***April 15, 2025***

## Rethinking Stroke Risk in Patients with Atherosclerotic Carotid Stenosis

*Multicenter study suggests stroke prevention guidelines may underestimate risk in patients with symptomatic mild carotid stenosis*

**Current risk assessment guidelines for ischemic stroke may underestimate patients with mild carotid stenosis. A Japanese multicenter study found that unstable plaque—particularly intraplaque hemorrhage—was a key stroke predictor. Surgical intervention, such as carotid endarterectomy, significantly reduced stroke risk compared to medical therapy alone. These findings could prompt a shift in how physicians assess and treat mild but symptomatic carotid artery disease.**

Ischemic stroke remains one of the leading causes of death and long-term disability worldwide, with narrowing of the carotid artery due to atherosclerosis contributing to up to 30% of all cases. For decades, medical practitioners have primarily relied on the degree of carotid narrowing (stenosis) to assess the risk of stroke and determine the best treatment options. However, mounting evidence suggests that this approach may be insufficient for patients with mild but symptomatic carotid stenosis.

Despite being classified as 'low-risk' due to having less than 50% carotid artery narrowing, a significant number of patients with mild carotid stenosis continue to experience recurrent ischemic events, even when receiving appropriate medical therapy. This implies that factors beyond the degree of stenosis may play a crucial role in determining stroke risk for this patient population.

To address this gap, a team including Lecturer Daina Kashiwazaki and Dr. Satoshi Kuroda from Toyama University, Japan, aimed to tackle this knowledge gap via their 'Mild but Unstable Stenosis of Internal Carotid Artery (MUSIC)' study. This multicenter prospective cohort study, which was published online on February 21, 2025, in the *Journal of Neurosurgery*, investigated the clinical features, radiological findings, and treatment outcomes of patients with symptomatic mild carotid stenosis.

The researchers enrolled 124 patients who had experienced cerebrovascular or retinal ischemic events ipsilateral (same side) to mild carotid stenosis. While all participants received the best medical therapy (BMT) for their condition, carotid endarterectomy (CEA)—the surgical removal of plaque—or carotid artery stenting (CAS) was performed in 63 patients. Patients were followed up for two years, with the primary endpoint being the occurrence of ipsilateral ischemic stroke.

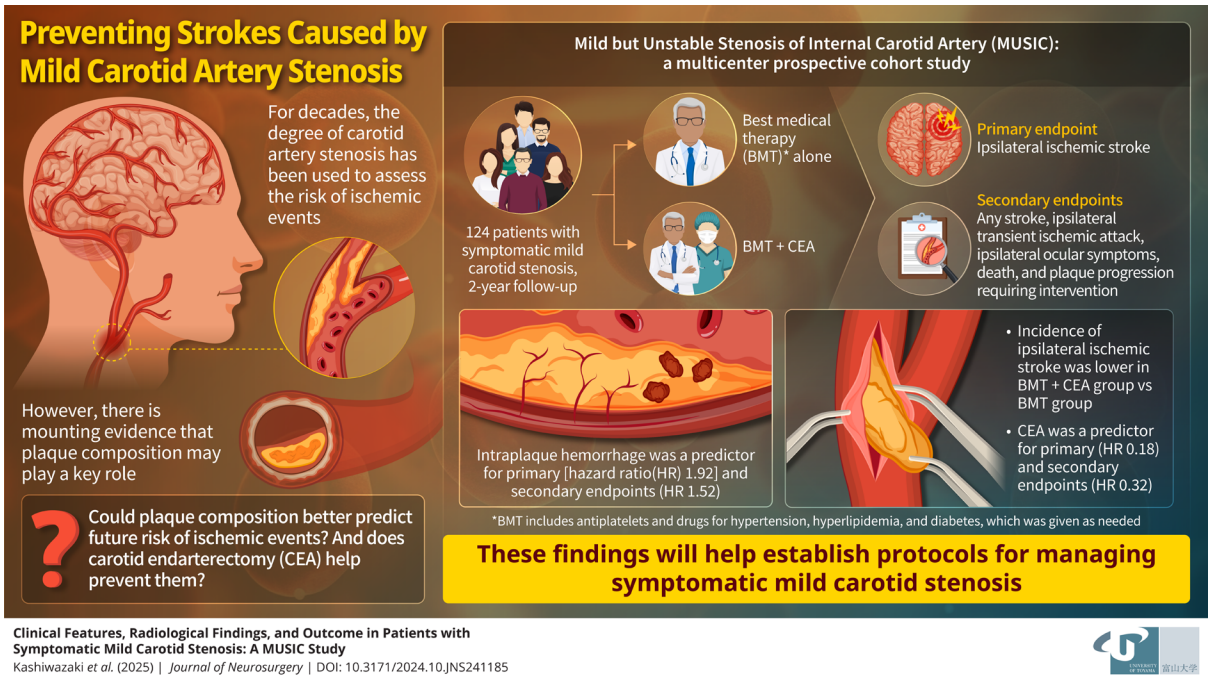
The findings were quite striking: approximately 81% of patients had radiologically unstable plaque, with 59.5% exhibiting intraplaque hemorrhage (IPH). This type of plaque composition was associated with a significantly higher risk of both primary and secondary endpoints, the latter of which included ocular symptoms, any type of stroke, and plaque progression requiring CEA. Additionally, the incidence of ipsilateral ischemic stroke was markedly higher in the group receiving only BMT compared to those who also underwent CEA (15.1% vs. 1.7%). "*The distinctive clinical and radiological features in high-risk patients strongly indicate that plaque composition, namely IPH, but not degree of stenosis, plays a key role in subsequent ischemic events in patients with symptomatic mild carotid stenosis*," explains Kashiwazaki.

This study challenges current medical guidelines, which typically do not recommend CEA for patients with symptomatic mild carotid stenosis. The results demonstrated that CEA significantly reduced the incidence of both primary and secondary endpoints during the two-year follow-up period, with CEA emerging as a protective factor and IPH as a risk factor for recurrent events. Moreover, it is also particularly noteworthy that approximately half of the study participants had been receiving antithrombotic therapy prior to enrollment but still experienced cerebrovascular or ocular events. This suggests that certain patients with mild carotid stenosis may be resistant to conservative medical therapy alone, calling for more proactive interventions.

Overall, the implications of this study could fundamentally alter how physicians approach stroke prevention. "*In the very near future, the evaluation of plaque composition will be an essential examination to predict the risk of further events and to determine treatment strategies in each patient with symptomatic mild carotid stenosis*," notes Kashiwazaki. In this way, by shifting focus from stenosis degree to plaque composition, clinicians may be able to better identify high-risk patients who would benefit from surgical intervention. With any luck, this revised approach could potentially reduce stroke incidence and improve outcomes for a previously underrecognized at-risk population.

This research underscores the need for personalized stroke prevention strategies that go beyond measuring stenosis severity alone.

## Image




**Title:** A prospective multicenter study on mild carotid artery stenosis
**Caption:** Researchers examined the clinical features, radiological findings, and treatment outcomes of patients with symptomatic mild carotid stenosis, seeking to improve current medical guidelines for the management of this patient population.
**Credit:** Lecturer Daina Kashiwazaki from Toyama University, Japan
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## Reference

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## About Toyama University, Japan

University of Toyama is a leading national university located in Toyama Prefecture, Japan, with campuses in Toyama City and Takaoka City. Formed in 2005 through the integration of three former national institutions, the university brings together a broad spectrum of disciplines across its 9 undergraduate schools, 8 graduate schools, and a range of specialized institutes. With more than 9,000 students, including a growing international cohort, the university is dedicated to high-quality education, cutting-edge research, and meaningful

social contribution. Guided by the mission to cultivate individuals with creativity, ethical awareness, and a strong sense of purpose, the University of Toyama fosters learning that integrates the humanities, social sciences, natural sciences, and life sciences. The university emphasizes a global standard of education while remaining deeply engaged with the local community.

Website: https://www.u-toyama.ac.jp/en/

**About Lecturer Daina Kashiwazaki from Toyama University, Japan**

Dr. Daina Kashiwazaki, MD, PhD, is a Lecturer in the Department of Neurosurgery at Toyama University Hospital. He specializes in neuroscience, neuroimaging, and neurosurgery, and his research interests include the spinal cord, the peripheral nervous system, brain surgery, and stroke prevention. He has over 100 publications on these topics.

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