
LIPID PEROXIDATION IN ORAL CANCER

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Summary

In this study, 20 patients with oral cancer (confirmed by histopathological examination) and 21 control subjects were included, to evaluate the degree of lipid peroxidation (LP) in oral cancer. Serum malondialdehyde (MDA) was significantly higher among oral cancer patients (5.84 ± 2.19 nMol/L) compared to control subjects (1.79 ± 0.61 nMol/L), ($P < 0.001$). We conclude that oral cancer is accompanied with a significant degree of free radicals formation resulting in increased LP. Therefore, serum MDA level may serve as a marker for oral cancer.

Introduction

Oral cancer is a major health problems responsible for a large number of cases of death and infirmity. On the other hand, many of those who survive remain crippled or disabled inspite of the recent advances in medical science¹.

Oral cancer constitute 3 to 5 percent of all cancers, and the most common type is squamous cell carcinoma, which accounts for approximately nine of every ten oral malignancies².

There has been a growing interest in establishing the role played by free radicals formation and the subsequent lipids peroxidation (LP) in human diseases³.

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A free radical is simply a molecule containing an odd number of electrons, and because it tries to pair this odd electron, such a molecule is, rendering it chemically reactive⁴. They include the molecules superoxide anion (\dot{O}_2^-), hydroxyl radical ($\dot{O}H$) and hydrogen peroxide (H_2O_2)⁵.

It is generally accepted that the peroxidation of the polyunsaturated fatty acid proceeds through a free radical chain reaction. This oxidative damage causes a reduction in membrane fluidity and permeability⁶. LP may cause inflammatory diseases, cancer, aging and atherosclerosis⁷.

Changes in the rate of LP seem to be a general feature of cancerous cells, and may be a prerequisite to cell division⁸.

Malondialdehyde (MDA), a secondary product of LP, has been implicated in carcinogenesis, in part for its reported

mutagenic activity. Therefore, it was interesting to determine its activity as either a complete carcinogen, a tumour initiator, or a tumour promotor⁹.

The aim of this study was to evaluate the degree of LP in oral cancer patients.

Patients and Methods

This study was carried out from December 1993 throughout October 1994. Twenty patient with oral cancer (confirmed by histopathological examinations), were included. They were 14 males and 6 females, their age ranged from 39-80 years. They were in-patients at Al-Shaheed Adnan Kheralla and Al-Karkh Hospitals. In addition, a randomly selected twenty-one healthy subjects were included. They were 10 males and 11 females, their age ranged from 35-70 years.

Venous blood were collected from patients and controls. Sera were separated. Serum MDA concentration was determined by using thiobarbituric acid reaction method¹⁰.

Statistical analysis was carried out using student's t-test. $P < 0.05$ was considered statistically significant.

Results

Table I presents the age distribution of patients with oral cancer and control subjects. The majority of patients (70%) were between 45-65 year of age.

Table I. Age distribution of oral cancer patients and control subjects.

Group	Age (years)	No.	%
Patients	<45	1	5
	45-65	14	70
	> 65	5	25
	Total	20	100
Controls	<45	14	66.7
	45-65	4	19.0
	> 65	3	14.3
	Total	21	100

Table II shows the serum MDA concentrations in patients and controls. MDA serum concentration were significantly higher among oral cancer patients (5.84 ± 2.19 nMol/L) compared to control subjects (1.79 ± 0.61 nMol/L), ($P < 0.001$).

Table II. Serum MDA concentration among oral cancer patients and controls.

Group	No.	Serum MDA concentration
Patients	20	5.84 ± 2.19
Controls	21	1.79 ± 0.61

The results are expressed in nMol/L as Mean \pm SD ; $P < 0.001$.

Discussion

Increased production of free radical is a feature of most, if not all, human disease, including cardiovascular disease and cancer¹¹. It can initiate LP and DNA damage leading to mutagenesis, carcinogenesis and cell death, if the antioxidant system is impaired¹².

In this study, MDA was used as an indicator of the rate of LP, in other words as an indicator of radical formation in oral cancer.

Serum MDA concentration among oral cancer patients was significantly higher ($P < 0.001$) than that of the control group. This finding was in agreement with the observation of others¹³. In addition, similar results had been reported in malignant cases other than oral cancer^{3,14,15}.

The mechanism by which serum MDA level is increased in neoplasm has been attributed to the decreased level of the antioxidant enzymes, such as superoxide dismutase (SOD), and glutathione peroxidase (GPx), representing the lack or impaired antioxidant defense^{13,15}. Such impairment of the body antioxidant system, together with increased free radical release from the tumour cells, results in acceleration of LP process.

On the other hand, several studies demonstrated higher MDA levels in the tumour tissue compared to the healthy one^{16,17,18}.

In conclusion, oral cancer is associated with a high rate of free radicals formation, and hence, a considerable degree of

LP. Therefore, serum MDA level may be a useful biological marker of oral cancer.

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