Smoking and Risk of Ischemic Stroke in Young Men

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Background and Purpose—There is a strong dose–response relationship between smoking and risk of ischemic stroke in young women, but there are few data examining this association in young men. We examined the dose–response relationship between the quantity of cigarettes smoked and the odds of developing an ischemic stroke in men under age 50 years.

Methods—The Stroke Prevention in Young Men Study is a population-based case–control study of risk factors for ischemic stroke in men ages 15 to 49 years. The $\chi^2$ test was used to test categorical comparisons. Logistic regression models were used to calculate the odds ratio for ischemic stroke occurrence comparing current and former smokers to never smokers. In the first model, we adjusted solely for age. In the second model, we adjusted for potential confounding factors, including age, race, education, hypertension, myocardial infarction, angina, diabetes mellitus, and body mass index.

Results—The study population consisted of 615 cases and 530 controls. The odds ratio for the current smoking group compared with never smokers was 1.88. Furthermore, when the current smoking group was stratified by number of cigarettes smoked, there was a dose–response relationship for the odds ratio, ranging from 1.46 for those smoking <11 cigarettes per day to 5.66 for those smoking 40+ cigarettes per day.

Conclusions—We found a strong dose–response relationship between the number of cigarettes smoked daily and ischemic stroke among young men. Although complete smoking cessation is the goal, even smoking fewer cigarettes may reduce the risk of ischemic stroke in young men. (Stroke. 2018;49:00-00. DOI: 10.1161/STROKEAHA.117.018859.)

Key Words: risk factors ■ smoke ■ smoking ■ stroke ■ tobacco products
Results

Among the participants, 615 of 625 cases and 530 of 537 controls had complete data for all covariates, leaving a final study population of 1145 subjects. Cases were less educated and were more likely to have hypertension, diabetes mellitus, myocardial infarction, angina, and obesity (body mass index >30; all \( P < 0.05 \)). Among controls, current smokers were less educated and were more likely to be black than their non-smoking counterparts (all \( P < 0.05 \); Table 1).

Table 2 shows that in the age-adjusted model, the odds ratio for the current smoking group compared with never smokers was 1.88 (95% confidence interval, 1.44–2.44). Furthermore, when the current smoking group was stratified by number of cigarettes smoked, there was a dose–response relationship for the odds ratio, ranging from 1.46 (95% confidence interval, 1.04–2.06) for those smoking \(<11\) cigarettes per day to 5.66 (95% confidence interval, 2.14–14.95) for those smoking \(40+\) cigarettes per day. In the fully-adjusted model, there is a similar dose response observed but with slightly lower odds ratios. In the age-adjusted model, the odds ratio for the former smoking group compared with never smokers was 1.42 (95% confidence interval, 1.01–1.99), with similar results for the fully-adjusted model (Table 2).

Discussion

Our study demonstrates a strong dose–response between amount of cigarettes smoked and risk of IS in young men.
There is evidence for a dose–response relationship between cigarette smoking and risk of stroke in middle-aged and older adults as well; however, the association is less strong.\(^6\) Our finding is consistent with results from prior studies of women and young adults in general.\(^2,5,7\) Our earlier study among women similarly demonstrated a strong dose–response relationship between current cigarette smoking and IS risk.\(^5\) A study of young adults in Iowa demonstrated a dose response between amount of current cigarette smoking and IS risk but did not stratify their findings by sex.\(^6\) These studies demonstrate that smoking amount is an important risk factor for IS but do not characterize the dose–response relationship in young male smokers.

Our study builds on this research by focusing on young men. Our results are in line with the findings of a Swedish study of young men that analyzed smoking history among military recruits ages 18 to 20 years as a predictor of IS before age 45 years.\(^8\) Compared with the Swedish study, a strength of our study is that it includes a more ethnically diverse population and is adjusted for education.

Our study also has several limitations. Because we did not record the use of other tobacco products, we cannot exclude the possibility that concurrent use of these products could have affected our results. Similarly, we did not control for factors such as alcohol consumption and physical activity in our model, which may have resulted in unmeasured or residual confounding of our risk estimates. Another limitation of our study is the case–control design, which allows for the possibility of differential recall bias by case–control status. However, the similar findings in the Swedish study, derived from a cohort design, suggest that there was not a major effect from differential recall bias.

Smoking rates among patients hospitalized for IS have been increasing.\(^3\) The clinical implications of our finding are that while complete cessation of smoking is the goal, even reducing the number of cigarettes smoked may have beneficial health effects.

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Disclosures

Dr Merino serves as US Research Editor for the British Medical Journal, stroke outcome adjudicator for the Women’s Health Initiative, and coeditor of the Blogging Stroke Blog of the Stroke Journal. The other authors report no conflicts.

References

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