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Tobacco: Our Old Enemy is Threatening Our Lives More than Ever Before

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COLUMN ARTICLE

Abstract

Tobacco is a well-known, highly investigated cardiovascular risk factor. It has found in many forms for our daily utilization. This short and brief summary covers the pharmacologic properties of tobacco, its main cardiovascular effects, and its degree of threat to humanity.

Keywords: Tobacco; Nicotine; Cardiovascular Risk

The tobacco epidemic is one of the biggest public health threats the world. Tobacco consuming have reached up to 1.1 billion people, which the humankind has ever faced. Tobacco is killing more than 6-8 million people a year around the world. If we compare to European Countries population this means, 1/7 of Great Britain, 1/8 of France, 1/9 of Italy or half of Romania population. More than 7 million of those deaths are the result of direct tobacco use whilst 1.2 million are the result of second-hand (exhaled smoke from a person to another person) non-smokers, which were the result of exposing to tobacco of another persons' exhaling product.

Third-hand smoke results when exhaled smoke gets and sticks on surfaces (Carpets, Clothes, Chairs, Tables, Hair etc.) release as a nonvisible smoke but one can smell of that tobacco. This Third-hand smoking, which has been demonstrated in mice yielding to damage the liver and lungs, also complicates wound healing and cause hyperactivity [1]. When we combine third-hand smoking with the western diet demonstrated increased oxidative stress as well as developing more severe insulin resistance [1]. This whole process also explains the mechanism of weight-loss among tobacco users as first or second-hand tobacco consuming, while Nicotine decreases appetite by affecting the brain and some hormone levels, it results also in increased oxidative stress [1].

Nicotine is a natural alkaloid found primarily in tobacco leaves. Inhaling is most commonly result from cigarette smoking. A cigarette contains 10 to 15 mg of Nicotine and delivers on average 1 mg of Nicotine to the smoker.

The peak plasma Nicotine concentration during smoking is 10 to 50 ng/mL. The half-life averages two hours. Lung, liver and kidney [2] metabolize approximately 80 to 90 percent of Nicotine. Principal metabolite of Nicotine is Cotinine, which has a plasma concentration that is 10-fold higher than nicotine. Cotinine has a half-life of 15 to 20 hours and is used as a biomarker of nicotine exposure [2].

Nicotine binds to nicotinic cholinergic receptors that are located in the brain, autonomic ganglia, the adrenal glands, and at neuromuscular junctions [3,4]. The major Cardiovascular effect of Nicotine is Sympathetic Nervous System stimulation of the body. This stimulation mostly occurs on brain stem as well as the caudal parts of the spinal cord [3-5].

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Nicotine also enhances the release of various neurotransmitters, including Epinephrine, Norepinephrine, Dopamine, Acetylcholine, Serotonin, Vasopressin, Glutamate, Nitric oxide, Calcitonin growth-related peptide, and Beta-endorphin, which some of these may contribute to the effects of nicotine on blood vessels [4].

Smoking is an important and established risk for myocardial infarction and other coronary events, including myocardial infarction and angina pectoris [6].

The mechanisms by which cigarette smoking accelerates atherosclerosis and precipitates acute coronary events are complex. There are a number of ways in which nicotine can affect the cardiovascular system to increase the risk of atherosclerosis and cardiovascular events such as myocardial infarction;

1. Increased myocardial work
2. Coronary vasoconstriction
3. Increased inflammation
4. Hypercoagulable state
5. Endothelial dysfunction
6. Adverse effects of Nicotine on blood lipid profile.

These effects can be seen by the inhalation of some certain combustion products, including Oxidizing chemicals, Acrolein, Butadiene, Metals (such as Cadmium), Polycyclic Aromatic Hydrocarbons, Particulates, and Carbon monoxide. Oxidizing chemicals increase free radicals, increase lipid peroxidation, and contribute to several potential vascular mechanisms of cardiovascular disease, including inflammation, endothelial dysfunction, oxidation of low-density lipoprotein (LDL), and platelet activation. We all know this whole flowing process as 'Atherosclerosis'.

Other nicotine products and cardiovascular risk

Smokeless tobacco and e-cigarette

Smokeless tobacco (e.g. oral snuff or chewing tobacco) and electronic cigarettes (e-cigarettes) utilized widely in this regard, which Nicotine is the mostly absorbed through the mucosa from smokeless tobacco products [7-9].

These products created to switch from real Nicotine to these products just for replacing or giving up Nicotine consumption with more healthy assumed and acceptable products. However, 'Smokeless Tobacco' (Loose Snuff or Chewing) may contribute to high blood pressure because of high Sodium ingredient as well as its active ingredient Licorice and Glycyrrhizin acid yielding to mineralocorticoid like activity, such as hypertension and potassium loss [10].

The nicotine-containing products (cigarettes, oral snuff, and chewing tobacco) were associated with significant increases in heart rate throughout the day but no change in blood pressure [11].

Smoking cessation reduces cardiovascular morbidity and mortality for smokers with or without cardiovascular disease but is particularly important for patients at high risk for coronary events. Although it is hard for them to quit smoking, we must force and encourage these patients in terms of quitting smoking and try to educate them for the harms of Nicotine.

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