

PublisherInfo		
PublisherName	:	BioMed Central
PublisherLocation	:	London
PublisherImprintName	:	BioMed Central

Antioxidant nutrients are associated with better lung function

ArticleInfo		
ArticleID	:	1650
ArticleDOI	:	10.1186/rr-2001-68584
ArticleCitationID	:	68584
ArticleSequenceNumber	:	61
ArticleCategory	:	Paper Report
ArticleFirstPage	:	1
ArticleLastPage	:	4
ArticleHistory	:	RegistrationDate : 2001-9-20 Received : 2000-8-14 Accepted : 2001-9-20 OnlineDate : 2001-9-20
ArticleCopyright	:	Biomed Central Ltd2001
ArticleGrants	:	
ArticleContext	:	129312211

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Keywords

Antioxidants, chronic obstructive pulmonary disease, COPD, nutrition, population study

Introduction

The literature supports a role for protease/antiprotease and oxidant/antioxidant imbalance in the pathogenesis of chronic obstructive pulmonary disease (COPD). This disease is characterized by chronic persistent expiratory limitation, as measured mainly by the spirometric index, FEV₁ (forced expiratory volume in the first second). Previous reports, including the first and second articles from the National Health and Nutrition Examination Surveys, suggested that FEV₁ and respiratory symptoms are positively associated with intake of antioxidant nutrients. This is the first study to examine effect of all the main antioxidant nutrients on lung function in a large, general population.

Comments

Several data in literature support a role for oxidant/antioxidant imbalance in the pathogenesis of COPD. This large study of a general adult population has several strong points: sample size; good methodology; bias correction (particularly for tobacco smoking); assessment of the actual antioxidant intake using serum analyses; and consideration of different major antioxidants together. The main weakness is the cross-sectional design, which precludes causal inference. The paper presents important data which should influence future research.

Methods

Approximately 18,000 adults took part. Respiratory function was measured and serum samples taken for biochemical analyses of vitamin C, vitamin E, β -carotene, and selenium).

Dietary intake was evaluated by a questionnaire on 24 h dietary recall and standard nutrient database composition.

Regression methods were used to assess the relation of dietary or serum antioxidants to FEV₁, both individually and jointly.

Dietary and serum variables were considered in separate models. Different variables were considered for data adjustment (eg sex, age, race, height, body mass index, and interestingly, smoking habit).

Results

The main finding was that higher levels of dietary antioxidants are associated with better lung function. Vitamin supplementation had no impact on lung function. Stratification for smoking habit (the main risk factor for COPD) yielded different results for each antioxidant. In current smokers, serum β -carotene showed a less positive association with FEV₁, inversely correlated with the number of cigarettes, while serum selenium had a stronger positive association with lung function, independent of smoking dose. Lung function of former smokers was similar to that of nonsmokers.

Discussion

This study confirms that dietary antioxidants are positively related to lung function in a general population. The strength of the association varies across smoking categories. Data are cross-sectional and assume that dietary and serum antioxidant levels at a certain point in time may reflect long-term levels. This research strengthens the need for prospective investigation of the role of oxidants/antioxidants in lung disease.

Additional information

References

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