

The Carcinoembryonic Antigen Level Among Tobacco Workers

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✓ Bu çalışmanın amacı, bir sigara fabrikasında çalışan işçilerden sigara içenler ve içmeyenler arasında karsinoembriyjenik antijen (CEA) düzeyini araştırmaktır. Kontrol grubu olarak kırsal alanda yaşayan çiftçiler alındı. Sigara fabrikasında çalışanlardan sigara içenler ve içmeyenler arasında ortalama serum CEA düzeyleri açısından istatistiksel olarak bir fark bulunamadı ($p>0.05$). Ancak, kontrol grubundaki ortalama serum CEA düzeyleri ile sigara içenler ve içmeyenlerin düzeyleri arasında anlamlı farklılık saptandı ($p<0.05$). Bunun üzerine sigara toz inhalasyonu ya da diğer bazı nedenlerin sigara fabrikasında çalışan işçilerde serum CEA düzeylerini artırdığı öne sürüldü. Bu tip işyerlerinde, düzenli aralıklarla kanser taraması yapılması gerektiği vurgulandı.

Anahtar Kelimeler: Karsinoembriyjenik antijen, Sigara işçileri

✓ The purpose of this study was to investigate the carcinoembryonic antigen (CEA) levels among smoker and nonsmoker workers who work in a tobacco factory. The control group was farmers who live in a rural area. Among the smokers and nonsmokers who work in the tobacco factory, the mean serum CEA levels were not different statistically ($p>0.05$). But, in the control group mean serum CEA levels were significantly different between smokers and nonsmokers ($p<0.05$). Therefore, it is suggested that the inhalation of tobacco dust or some other way causes increasing CEA serum levels among tobacco factory workers. In this type of working places, cancer screening by regular intervals is necessary.

Key words: Carcinoembryonic antigen, Tobacco workers

The antigenic differences between normal and malignant cells were studied by various researches. These researches have not been successful until tumor antigens were shown⁽¹⁾.

In 1965, in a study by absorption of rabbit ant-serum with normal human colon tissue and serum by gel diffusion techniques by Gold and Freedman, it was understood for the first time that all of the antigen was originated endodermally from adenocarcinomas of gastrointestinal system and it was accepted tumor specific. In addition, this antigen has been detected in the fetal and the embryonic liver, intestine and pancreas during the first and the second trimestre of the pregnancy. Because of the distribution of these antigens in tumor tissue and embrion, this was called "carci-

noembryonic antigen (CEA)" by Gold and Freedman⁽²⁾.

After elevated levels of carcinoembryonic antigen (CEA) were found in a patient with carcinoma of colon, it was speculated that CEA was a tumor-specific antigen that would be of value for the identification of patients with carcinoma of the colon and as a mean of detecting tumor recurrence after treatment. Subsequently, elevated CEA levels were found in patients with carcinomas of the pancreas, lung, stomach breast and head neck region. Furthermore, elevated levels of CEA also were found in patients with benign diseases such as chronic bronchitis, emphysema, ulcerative colitis, regional enteritis and alcoholic cirrhosis. Such elevations of CEA levels in nonmalignant diseases limit the usefulness of the an-

tigen as a marker of tumor presence and as a monitor of response to treatment⁽³⁻⁸⁾.

The most pervasive factor shown to be associated with elevations of CEA levels is cigarette smoking, a relationship originally suggested by investigators at the Cancer Diagnostic Laboratory, Hoffman-La Roche Inc. Stevens and Mackay subsequently described a 15% incidence of elevated CEA levels in normals with a smoking history of over 15 cigarettes a day, compared to only 1.8% incidence in age-matched nonsmokers. Others confirmed the observation of elevated CEA levels in cigarette smokers. In 97% of nonsmoker healthy persons, the levels of serum CEA were found normal (2.5 ngr/ml)⁽⁹⁾.

Today, CEA is an antigen which is used to show early detection of malignancy to follow metastasis and clinically as an indicator of recurrence postoperatively or as a monitor of therapy in known cancer patient⁽¹⁰⁻¹⁵⁾.

The purpose of this study was to show the difference of CEA levels between smoker and nonsmoker persons who work in the tobacco mixing unit in the Tobacco Factory of Samsun Province, Turkey.

MATERIALS AND METHODS

The data were collected from 84 tobacco workers who work in the Tobacco Factory of Samsun Province and the control group for the study comprise 74 farmers who live in a rural area.

In the first step, a questionnaire form was applied to the study population. After collecting the knowledge of their demographic characteristics and diseases, past and family history, the duration of smoking and the number of cigarette per day, the control group was matched to these charac-

teristics with the tobacco workers. The study group consisted of 43 smokers and 41 nonsmokers among the workers in the Tobacco Factory. The control group was chosen from healthy persons. Of these, 37 were smokers and 37 were nonsmokers.

In the second step, 3 cc blood samples were taken from the study and control subjects who were accepted as healthy persons according to their past and family history and clinical examinations. The serum CEA levels were determined by Amerwell CEA Assay (Radio immuno assay) technique.

Statistical analysis of the data consisted of khi-square test for trend and student-t. Statistical significance was considered at $p < 0.05$.

RESULTS

The characteristics of study population are presented in Table I. No statistically significant differences of demographic values were observed between the tobacco workers and the control group ($p > 0.05$).

Table-I: Characteristics of Study Population

Characteristics	Tobacco Workers	Control Group	Test for Trend
	(n=84)	(n=74)	
Age (mean)	36.6	38.3	NS*
Sex (male %)	52.0	53.0	NS
Smoker (%)	52.3	50.0	NS
Nonsmoker (%)	47.7	50.0	NS
Education Level			
Primary School	80.0	84.0	NS
High Schoolh	20.0	16.0	NS

* NS: Not statistically significant

Table II shows the mean values of CEA levels among tobacco workers. It was found 2.576 ± 0.037 ngr/ml for nonsmokers and 2.986 ± 0.243 ngr/ml for smokers. There was no statistically significant ($p > 0.05$) differences in the CEA levels between smoking and nonsmoking tobacco workers.

Table-II: Difference of CEA Levels in the Tobacco Workers

	CEA (ng/ml)	
	n	Mean±SD
Nonsmokers	41	2.576 ± 0.037
Smokers	43	2.986 ± 0.243

Student-t test: 1.668, $p > 0.05$

As shown in Table III, in the control group the mean values of CEA levels of smokers and nonsmokers were 2.968 ± 0.129 ngr/ml and 2.039 ± 0.038 ngr/ml, respectively and there was a statistically significant ($p < 0.05$) difference among these values.

Table-III: Difference of CEA Levels in the Control Group

	CEA (ng/ml)	
	n	Mean±SD
Nonsmokers	37	2.039 ± 0.038
Smokers	37	2.968 ± 0.129

Student-t test: 3.196, $p < 0.05$

Among smokers we found statistically nonsignificant ($p > 0.05$) differences in the mean values of CEA levels between tobacco workers and control group (Table IV).

Table-IV: Comparison of CEA Levels Between Smoking Tobacco Workers and Smoking Control Group Subjects

	CEA (ng/ml)	
	n	Mean±SD
Tobacco Workers	43	2.986 ± 0.243
Control Group	37	2.968 ± 0.129

Student-t test: 0.346, $p > 0.05$

As shown in Table V, in nonsmokers there were differences among the mean values of CEA levels. But, this was statistically nonsignificant ($p > 0.05$).

Table-V: Comparison of CEA Levels Between Nonsmoking Tobacco Workers and Nonsmoking Control Group Subjects

	CEA (ng/ml)	
	n	Mean±SD
Tobacco Workers	41	2.570 ± 0.037
Control Group	43	2.039 ± 0.038

Student-t test: 0.703, $p > 0.05$

DISCUSSION

The purpose of this study was to determine the effect of working in the Tobacco Factory on the level of CEA in workers. There were 84 tobacco workers in the study group. Of these, 41 were nonsmokers and 43 were smokers. There was no statistically significant differences in the CEA levels between smoking and nonsmoking tobacco workers.

John C. Alexandre et al.⁽⁹⁾ determined

serum CEA levels by Henen-Z-Gel technique in healthy volunteers. The mean of CEA levels was significantly higher in smokers than in nonsmokers and a significantly higher percentage of smokers had elevated CEA levels. Investigators at the Cancer Diagnostic Laboratory, Hoffman-La Roche Inc. described a 15% incidence of elevated CEA levels in normals with a smoking history of over 15 cigarettes per day, compared to only 1.8% incidence in nonsmokers. Stevens and Mackay⁽⁹⁾ in their researches confirmed the observation of elevated CEA levels in cigarette smokers.

According to our data, similar results were found in control group. The mean of CEA levels was significantly higher in smokers than in nonsmokers in the control group.

Among smokers, the mean CEA levels of tobacco workers and control group were very similar. But, among nonsmokers the mean of CEA levels of tobacco workers were higher than control group ($p < 0.05$).

In summary, working in the tobacco factory causes an increase in the levels of CEA. The reason of this increase may be inhalation or some other way such as swallowing or dermal contact with tobacco dust. It is therefore suggested that in this type of working places screening by regular intervals to take measures is necessary.

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