EVALUATING THE EFFECTS OF VITAMIN THERAPY ON THE REDUCTION OF RECURRENCES OF ORAL PRECANCEROUS CONDITIONS

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Abstract

Epidemiological studies have shown that environment and personal habits, especially tobacco consumption and alcohol consumption, are major aetiological factors in the induction and progression of oral cancer (Halliwell and Whiteman, 2004).

Vitamin therapy in the treatment of oral precancerous conditions has been carried out in order to assess the incidence and to determine the number of patients with precancerous and/or cancerous lesions who want to undergo vitamin supportive treatment, mainly with vitamin C and provitamin A (beta-carotene), to reduce relapses and mutilating surgeries and to monitor the clinical development of oral precancerous lesions.

Vitamin therapy has led to two cases of complete remission and three cases of partial remission in the study group as compared to two cases of partial remission and no case of complete remission in the control group. This confirmed the favourable effect of dietary supplements composed of beta-carotene and vitamin C on oral precancerous lesions.

Key words: vitamin therapy, vitamin C, beta-carotene, healthy diet, oral precancerous lesions

INTRODUCTION

In order to evaluate the effects of vitamin therapy on the reduction of the oral precancerous lesions, it is necessary to discuss all aspects of the oxidative stress that induces structural modification and modulation of the functions of the nucleic acids, proteins and lipids.

The imbalance created between reactive oxygen species and the antioxidant defence system can trigger the formation of specific factors responsible for the oxidative damage in the cell such as: oncogene overexpression, generation of mutagenic compounds, promotion of atherogenic activity, occurrence of senile wound or inflammation. This imbalance induces cancer, neurodegenerative diseases, cardiovascular diseases, diabetes and kidney disease (Pisoschi and Pop, 2015). The oxidation of the molecule of free radicals and several species of free radicals such as hydrogen peroxide (H2O2), superoxide (O2-), singlet oxygen (1 / 2 O2) and hydroxyl radical (OH-) may cause oxidative damage to the cell produced by reactive oxygen species (ROS).

Antioxidant vitamins act on reactive oxygen species (ROS), blocking the production of reactive oxygen derived from NADPH-cytochrome P450, resulting in an improvement in precancerous pathologies (Beswick at al, 2005).

Oxidative stress can cause tissue damage either directly by inducing the oxidation of important biomolecules or indirectly by activating redox-sensitive transcription factors, such as nuclear factor κB (NF-κB), leading to a remote control of gene expression with pro-inflammatory effects (Gilmore, 2006; Kim at all., 2009; O'Donnell at all, 2005).

The use of antioxidant vitamins in precancerous and cancerous conditions should be correlated with individual factors that require the assessment of both natural and parenteral nutrition as antioxidant vitamins proved to be useful as supportive treatment, reducing inflammation by suppressing cox-2 and nuclear factor-kappaB (Gilmore, 2006).

The prescription of antioxidant vitamins in oral precancerous pathologies requires an analysis of these pathologies as they interfere with the organism's metabolism (Higdon and Frei, 2003). This prescription must take into account all aspects of the disease, its metabolic implications and be in agreement with all scientific data related to it.

To demonstrate the anticancer activity of vitamins C and E on oral cancer and precancerous leukoplakia, research has been carried out in order to assess the anticancer properties of these vitamins of inhibiting carcinogenesis, preventing the development of oral cancer and the regression of oral carcinoma (Cabrera at all , 2006; Yuen Chuen at all, 2016). Theses studies have demonstrated the synergism in the anticancer activity of beta-carotene and alpha-tocopherol as well as the synergism between beta-carotene and alkylating anticancer agents such as melphalan and cyclophosphamide. These assessments have shown that beta-carotene and alpha-tocopherol inhibit both major stages of carcinogenesis, initiation and progression (Edge and Truscott, 1997).

The properties of antioxidants and micronutrients of inhibiting various forms of cancer have been repeatedly analysed and reanalysed, concluding that these nutrients act by inhibiting and regressing precancerous lesions. They act mainly by stimulating cell differentiation, resulting in the apoptosis of the neoplastic cells (Pallozza, 1998).

MATERIAL AND METHOD

The method of evaluating the action of antioxidant vitamins on the prognosis of oral precancerous lesions aims at developing therapeutic approaches for the prevention of oral cavity cancer based on the association of conventional aetiological therapy with a series of adjuvant therapies.

The study method was a prospective and retrospective, randomized, double-blind study in which each patient was informed both on the possible adverse effects and on the possible beneficial effects of the treatment. Only patients who understood and signed an informed consent form were included in the study.

Each patient was assigned randomly either to the study group (30 subjects, 10 mg/day of beta-carotene and 500 mg/day of vitamin C) or to the placebo group (30 patients, 2 placebo tablets). This distribution was performed using computer-generated random number sequence with stratification, blocking randomization based on the presence or absence of dysplasia which was a potential prognostic factor for malignancy.

Drug packaging was designed to have the same size, shape and colour, the difference consisted in a code known only by the study coordinator. Vitamin antioxidants were administered over one year and patients were under medical supervision for 12 months to evaluate their effect.

RESULTS AND DISCUSSION

According to the obtained effects, results on the oral precancerous lesions after the administration of antioxidant vitamins were distributed as follows: complete remission (CR), if the lesion disappeared completely 12 months later; partial remission (PR), which meant the reduction in lesion size of at least 50%; no change (NC), which meant the reduction in lesion size of less than 50% or lesion size did not change; progressive disease (PD), where lesions increased in size by at least 25% and malignant transformation (MT), where the presence of invasive carcinoma was confirmed based on the histopathological examination.

The evaluation of vitamin therapy on the reduction of the incidence of oral precancerous lesions showed a more benign evolution of patients in the experimental group, where two cases of complete remission (RC) and three cases of partial remission (PR) were recorded, thus confirming the beneficial effects of dietary supplements composed of beta-carotene and vitamin C (Table 1).

Table 1.
The clinical prognosis of oral precancerous lesions and the distribution of results according to the group of patients

Clinical prognosis	Study group (n=28)	Control group (n=29)	Total (n=57)	Test for homogeneity (p)
CR (%)	2 (7.2)	0 (0)	2 (3.5)	0.4011*
PR (%)	3 (10.7)	2 (6.9)	5 (8.8)	
NC (%)	20 (71.4)	25 (86.2)	45 (78.9)	
PD (%)	3 (10.7)	2 (6.9)	5 (8.8)	
MT (%)	4 (14.3)	4 (13.8)	8 (14)	0.7430**
CR = complete remission, PR = partial remission, NC = no change, PD = progressive disease, MT = malignant transformation * - chi-square test, ** - Yates' chi-square test				

The cumulative positive effect of vitamin therapy on complete remission (CR) recorded values of 7.2% in the experimental group and 0.0% (PR) in the control group. The positive cumulative effect of vitamin therapy on partial remission (PR) was slightly higher as compared to the complete remission (CR) in both the experimental group and in the control group, 10.7% and 6.9%, respectively.

Although some alternative antioxidant supportive treatments may be effective in curing oral cancer pathologies, they do not yet have the ability to prevent recurrence and malignancy. That is why these pathologies must be regularly monitored, regardless of their response to topical or systemic treatment, including clinical remission.

Table 1 shows that the percentage of progressive disease (PD) was similar to that of the partial remission (PR) due to aetiological factors, smoking and alcohol consumption.

CONCLUSIONS

Results show that vitamin therapy has an ameliorative effect on the prognosis of oral precancerous lesions, improving patients' quality of life.

Vitamin therapy is considered a chemopreventive therapy capable of deactivating and of preventing the formation of free radicals.

Antioxidant vitamins inhibit the development of cancer cells by destroying them through apoptosis (programmed cell death), by stimulating cytotoxic cytokines, by acting on the gene expression, by preventing the blood supply for the tumour or by cell differentiation.

Vitamin therapy reduces the adverse effects of chemotherapy when administered simultaneously because, for the destruction of a free radical, antioxidant fat-soluble vitamins, such as vitamin E and A, undergo oxidation. Vitamin C is needed then to act by re-establishing them, thus creating in the body a vitamin C deficiency that needs to be restored orally or parenterally.

Antioxidant vitamin therapies should always be adapted to the individual treatment protocol, taking into account the specific interactions of cytotoxic substances with bioactive nutrients.

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