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American Heart Association rapid access journal report:

Smoking and high blood pressure: a double blow for bleeding stroke risk

DALLAS, March 7 – Smoking may exacerbate the increased risk of a blood vessel bursting inside the brain (intracerebral stroke) already faced by people with high blood pressure, according to a new study in *Stroke: Journal of the American Heart Association*.

“Smoking and high blood pressure both increase the risk of hemorrhagic stroke. Since we found that these two risk factors have a synergistic effect, quitting smoking and lowering blood pressure will contribute more to preventing stroke than if this previously unreported interaction is ignored,” said Koshi Nakamura, M.D., Ph.D., lead author of the study.

The study found that for every 10 millimeters of mercury (mm Hg) increase in systolic blood pressure (the top number in a reading), smokers face an additional 15 percentage point increase in risk of hemorrhagic stroke (bleeding in the brain), compared with nonsmokers.

“Hemorrhagic stroke is an especially debilitating stroke as about half of the people who have one die as a result of it, while many survivors are left with paralysis or other debilitating effects,” said Rachel Huxley, D.Phil., a study co-author.

High blood pressure and smoking are both major risk factors for cardiovascular diseases. Some research suggests they are the first and second most common contributing factors of death in the world, together contributing to more than one in five deaths worldwide, said Nakamura, a visiting research fellow in the nutrition and lifestyle division at The George Institute for International Health in Sydney, Australia.

The researchers used data on 563,144 people (82 percent Asian, 35 percent women, and average age 47) in the Asia Pacific Cohort Studies Collaboration (APCSC) to examine whether smoking increased the risk of stroke and coronary heart disease in people with high blood pressure.

More than a third (37 percent) of the participants were smokers at the start of the study. During a median of 6.8 years of follow-up, 746 of the 210,961 smokers and 899 of the 352,183 nonsmokers suffered a hemorrhagic stroke.

For every 10 mm Hg increase in systolic blood pressure, smokers faced an 81 percent increase in hemorrhagic stroke risk, while nonsmokers faced a 66 percent increase in risk — a 15 percentage point increased risk in smokers than nonsmokers. This effect of smoking on blood

pressure was specific to hemorrhagic stroke as there was no evidence to indicate a similar effect on the risk of coronary heart disease or ischemic stroke, researchers said.

Systolic blood pressure (SBP) is the pressure when the heart beats. The lower number in a blood pressure reading is called the diastolic blood pressure (DBP) and is the pressure between beats. Normal blood pressure is defined as SBP below 120 mm Hg and DBP below 80 mm Hg. High blood pressure is defined as blood pressure of 140 mm Hg systolic and/or 90 mm Hg diastolic or greater.

Compared with smokers with the lowest systolic blood pressure readings (120 mm Hg or less), smokers with the highest readings (150 mm Hg or greater) were 9.32 times more likely to suffer a hemorrhagic stroke. For nonsmokers, being in the highest versus the lowest SBP group raised the risk of hemorrhagic stroke by 7.05 times.

Smoking did not appear to exacerbate the impact of systolic blood pressure on the risk of coronary heart disease or ischemic stroke (strokes caused by a blood clot).

The researchers speculated that smoking may damage blood vessels in the brain that are already weakened by high blood pressure. Weakened blood vessels are prone to rupture and bleeding and hence are particularly susceptible to hemorrhagic stroke.

Other co-authors are Federica Barzi, Ph.D.; Tai-Hing Lam, M.D.; Valery L. Feigin, M.D.; Hirotugu Ueshima, M.D.; Jean Woo, M.D.; Dongfeng Gu, M.D.; Takayoshi Ohkubo, M.D.; Carlene M.M. Lawes, Ph.D.; Il Suh, M.D. and Mark Woodward, Ph.D.

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Editor's note: The American Heart Association strongly supports the Family Smoking Prevention and Tobacco Control Act, legislation giving the U.S. Food and Drug Administration (FDA) adequately funded and meaningful authority over the manufacture, sale, distribution, labeling and promotion of tobacco products. The association also advocates for comprehensive clean indoor workplace policies, as well as increases in tobacco excise taxes and tobacco control prevention and cessation programs.