

THE EFFECTS OF ETHYL ALCOHOL ON THE ORAL CAVITY

Todor Liana*, Todor Sergiu Andrei**

*University of Oradea, Faculty of Medicine and Pharmacy, Department of Dental Medicine, 10 P-ța
1 Decembrie, Oradea, Romania, e-mail: : liana.todor@gmail.com

**West University of Timișoara, Faculty of Chemistry, Biology and Geography, Department of
Biology-Chemistry, 16 Pestalozzi Blv., 300115 Timișoara, Romania,

Abstract

In what regards the effect on the oral cavity, the ethyl alcohol is, first of all, a cellular toxic. Due to its hygroscopic effect it acts as a poison for the cells, meaning that alcohol in high concentration extracts the water. At cellular level this leads to the separation of albumins existing in protoplas, in colloidal form, and finally to its coagulation, thus destroying the cell. Thus, subsequently to an abusive and long term ethyl alcohol consumption, the cells of the oral tissues and of the salivary glands will be seriously damaged.

The alcohol abuse affects the structure and functioning of the mucous membrane of the oral cavity and of the salivary glands. The actions of alcoholism on the oral cavity are variable. The dental lesions are represented by multiple ordinary cavities. The most striking symptom is the gingival retraction, the occurrence of the gingival bag and of the tartar.

When in contact with the oral mucous, the ethyl alcohol is able to produce a morphological change characterised by an epithelial atrophy which means an increased sensitivity of the tissue under the action of the carcinogenic chemical substances.

Key words: ethyl alcohol, oral cavity, salivary glands, gingival injuries

INTRODUCTION

Man is found in multiple relationships with the environment with which he forms a specific ecological system - the human ecosystem. The harmful environmental studies are based on the vision of systemic factors.

The ethyl alcohol is toxic because it causes harmful action on the body in relatively small quantities.

MATERIAL AND METHOD

Experimental observations on subjects were conducted on 30 alcoholics with a diagnosis of chronic alcoholism who were investigated including the components of the oral cavity. Discovered signs were recorded in a general observation sheet.

The ethyl alcohol is a liquid substance with a chemical structure called hydroxyl (formed by an atom of oxygen and an atom of hydrogen). The ethy can be obtained either by direct hydration of the ethene in the presence of phosphoric acid, at high temperatures and pressures or by alcoholic fermentation of the fruit glucose, in the presence of yeast, at the

temperature of the surrounding environment. It is a component of the alcoholic drinks.

The restricted molecular formula of the ethyl alcohol is C_2H_6O while the structural one is CH_3-CH_2-OH . The identification number in Chemical Abstracts is 64-17-5, molecular weight is 46,07, m.p. = $-114,1^{\circ}C$ and b.p. = $78,5^{\circ}C$.

The ethyl alcohol is soluble in water as well as in organic solvents (acetone, benzene, diethyl ether and diethylsulfoxide) and it is used for preparing various spirits, as a dissolvent in the varnishes and lacquers industry, paints industry, pharmaceutical industry as well as for producing explosives. It is also a good antiseptic, solvent and dehydration agent. Alcohol brings much energy, 30 kilojoules (7,1 kilocalories)/1 g of alcohol. It can be rapidly transformed in fat.

The human body is affected by the action of the ethyl alcohol in two ways:

1. After ingestion it gets in contact with oral cavity, esophagus, stomach and intestines, having an irritating and anaesthetical action (causing the lack of pain sensation with or without losing consciousness);
2. Only 20% of the quantity of ethyl alcohol ingested is absorbed by the stomach while the rest of 80% is being absorbed through the intestinal walls, directly in the blood thus reaching each cell of the organism.

After being drunk, the alcohol reaches the stomach and the intestines from where, through absorption, it is taken by the blood and submitted through the circulatory apparatus in the entire organism. This is why the highly blood irrigated tissues are the most affected.

In what regards the effect on the oral cavity, the ethyl alcohol is, first of all, a cellular toxic (cytotoxicity). Due to its hygroscopic effect it acts as a poison for the cells, meaning that alcohol in high concentration extracts the water. At cellular level this leads to the separation of albumins existing in protoplasm, in colloidal form, and finally to its coagulation, thus destroying the cell. Thus, subsequently to an abusive and long term ethyl alcohol consumption, the cells of the oral tissues and of the salivary glands will be seriously damaged.

Each portion of ethyl alcohol produces a poisoning, alcohol is slowing down the functioning of the cells and organs until their activity becomes much less efficient.

The consumption of ethyl alcohol in big quantities increases the risk of occurrence of mouth cancer, tongue cancer, probably because of its irritating action.

Because the oral cavity is the part of the body that is in direct contact with the ethyl contact, the components that are part of the alcoholic drinks are often found here in high concentration. Subsequently they are subject to different changing processes, mediated by the enzyme system of the body.

The ethyl alcohol diffuses rapidly into saliva during the drinking, and immediately after its salivary concentration is temporarily much higher than in plasma. Within 30 minutes, salivary ethanol concentration equilibrates with the plasma level, thus suggesting that ethanol easily penetrates the whole body, including oral cavity tissues and salivary glands.

When in contact with the oral mucous, the ethyl alcohol is able produce a morphological change characterised by an epithelial atrophy which means an increased sensitivity of the tissue under the action of the carcinogenic chemical substances. This way it was suggested that ethanol is able to increase the level of penetration by the carcinogens substances of the oral mucous, due to their adaptability to solubility as well as through the increase of the permeability of the oral mucous.

The International Agency for Research in the Field of Cancer stated that there are enough evidences for identifying acetaldehyde as being carcinogen for animals, which makes it possible to be carcinogem for humans as well.

The oral mucous is the entrance gate for most pathogenic agents. The oral cavity and the defense systems of the antimicrobial salivary immune system eliminates the pathogenic agents for preventing the exaggerated extension of the microorganisms. The defense system of the oral cavity participates in the protection against microbial pathogenic agents not only of the oral tissues but also of the superiour digestive tube and of the respiratory tract.

Alcohol abuse affects the structure and function of oral cavity mucosa and salivary glands. The severe tissue damage occurs in particular when alcohol abuse coincides with smoking. Sparkling beverages [wine, champagne] as well as long term chronical thrown ups caused by ethylism represent factors that are favourable to dental erosions.



Fig.1: Gingival retractions with dental erosions and tongue ulcerations at alcoholics

RESULTS AND DISSCUSIONS

Oral expressions in alcoholism are variable and inconsistent with the state of intoxication of alcoholics. Dental caries lesions are present through regular multiple forms. The most prominent symptom is the retraction of the gingival margin (over 70%), gum color variation being amended due to hyperemia (25%), periodontal pockets (25%), calculus (over 70%). Tooth pathological mobility appears only in alcoholics over 40 years.

Radiologic salivary investigation indicates hyperplasia, with salivary glands grown beyond of the ascending mandible branches. They become the headquarters of dystrophic lesions with opacities and predominance of acinary canalicular margins in channels.

In alcoholic cirrhosis parotid glands are seen at a rate of 60-80% as compared to non alcoholic cirrhosis in which there are no such signs. Volume changes occur early in men and women alike, become visible at 50 years and sometimes in younger alcoholics.

Examination symptoms occurred with the age shows swollen salivary glands at a rate of 10% (below 40 years) and 30% (over 40 years), the excretory parenchyma has permeable trophicity, papilla has a normal excretory channel in youngs, and at the elderly is increased or reduced. Salivary lumen looks normal.

CONCLUSIONS

Based on these study it can be shown that in chronic alcoholism, there are many changes in the dento-maxillary system (both young and old patients) and in patients over 40 years.

For short term, the human organism can adapt for counteracting the negative effects produced by ethyl alcohol but after a period of time it becomes unable to maintain its normal balance which finally leads to disastrous effects. Maintaining a state of balanced functioning of the human body by neutralising the toxins in the organism is all the liver can do. If after a while the consumer gives up the consumption of ethyl alcohol the negative effects might disappear but if the period of excesses is extended too much, irreversible changes might occur.

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