Phenylthiocarbamide perception in epileptic patients on carbamazepine therapy

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Received Accepted
١.٦.٢٠١٠
٢٧.١٢.٢٠١٠

ABSTRACT

The present study was designed to study the taste sensitivity to phenylthiocarbamide among epileptic patients. A total of ٧٣ epileptic patients participated in the study. The epileptic state of the patients was well controlled by carbamazepine therapy, with their serum level of carbamazepine within therapeutic range. The other group consists of ٦٢ healthy volunteers, serving as a control. Test strips impregnated with phenylthiocarbamide have been used to identify tasters from non tasters of both patients and control groups. The individuals who perceive phenylthiocarbamide as bitter tasting was regarded as tasters while those describe it as tasteless were regarded as non-tasters. The results showed no significant difference with regard perception of phenylthiocarbamide between epileptic patients on carbamazepine therapy and controls.

Key words: phenylthiocarbamide taste sensitivity, epileptic patients, carbamazepine

الخلاصة

صممت الدراسه لمعرفة حساسية تذوق طعم مادة الفنايل ثايوكاربامايد بين المرضى الذين يعانون من الصرع. شارك في هذه الدراسه ٧٣ مريضا يعانون من الصرع والذين يستخدمون عقار الكاربامیزابین، وفد بين قياس تركيز عقار الكاربامیزابین في مصل الدم بان تركيز العقار يقع في المجال العلاجي . وقد شارك في الدراسة ايضا ٦٢ متطوعا من الاصحاء كمجموعة ضبط. استخدم في الدراسة شريط اختبار مشرب بمادة الفنايل ثايوكاربامايد لمعرفة الذائق والغير الذائق في مجموعتي المرضى والضبط، الافراد الذين يدركون الفنايل ثايوكاربامايد كطعم مر ،يعتبرون ذائقون بينما الذين يصفون الفنايل ثايوكاربامايد لاطعم لديه يعتبرون غير ذائقون. وكانت النتيجة عدم وجود فرق معنوي فيما يتعلق بتذوق مادة فنيل ثايوكاربامايد بين المرضى المصابين بالصرع وتحت علاج عقار كاربامازبين والأشخاص الأصحاء

The ability or inability to taste the compound phenylthiocarbamide (PTC) is a classic inherited trait in humans and has been the subject of genetic and anthropological studies for over ٧٠ years.

This trait has also been shown to correlate with a number of a dietary preferences and thus may have important implications for human health [١].

Fox set about testing a large number of people and found that distinct variation was common regardless of age, sex, and ethnicity [٢]. Most interestingly Fox found that most people fall into just ٢ categories: those able to taste PTC even at a very low concentrations, whom he referred to tasters and those unable to taste the compound except at very high

concentrations whom he referred to as non-tasters or taste blind [٢].

Bitter taste perception is classically variable[٣]. The prevalence of taste blindness (a lack of sensitivity to or an inability to taste bitter chemicals) ranges from ٣% in West Africa to ٦-٢٣% in China and ٤٠% in India; ٣٠% of the white North America populations have taste blindness[٣,٤].

Studies of sensitivity of bitter tasting Phenylthiocarbamide have shown this to be an inherited trait determined by a dominant allele[٥]. Investigators recently reported that haplotypic variation in the region of chromosome (٧) containing the TAS٢R٣٨ taste receptor gene shows a strong association with a bitter compound tasting ability. As such variation across TAS٢R٣٨ is currently recognized as highly indicative of individual bitter compound-tasting ability[٦].

Some scientists are now interested in potential health application of genetic taste studies. For example, people who find PTC bitter are suspected to find the taste of cigarette bitter, which could make strong tasters less likely to smoke[٧].

There are also possible correlations between the ability to taste PTC and preferences for certain foods, which could influence a person's diet [٨].

The ability to taste PTC has been associated with a number of medical and neurological illness not typically related to taste, and as a limited data are available which test the correlation between PTC tasters and non-tasters with epilepsy, the present study was designed to study the taste sensitivity to PTC among epileptic patients.

Patients and methods

A total of ٧٣ epileptic patients (٤٦ idiopathic and ٢٧ secondary generalized) participated in the study. The epileptic state of the patients was controlled by the antiepileptic drug, carbamazepine (SDI, Samara, ٢٠٠ mg tablet). Other group consists of ٦٢ healthy volunteers, serving as controls, was also studied.

The epileptic patients consist of ٥٩ males and ١٤ females with a mean ± SD age of ٣٢.٣٢±٩.٢٣ years. The control group consists of ٥٣ males and ٩ females with a mean ± SD of ٣٣.٠٣ ± ٩.٥٠ years. The patients were collected from Neurology Outpatients Department, Ebn-Sina Hospital, Mosul, Iraq .

Test strips impregnated with Phenylthiocarbamide (Carolina Biological supply company, Burlington, N.C) have been used to identify taster from non-tasters of both patients and control groups. The individuals who perceive PTC, as bitter tasting is regarded as tasters, while those who describe it as tasteless are regarded as non-tasters.

Carbamazepine was administered in doses range of ٢٠٠-٨٠٠ mg daily. Serum carbamazepine concentration was measured in the serum of blood samples taken from all patients by a method using gas liquid chromatographic method [٩].

Results

Table ١ shows number and percentage of tasters and non-tasters among epileptic patients on carbamazepine therapy and controls. No significant difference with regard perception of phenylthiocarbamide was noticed between epileptic patients on carbamazepine therapy and controls.

Measuring serum carbamazepine levels revealed a range of ٤.١ to ١١.٢ µg/ml (mean± SD: ٦.٨٤±١.٥٦ µg/ml)

Table ١. Frequency of PTC tasters and non-tasters in epileptics and controls

parameters	Non-tasters		Tasters	
	N	%	N	%
Patients	٥٧	٧٨	١٦	٢٢
Controls	٤٢	٦٧.٧	٢٠	٣٢.٣

Chi-square test: ٠.٠٩٦ ;P=٠.١٥

Discussion

In the present study we examined PTC sensitivity in ٧٣ patients and ٦٢ healthy controls to determine whether taster status could represent a simple vulnerability marker. The results of the study revealed a higher prevalence of non-tasters in epileptic patients relative to healthy controls.

Review of the literature showed the presence of only one literature which test the prevalence of PTC tasters and non-tasters among epileptic patients.

The study was reported by Pal et al[١٠], who showed that the frequency of PTC non-tasters is higher in the epileptic patients as compared with the healthy controls. These results are in agreement with our results .

The frequency of PTC tasters and non-tasters have been tested in another neurologic diseases including parkinsonism and psychotic diseases including depression and in smokers. PTC sensitivity was examined in ٦٧ schizophrenic patients, ٣٠ healthy controls and ٣٠ first degree relatives. A higher prevalence of non-tasters was seen in patients and family members relative to healthy controls[١١]. To identify genetic differences based on whether a bitter taste is perceived among smokers, Snedecor et al.[٧] studied a group of smokers, a higher number of non-tasters was reported as compared to tasters among the smoker group. They suggested that among smokers ability to taste PTC may confer some protection among smokers, from development of nicotine dependence and positive reinforcement from smoking. In other study, a higher proportion of non-tasters were found in patient with parkinsonism relative to healthy comparison subjects[١٢].

The epileptic patients in our study are controlled cases, their epileptic state was controlled by prophylactic doses of the antiepileptic drug carbamazepine as evident by the reduction of the epileptic fit during treatment and by the measurement of serum carbamazepine concentration, which revealed a therapeutic level in the sera of all patients. Wilson and Wilkinson[١٣] showed that, the control of epilepsy by antiepileptic drugs depends on the blood level of the drug. Control of epilepsy by antiepileptic drug is obtained at therapeutic concentration of the drugs which is called therapeutic range[١٤], which is for carbamazepine is (٤-١٢) μg / ml [١٥].

The prevalence of high frequency of non-tasters among epileptic patients in the present study and as phenotypic variations in PTC sensitivity is genetic

in origin [٦], this may represent a surrogate risk factor for the development of epilepsy disease, and also this variation in the tasters and non-tasters may also explain the control of epileptic fits by the antiepileptic drug and reducing the likely of epileptic resistance to it.

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