Increasing Ischemic Stroke Treatment Rates: What Is a Realistic Goal?

Early aggressive intervention for the treatment of acute ischemic stroke may limit subsequent disability.

BY MARILYN M. RYMER, MD

Fifteen years after US Food & Drug Administration (FDA) approval of the use of intravenous tissue plasminogen activator (IV tPA) for the treatment of acute ischemic stroke, the number of cases being treated is very low. A recent article in the *Journal of the American Medical Association* reported that in the state of New York in 2005 and 2006, 30,947 ischemic stroke cases were diagnosed. In designated stroke centers, 4.8% of cases received IV tPA, and in nondesignated hospitals, the treatment rate was 1.7%.[1]

THE SAINT LUKE'S EXPERIENCE

At Saint Luke's Brain and Stroke Institute (SLBSI) in Kansas City, Missouri, a total of 591 patients with ischemic stroke were admitted in 2010, and 39% (231) were treated acutely; 18.6% of those (110) were treated with IV tPA alone, and an additional 20.4% (121) were treated using endovascular techniques with and without IV tPA on board. Since 2002, the annual acute treatment rate at SLBSI has been above 21%. This reflects the strong regional referral network that has grown up over many years, as well as the well-established acute stroke response once the patient arrives.[2,3] These are essential elements in driving stroke treatment rates up. As there is no national stroke database or registry for acute stroke therapy, it is difficult for large-volume stroke interventional centers to benchmark outcomes.

In addition to the factors mentioned above, there are three emerging trends that are contributing to even more cases being considered for treatment. These are: (1) evidence that people with rapidly improving or mild stroke symptoms (RIMS) should be offered treatment, (2) an expanded time window to 4.5 hours for IV tPA based on the ECASS III study,[4] and (3) endovascular treatment of cases with unknown time of onset based on advanced imaging. The last two were the subjects of an article in *Endovascular Today* in 2010.[5]

RAPIDLY IMPROVING AND MILD SYMPTOMS

Between 2008 and 2010, the percentage of patients receiving IV tPA alone at SLBSI doubled from 9.8% (46/468) to 18.6% (110/591), and the absolute number increased from 46 to 110 cases. Some of the increase reflected the 4.5-hour treatment window, but the majority of the increase was due to a more aggressive approach to RIMS based on evolving evidence.

A LOOK AT THE LITERATURE

Barber et al reported on the Calgary study that found 98 patients who did not receive tPA based on RIMS.[6] Of these patients, 32% remained dependent at discharge or died. Smith et al reported a case series of 41 patients not treated based on mild symptoms; 27% died or were not discharged home.[7] A poster presented at the International Stroke Conference (ISC) in 2006 by Jim Grotta's stroke group in Houston, Texas, reported that of those patients with an initial National Institutes of Health Stroke Scale (NIHSS) score of 0 through 3 who received IV tPA, 90% had a good outcome (modified Rankin scale 0–1 at 90 days) compared to 58% who did not receive treatment.[8]

Dr. Pooja Khatri, a stroke neurologist at the University of Cincinnati, presented a paper at ISC in February 2011 that suggested giving IV tPA to patients with mild strokes (presenting NIHSS 0–5) could prevent 2,000 cases of disability annually.[9] She found that one-third of all patients with mild strokes have some disability at 90 days. Dr. Steven Greenberg, Professor of Neurology at Harvard Medical School, commented in *Neurology Today* when asked about Dr. Khatri's study: "You can almost argue that there is no

such thing as a mild stroke …" and suggested that people with mild strokes are significantly less likely to have a hemorrhagic complication of treatment.[10]

Although many of the mild strokes represent small-vessel disease, it is estimated that 9% to 21% of cases presenting with mild and/or fluctuating symptoms have large-vessel proximal arterial occlusions.[11] Patients with internal carotid artery occlusions are particularly prone to present with fluctuating and, therefore, confusing symptoms. The patient may present with a history of sudden onset of hemiplegia, which has substantially improved by time of arrival at the emergency department. Only with the help of advanced imaging such as computed tomography or magnetic resonance angiography and perfusion studies are these patients properly identified and offered treatment.

FINAL THOUGHT

Through evaluation of evolving evidence and use of advanced imaging, the number of patients eligible for the treatment of acute ischemic stroke should grow substantially, reducing disability and cost of care. ■

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