Stroke classification system called TOAST is easy to use and effective

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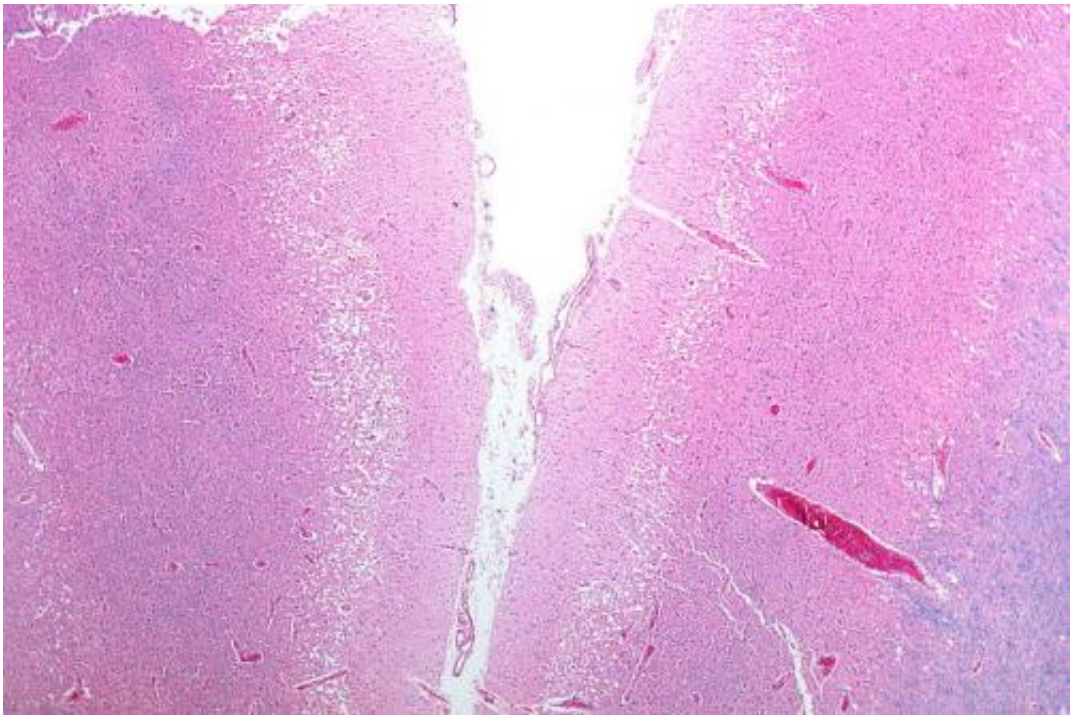

Micrograph showing cortical pseudolaminar necrosis, a finding seen in strokes on medical imaging and at autopsy. H&E-LFB stain. Credit: Nephron/Wikipedia

In 1993, neurologists Harold P. Adams Jr., MD, and Jose Biller, MD, and colleagues proposed a new way to classify strokes.

It became known as the TOAST classification.

Twenty-two years later, the TOAST classification remains an effective and easy-to-use system that is routinely employed in stroke studies around the world, Drs. Adams and Biller report in the journal *Stroke*, published online ahead of print.

Dr. Adams is a professor of neurology and director of Cerebrovascular Disease at the University of Iowa Carver College of Medicine. Dr. Biller is chair of the Department of Neurology of Loyola University Chicago Stritch School of Medicine.

The original article that Drs. Adams, Biller and colleagues wrote describing the TOAST classification has been cited more than 4,600 times, making it one of the most cited articles ever published in *Stroke*.

TOAST is used to classify ischemic strokes, which are caused by blood clots and account for about 85 percent of all strokes. A wide range of diseases can cause blood clots in the brain. Establishing the most likely cause influences both short-term and long-term prognoses. It also affects treatment decisions, especially treatments to prevent recurrent strokes.

In the late 1980s, Drs. Adams and Biller were colleagues at the University of Iowa. They needed to classify strokes for their multi-center clinical trial of a promising clot-busting drug known as Org 10172. The name of the trial, which also became the name of the stroke classification system, was TOAST (Trial of Org 10172 in Acute Stroke Treatment).

Drs. Adams and Biller aggregated groups of ischemic stroke patients into five broad categories representing the most common causes of ischemic stroke: atherosclerosis (hardening) of a large artery; blockage of a small artery; cardioembolism (blood clot that develops in the heart and travels to the brain); other demonstrated causes; and undetermined causes. These broad categories have subcategories.

The system is most useful for real-world stroke research, but it may not be as helpful when determining treatment for an individual patient, Drs. Adams and Biller write. Also, TOAST is not intended for classifying pediatric strokes, and it may not work well in emergency settings because vascular and cardiac imaging studies may not be readily available.

But despite its limitations, and its age, the TOAST classification "remains a useful tool for clinicians and researchers," Drs. Adams and Biller write. "It should not be considered as a static instrument. The system has been and can continue to be modified as advances in the diagnosis of the causes of stroke continue."

More information: Adams, H. P., & Biller, J. (2015). Classification of Subtypes of Ischemic Stroke: History of the Trial of Org 10 172 in Acute Stroke Treatment Classification. *Stroke*. DOI: 10.1161/strokeaha.114.007773

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