causes lethargy, giddiness, diplopia, dysarthria, ataxia, and other symptoms that are usually reversible once the drug is stopped.[1] Higher phenytoin doses for longer periods of time are linked to cerebellar and vestibular toxicity.[2] Long-term phenytoin usage, both therapeutic and harmful, can result in cerebellar abnormalities, including atrophy. [1]

The term "atrophy" refers to the shrinking or wasting away of any component of the body. Cerebral atrophy can affect the entire brain or only a small portion of it, resulting in a loss of brain mass and neurological function.[4] Dementia, convulsions, loss of motor coordination, and difficulties speaking, comprehending, or reading are all symptoms of cerebral atrophy. [5]

CASE REPORT

A male patient of 50 years of age was admitted to inpatient care with episodes of seizure, with known case of type 2 diabetes mellitus, hypertension and with the history of alcohol intake .On admission the patients was conscious and oriented , the vitals were found to be BP: 90/60mmhg , PR: 102 b/m, SPo2 : 92% RA , RR: 22cpm . He was epileptic since one year and was on oral phenytoin 100mg /day (TID). On admission the patient came with complaints of poor response to oral commands, slurred speech, limited upper limb movements and neck rigidity. Upon CT scan of brain, the impression was found to be mild diffuse cerebral atrophy with 4mm slice thickness in infratentorial region and 7mm in the supratentorial region. Phenytoin was stopped and was changed to sodium valproate in the past 15 days.

Table 1: Laboratory Investigation

Sr. no.	TEST	FINDING	REFERENCE
1.	Hemoglobin	10.4 gm%	14-17gm%
2.	RBC	4.44mcl	4.7-6.1mcl
3.	WBC	6.9 *10^9/L	4.5-11 *10^9/L
4.	Lymphocytes	69.1%	20-45%
5.	PLT	90*10^9/L	100-350*10^9/L
6.	UREA/BUN	36mg/dl	10-45mg/dl
7.	Creatinine	1.1mg/dl	0.5-1.5mg/dl
8.	Bilirubin Total	2.9mg/dl	0.3-1mg/dl
9.	Direct Bilirubin	0.3mg/dl	0.1-0.3mg/dl

Table 2: Electrolyte Investigations

1	Sodium	132mEq/L	135-145mEq/L
2	Potassium	5.8mEq/L	3.6-5.2mEq/L
3	Calcium	9.1mg/dl	8.1-10.6mg/dl

DISCUSSION

Antiepileptic medicines are used to treat epilepsy, which is a common neurological condition. PHT is a first-line antiepileptic medication that is widely used. PHT is used to treat both generalised and partial epilepsies, although it should not be used to treat myoclonic epilepsy. [1] This medicine is generally considered safe and is widely used around the world. However, drowsiness, gum hypertrophy, lymphadenopathy, chorea, ataxia, and other drug-induced side effects may occur in a significant number of individuals. There have been a few cases of cerebellar atrophy as a result of long-term PTH use. [2] If the drug serum levels are above the therapeutic range, these side effects are usually reported. If the drug level is within the normal range, they have also been reported. However, by lowering the PHT dose, these effects can be reversed. Our patient had a mild cerebral condition and had been taking the medication for one year and had a history of alcoholism while alcoholic changes include both cerebral and cerebellar atrophy. However, after discontinuing the medicine, he began to improve steadily. [4] As a result, in patients who are on medications for a long time, routine monitoring for adverse drug reactions should be considered. These reactions could be sporadic or dose-dependent, and they could be acute or persistent. Because the majority of these side effects are reversible, it's critical to recognize and manage the clinical signs of medication toxicity. It also emphasizes the importance of regular plasma concentration monitoring, precise dose, and identifying phenytoin adherence concerns in patients. [3]

CONCLUSION:

Phenytoin is widely used in the treatment of all types of seizures and is usually deemed safe. Partial and grand mal seizures are two different forms of seizures. Nonetheless, the patient in this case study began to improve steadily after the medicine was taken off. As a result, regular monitoring is required in patients. Unfavorable medication reactions should be considered for phenytoin treatment if being used on a long-term basis. These Adverse effects might be either immediate or chronic in nature, may be sporadic or dose-dependent. The majority of these side effects are reversible once treatment is stopped, early detection and management of adverse effects is critical. The current study also underlines the necessity of regular plasma drug concentration monitoring, proper dosage of medications with a narrow therapeutic index, and identifying noncompliance in phenytoin patients.

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