

Acute Effects of Tobacco and Non-tobacco Cigarette Smoking on the Blood Pressure and Heart Beat Rate

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Abstract

Smoking of tobacco cigarettes is associated with a rise in blood pressure together with an increase in heart beat rate. This study examined the acute effect of tobacco and non-tobacco cigarette smoking on the blood pressure and heart beat rate by randomized crossover study involved 39 volunteers. In the results, systolic blood pressure and heart beat rate changes after smoking were significantly different in non-tobacco cigarette smoking group from in tobacco cigarette smoking group.

Introduction

The established risk factors for cardiovascular disease include smoking, high plasma lipid concentration(particularly cholesterol), high blood pressure, obesity, factors associated with fetal and infant growth, diabetes, risk of thrombogenesis, lack of physical activity and some dietary factors.

Various studies have analysed the relationship between cigarette smoking and blood pressure and physical activity and have shown that the smoking of tobacco cigarettes is associated with a rise in blood pressure together with an increase in heart beat rate. These effects have been attributed to the nicotine present in tobacco smoke, this compound being known to stimulate catecholamine release from both sympathetic neurons and the adrenal medulla. Nicotine also stimulates reflex increases in blood pressure and heart beat rate through its actions on carotid and aortic chemoreceptors.

We studied non-tobacco cigarettes manufactured from *Eucommia ulmoides* about the effects on blood pressure and heart beat rate in comparison with tobacco cigarettes sold most commonly. Because non-tobacco cigarettes have no nicotine in them, It might be expected that they would not share the hypertensive and tachycardiac effects of tobacco cigarettes. This study was designed to examine these hypothesis.

Materials and Method

We used non-tobacco cigarette made from *Eucommia ulmoides* by UDS corp. and This for tobacco cigarette because it has been smoked by most Korean people.

This randomized crossover study involved 39 volunteers(15 females and 24 males) each of whom had given written informed consent. All of them was smokers and aged between 20-60 and had no specific cardiovascular disease.

On each study day the subjects fasted(except for water and fruit juice) and refrained from smoking for 6h before attending the research center in the early evening. Upon arrival they were seated comfortably for rest. After 20min seated rest, blood pressure and heart beat rate were recorded using US Baumanometer, stethoscope and stopwatch.

Then, subjects belong to A group smoked 3 non-tobacco cigarettes and other subjects (belong to B group) smoked equal tobacco cigarettes up to clearing off for 20min and recorded blood pressure and heart beat rate every 15min for 1 hour.

Results and Discussion

Factors probed to be statistically significantly related to basal blood pressure in this study were age, gender, years of smoking, amount of meat intake, amount of fish intake, amount of coffee intake.

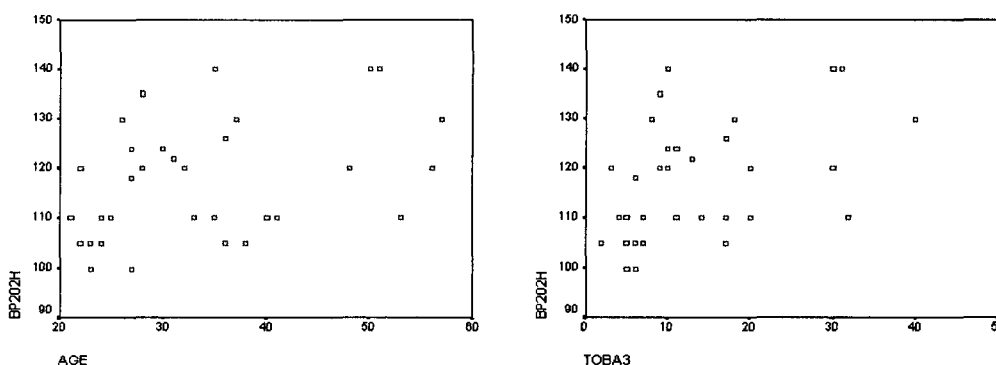


Fig. 1. Correlation between basal blood pressure(BP202H) and age and years of smoking(TOBA3).

Table 1. Coefficients of major variables for baseline blood pressure

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	161.612	13.649		11.840	.000
AGE	-.468	.440	-.414	-1.064	.297
Years of smoking	.912	.479	.745	1.905	.067
Freq. of meat intake	-1.244	2.759	-.071	-.451	.655
Freq. of fish intake	-8.081	3.008	-.370	-2.687	.012
Freq. of coffee intake	-5.042	2.371	-.298	-2.127	.042

Systolic blood pressure changes after smoking were significantly different between non-tobacco cigarette smoking group and tobacco cigarette smoking group. Especially increase of systolic blood pressure at the first measurement(20 minutes after smoking start) was remarkable in tobacco group. But, this blood pressure change was not shown in non-tobacco group.

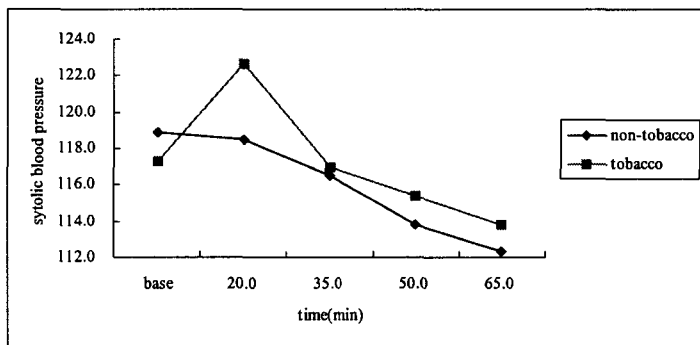


Fig. 2. Systolic blood pressure change in A group

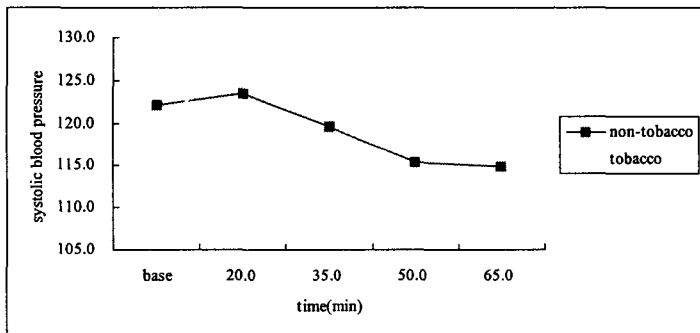


Fig. 3. Systolic blood pressure change in B group

Table 2. Variation of heart beat rate after smoking

Group	time(min)	non-tobacco		tobacco	
		female	male	female	male
A group	Base	75.0	70.2	72.0	72.0
	20	76.0	69.8	82.0	69.3
	35	74.0	70.7	80.0	70.2
	50	74.0	69.3	77.0	67.6
	65	73.0	72.0	77.0	69.3
B group	Base	79.3	76.0	77.3	74.4
	20	72.0	72.0	81.3	77.8
	35	72.0	68.4	78.0	71.8
	50	72.0	70.0	80.0	72.4
	65	70.0	70.4	78.0	76.0

It was shown that decrease in heart beat rate after smoking in non-tobacco female group and increase in heart beat rate in tobacco female group.

Conclusion

Because of absence of nicotine, non-tobacco cigarette smoking made different effects about blood pressure and heart beat rate.

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• Poster Presentation •

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