Study: Nitrus Oxide Does Not Increase Heart Attacks

Nitrous oxide — best known as laughing gas — is one of the world's oldest and most widely used anesthetics. Despite its popularity, however, experts have questioned its impact on the risk of a heart attack during surgery or soon afterward. But those fears are unfounded, a new study indicates.

The findings by researchers at Washington University School of Medicine [1] in St. Louis will appear in the July issue of the journal *Anesthesiology.*

"It's been known for quite a while that laughing gas inactivates vitamin B12 and, by doing so, increases blood levels of the amino acid homocysteine," said lead author Peter Nagele, MD, assistant professor of anesthesiology and genetics. "That was thought to raise the risk of a heart attack during and after surgery, but we found no evidence of that in this study."

Nitrous oxide normally is used as an adjunct during general anesthesia because by itself the drug isn't strong enough to keep patients unconscious during surgical procedures. The drug's influence on B vitamins and homocysteine is unrelated to its anesthetic effects.

Nagele and his colleagues followed 500 surgery patients at Barnes-Jewish Hospital [2] in St. Louis who had been diagnosed with coronary artery disease, heart failure or other health problems that could contribute to a heart attack. All subjects in the study had noncardiac surgery and received nitrous oxide anesthesia.

The patients were divided into two groups. Half received intravenous vitamin B12 and folic acid to help prevent homocysteine levels from rising during surgery. The others did not get the intravenous B vitamins.

"There were no differences between the groups with regard to heart attack risk," Nagele said. "The B vitamins kept homocysteine levels from rising, but that didn't influence heart attack risk."

To detect heart attacks during and after surgery, the researchers monitored a marker of heart damage, cardiac troponin I, for 72 hours. A rise in troponin levels indicates damage to the heart. But they found no link between patients' homocysteine and troponin levels.

The study also looked at gene variations that naturally lead to elevated homocysteine. Individuals with common variants in the MTHFR gene already make excess homocysteine. If people with those variants then get nitrous oxide anesthesia, their levels can climb even higher.

But only 3.1 percent of patients with the high-risk genetic variants had heart attacks during or after surgery, compared with 4.7 percent of the patients who didn't have the risky variants. Neither the gene variation nor treatment with B vitamins had an effect on troponin levels following surgery.

"People who had the gene variant did, indeed, develop very high levels of homocysteine in response to nitrous oxide," Nagele said. So the question is whether those patients would be at a higher risk for heart attack, and that answer is no."

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