Wolf Motor Function for RT versus UC was statistically significant at 36 weeks (p=0.005), though no other significant changes in Wolf Motor Function were noted at either 12 or 36 weeks. RT demonstrated significant improvement in Stroke Impact Scale at 12 weeks (p=0.009) and 36 weeks (p=0.04) compared with UC. There was no difference between RT and ICT for any outcome.

There were no treatment-related serious adverse events (AEs) that were observed. However, there were some treatment-related AEs that were associated with RT (12%) and ICT (9%) that were considered transient and mild (Table 1). None of these events occurred in the UC group.

Table 1. Number of Patients Experiencing Treatment-Related AEs (Not Serious).

Treatment-Related AE	RT	ICT	UC
Pain, Stiffness, Soreness	23	7	0
Fatigue	6	0	0
Cut, Scratch, Swell, Bruise	3	5	0
Numbness	2	0	0

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Outcomes were better for RT and ICT than UC over the 36-week evaluation period despite the high severity, chronicity, and incidence of multiple strokes in this patient population. Additionally, RT and ICT curtailed the use of additional health services over time, resulting in overall costs that were similar to those that were associated with UC. This study has shown that high-intensity repetition of movement can improve quality of life and extremity functionality in individuals with stroke-related impairment, concluded Dr. Lo. RT is a safe and effective rehabilitation strategy that merits further investigation.

Improvement in In-Hospital Clinical Outcomes for Ischemic Stroke 2003-2009: Findings from Get With The Guidelines-Stroke

There are many factors that contribute to the increased length of stay and the high morbidity and mortality rates that are associated with acute ischemic stroke. Get With The Guidelines (GWTG)-Stroke, a stroke registry component of a continuous evidence-driven performance improvement program that includes a web-based patient management tool to provide clinical decision-making support, reporting, and patient education elements, was developed to track, measure, and improve the quality of care and outcomes for patients with acute stroke or transient ischemic attack (TIA) in the United States. Recently, GWTG-Stroke data from the first one million stroke and TIA patients demonstrated that quality of care improved significantly from 2003 to 2009 [Fonarow GC et al. *Circulation Cardiovasc Qual Outcomes* 2010]. Lee H. Schwamm, MD, Massachusetts General Hospital, Boston, MA, presented a subset of these findings, including only patients with acute ischemic stroke.

A total of 1392 hospitals participated in GWTG-Stroke, with 601,599 patients admitted for ischemic stroke. Of these 1392 hospitals, 301 were considered core hospitals, defined as participating since 2004. There were 287,477 ischemic stroke patients who were admitted to core hospitals. Analysis was performed on the subset of 601,599 patients from all hospitals and on the subset of 287,477 patients who were admitted to participating core hospitals. The median age was 73 years. Fifty-two percent was female, and 73% was Caucasian. Comorbidities included atrial fibrillation (19%), coronary artery disease/prior myocardial infarction (29%), diabetes mellitus (32%), hypertension (79%), and smoking (20%). The primary outcomes were percentage of patients with lengths of stay (LOS) >4 days, which was the median LOS for the entire cohort, percentage that was discharged to the home with or without services, and percentage of in-hospital deaths.

In the large cohort that included all participating hospitals, mortality and LOS decreased significantly between 2003 and 2009 (p<0.001 for both). There was an increasing trend in the rate of patient discharge to the home (p<0.001) as well (Table 1). However, no significant difference in NIH Stroke Scale was observed over time. The subset of core hospitals demonstrated similar results with regard to mortality, LOS, and discharge home (p<0.001 for all). After adjusting for patient characteristics, such as age, gender, comorbidities, hospital arrival mode, and time of presentation (on vs off hours), and hospital characteristics, such as region, number of beds, annual stroke volume, and teaching versus nonteaching hospital, the core hospitals still demonstrated improvement with regard to mortality (p=0.006), LOS (p<0.001), and discharge home (p=0.309) over the 6-year period.

Overall, hospitals that participated in GWTG-Stroke demonstrated substantial reductions in LOS and in-hospital mortality in patients with acute ischemic stroke, even after adjusting for patient and hospital characteristics and accounting for hospitals that joined midstudy. Results from GWTG-Stroke are quite promising. However,

it is unclear at this point if the improved outcomes that were observed in GWTG-Stroke are owing to improved care, increased adherence to inpatient care process measures, or unmeasured confounders, such as more frequent use of emergency medical services, expanded public education, improvements in in-hospital response times, guideline adherence, and progressive prevention methods, concluded Dr. Schwamm. Further study is needed to establish the origin of these improvements in stroke outcome.

Table 1. Clinical Outcomes at Discharge.

In-Hospital Outcomes (Overall)	Percent
Discharge Destination	
Home	46.0
SNF	20.4
Rehab	21.3
Transfer	2.7
Left AMA	0.5
Hospice	3.6
Death (in-hospital)	
Yes	5.5
Ambulatory Status	
Able to ambulate	47.5
With Assistance	29.9
Unable to ambulate	19.5

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Common Carotid Artery Intima-Media Thickness and Stroke Incidence: Results from the MESA Study

Changes in common carotid artery intima-media thickness (IMT) are associated with stroke incidence in a multiethnic cohort, according to findings from the Multi-Ethnic Study of Atherosclerosis (MESA; NCT00005487) ancillary study for progression of IMT. Common carotid artery IMT is used as a predictive measure for cardiovascular events and stroke. However, studies that investigated the association between common carotid artery IMT and stroke have demonstrated mixed results [Lorenz et al. *Stroke* 2006; Hollander et al. *Stroke* 2002; O'Leary et al. *N Engl J Med* 1999; Chambless et al. *Am J Epidemiol* 2002]. Joseph F. Polak, MD, MPH, Tufts Medical Center, Boston, MA, presented findings from the MESA study.

The MESA study included 6814 individuals from 4 different ethnic groups (Caucasian-white, African-American, Chinese-American, and Hispanic-American) who were free of cardiovascular disease, without symptoms of atherosclerosis, and were capable of follow-up (median follow-up 3.0 years). The IMT progression substudy included 5640 participants. Ultrasonographies of the right common carotid artery were performed during two follow-up visits subsequent to the baseline visit. Ultrasonography studies included diameter curves, determined based on a 20-second-long series, and IMT measurements, determined from image selections at end-diastole.

The occurrence of stroke, defined as symptoms that lasted >24 hours or the detection of a clinically relevant lesion on brain imaging, was determined during the MESA follow-up visits or by phone interview, which was conducted every 9 to 12 months. Risk factors such as age, gender, systolic blood pressure, antihypertensive medications, cholesterol (high-density lipoprotein-HDL and low-density lipoprotein-LDL), diabetes, smoking, education, income, and ethnicity were also evaluated during this study, and Cox proportional hazards models were adjusted accordingly. Within this substudy, 39.5% of participants were Caucasian-white, 26.5% was African-American, 12.3% was Chinese-American, and 21.7% was Hispanic-American. The mean age was 64 years (range=46 to 88 years), and 52% was female.

This substudy revealed a mean rate of change in IMT of 0.015±0.05 mm, and 48 stroke events were observed. The rate of change in common carotid artery IMT was associated with stroke incidence in this multiethnic cohort (HR, 1.282; 1.014 to 1.620; p=0.0376). Age (p=0.0085), systolic blood pressure (p=0.0012), and HDL-cholesterol (p=0.0055) were associated with the highest risk after Cox proportional hazards models adjustment.

However, there was a stronger association prior to risk factor adjustments. The nonadjusted mean common carotid artery IMT was 0.71±0.19 mm for those with no stroke and 0.79±0.17 mm for stroke (p=0.0025), and the rate of change in common carotid artery IMT was 0.01±0.05 mm/year for those with no stroke and 0.04±0.07 mm/year for stroke (p=0.0506). The most significant risk factors that were associated with stroke, according to the nonadjusted data, were age (p=0.0007), systolic blood pressure (123.1±20.6 for no stroke and 138.8±22.7 for stroke; p<0.0001), treatment with hypertension medication (p=0.0020), and HDL-cholesterol (52.0±15.0 for no stroke and 46.5±11.2 for stroke; p=0.0028).