



Yesterday

- Until the 1950s, little was known about stroke and virtually nothing could be done for stroke victims.
- Death from stroke was 4 times what it is today.
- By 1960, the incidence and mortality from stroke began to gradually decline as treatable risk factors such as hypertension and smoking were identified.
- During the 1970s, further decline in stroke mortality was achieved through management of risk factors and significant clinical advances such as computer tomography for early diagnosis of ischemic or hemorrhagic stroke, the demonstration of the effectiveness of aspirin for ischemic stroke and prevention, and assessment of brain metabolism using Position Emission Tomography (PET) scanning.

Today

- Fewer people are dying of stroke today—age-adjusted stroke mortality rate has decreased 70 percent since 1950, and has decreased 33 percent since 1996, which indicates the trend persists. As the population ages, further advances are needed to keep pace.
- Over 6 million people in the United States have survived a stroke but live with its impact every day.
- In 1995, an NIH-funded clinical trial established the first (and only) FDA-approved treatment for acute ischemic stroke. The drug tPA (tissue plasminogen activator), currently approved for delivery within 3 hours of stroke symptoms, reduces the risk of disability and maximizes the potential for patient recovery.
- A recent analysis estimated that tPA can provide considerable cost savings if used in just 20 percent of all ischemic stroke patients in the US — nearly \$74 million for the first post-stroke year alone. Improving utilization through current stroke awareness campaigns will lead to better outcomes for stroke patients and substantial cost savings.
- Blood pressure is a major determinant of stroke risk, and a current large-scale NIH study is examining whether recommending more aggressive blood pressure control than is suggested by current guidelines would further reduce risk of major stroke or incidence of cognitive decline related to vascular dementia. Results from this study have the potential to impact clinical practice significantly.
- A large, NIH-funded clinical trial compared the effectiveness of a common surgical procedure, carotid endarterectomy, with carotid stenting, which is a newer intervention, to determine which resulted in the best outcomes for stroke patients. This provided clinicians with valuable risk-benefit information when considering optimal treatment courses with their patients. A number of devices can be deployed within the blood stream to remove clots from brain arteries and to dilate narrowed brain arteries. NIH clinical trials are ongoing to learn whether these devices will improve functional outcome in stroke patients.
- Observational cohort studies have improved our understanding of cultural and ethnic disparities that continue to exist in stroke occurrence, risk factors and mortality. Geographic variation has been thought to contribute to the high stroke mortality in the southeastern United States Stroke Belt. However, a NIH-funded national population-based cohort study (REasons for Geographic And Racial Differences in Stroke) (<http://www.regardsstudy.org>) found that exposure to the Stroke Belt during adolescence or early adulthood was more predictive of hypertension than was current residence in the Stroke Belt. This study clearly indicates that preventive measures must begin early in life.

Tomorrow

- A major objective is the control of blood pressure. The assessment of antihypertensive therapies will result in the identification of specific treatments to lower blood pressure and *preempt* primary and secondary stroke.

- NIH clinical trials will continue to generate evidence to help clinicians and patients decide on the best prevention, treatment, and rehabilitation strategies by comparing the effectiveness of different approaches.
- New therapies will emerge as investigators continue to explore and develop new approaches to treat acute stroke and minimize ischemic damage, providing patients and physicians with more therapy options and a better chance of survival and recovery.
- As results from large NIH cohort studies continue to improve our understanding of genetic and behavioral influences on stroke risk and occurrence, informed development of more tailored primary and secondary prevention strategies will improve stroke awareness and risk factor management, and will help reduce disparities in stroke incidence and outcomes.
- Results from a European study suggested that tPA is effective in a subset of patients beyond the currently approved 3-hour time-to-treatment window, providing an opportunity to offer the therapy to more patients. Advances in neuroimaging may allow clinicians to identify eligible patients at all time points, and to use stroke profiles to better predict outcomes and response to therapy.
- New approaches are currently being tested for the treatment of brain hemorrhage. If successful, this would lead to the first clinically directive intervention available for the most fatal type of stroke.

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