Angina pectoris worsened by mouthwash

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ABSTRACT

We report a case of variant (Prinzmetal's) angina pectoris in a 51-year-old man in whom coronary angiography revealed sluggish flow of contrast material. His chest pain was not controlled with standard antianginal therapy, but it resolved after discontinuation of mouthwash. This is the first case of angina pectoris reported that vastly improved after discontinuation of mouthwash.

KEYWORDS Angina pectoris; bacteria; chest pain; mouthwash; nitrate; nitric oxide

Antiseptic mouthwash disrupts the bacteria-driven mechanism of reducing nitrate (NO_3) to nitrite (NO_2), an important step in the production of nitric oxide (NO). We present a case report of angina pectoris that improved by discontinuing the use of mouthwash.

CASE DESCRIPTION

In May 2018, a 51-year-old man presented to his primary care physician with progressive exertional chest tightness and dyspnea. His electrocardiogram was normal. Laboratory results were notable for a mildly elevated low-density lipoprotein of 111 mg/dL. Chest computed tomography showed mild coronary artery calcification but normal lung parenchyma. Transthoracic echocardiogram showed normal left ventricular cavity size and normal systolic function. There were no obvious segmental wall motion abnormalities. During treadmill stress testing with myocardial perfusion imaging, the patient developed chest pain and hypotension that resolved with rest. Coronary angiography disclosed mild, nonobstructive coronary artery disease and sluggish flow with contrast injection (*Figure 1*), which improved with nicardipine administration. The patient was unable to tolerate nitrate-based medications and therefore began nifedipine 120 mg daily, later transitioning to amlodipine, but still had angina even at moderate workloads. The patient stopped using his twice-per-day mouthwash after finding articles on the ability of mouthwash to interfere with oral commensal bacteria, and within 3 weeks all symptoms resolved.

DISCUSSION

The mouthwash used by our patient contained eucalyptol, menthol, and thymol, which have been shown to have antimicrobial activity.^{1–3} In our patient's case, we hypothesize that his twice-daily use of mouthwash resulted in difficulty controlling his angina pectoris. Although the patient was fully compliant with his vasodilator medications, and although he increased nitrate-containing foods in his diet, his high mouthwash utilization lowered his ability to produce NO through the commensal bacteria NO_3 - NO_2 -NO pathway (*Figure 2*).⁴ Dietary nitrate has been shown to harbor cardiovascular benefits, such as improving endothelial function, reducing arterial stiffness, reducing mean arterial blood

Figure 1. The patient's coronary angiography.

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Received May 20, 2019; Revised June 6, 2019; Accepted June 10, 2019.

Figure 2. The role of oral flora in the $\text{NO}_3\text{-NO}_2\text{-NO}$ pathway. Reprinted from Qu et al.⁴ with permission from Sage.

pressure, and inhibiting platelet aggregation.⁵⁻⁷ These benefits can be reduced with antiseptic mouthwash, which interrupts the conversion of nitrate to nitrite in the oral cavity.⁷ There is no report of using this information therapeutically for angina pectoris, where discontinuing mouthwash has been found to relieve anginal symptoms. Therefore, this case represents the first description of using this information in a clinical setting to alleviate a patient's symptoms.

ACKNOWLEDGMENTS

The Department of Cardiology at New York Presbyterian–Weill Cornell.

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