Stroke is now managed in and out of dedicated stroke units. All agree that stroke units are worthwhile. But who should run them and who participate? Choice of physician personnel should depend on the type of unit, what participants need to know and to do, and who is available.

The most advanced stroke units provide cutting edge care from arrival in the emergency room until rehabilitation. They have ready access to advanced diagnostic and therapeutic technologies and treatments and have physician coverage 24 hour a day, 7 days a week. These units require the following:

(A) One or more physicians with intimate knowledge of brain anatomy, function, and cervicocranial blood supply. These physicians know the symptoms and signs found in stroke patients and the detailed differential diagnosis of stroke subtypes. They are very familiar with the symptoms, signs, and diagnosis of other neurological disorders. They are knowledgeable about stroke recovery and rehabilitation.

(B) One or more physicians who are competent and experienced in monitoring and treating acute and chronic cardiovascular and cardiopulmonary abnormalities and are familiar with the medical complications found in stroke patients and how to prevent and manage them if they occur.

The great majority of A-type physicians are neurologists, but some internists are interested and some are potentially educable. With training and experience they could fulfill the A-type job description. Similarly, neurologists, especially those with intensive care unit training, can become competent as B-type physicians, and many now are. Most guidelines emphasize that physician eligibility to perform given tasks depends on training, experience, and competence and not the union card that a physician carries (that is his or her original residency department). These stroke units also need nurses with experience in caring for stroke patients. Psychosocial and economic guidance personnel are also useful. Physical therapists are essential. Physicians manning these physical medicine specialists as well as by neurologists. Rehabilitation units are managed by geriatricians, internists, and physical medicine specialists as well as by neurologists. Physical therapists are essential. Physicians manning these units should be very familiar with the causes, treatments, and time courses of recovery of the various stroke subtypes. All too often the stroke patients in these units are assumed to be stable and all energy is focused on facilitating recovery. They are considered to have “graduated” from acuteness. The medical details of the acute stroke are all too often out of sight and out of mind.

Unfortunately, stroke care is often divided among 3 different locales and physicians: (1) the generalist who has treated the patient in the community and who, it is hoped, applies preventive measures before and after the stroke, (2) the physician who cares for the patient while hospitalized for the acute stroke, optimally in a dedicated stroke unit, and (3) rehabilitation specialists who care for the patient during recovery, often at a rehabilitation facility separate from the acute hospital. After rehabilitation the baton is then passed back to the general physician, who all too often has not been brought up-to-date on the details of the patient’s diagnosis and treatment. It would be wonderful if these 3 sites were well integrated, with all physicians and personnel working closely together.

Of course, most strokes are not now managed in dedicated stroke units. Physicians caring for these patients in the hospital or in the community should possess as many as possible of the capabilities enumerated in the A type and B type job descriptions. Among all potential specialists, neurologists with interest, training, and experience caring for stroke patients are most likely to possess all of these attributes. The brain is complex and is the major domain of the neurologist. The brain is the Rolls Royce of the human body. Would you want your Rolls Royce to be serviced by any ordinary mechanic, who takes care of all kinds of automobiles?

The opinions expressed in this editorial are not necessarily those of the editors or of the American Stroke Association.

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Controversies in Stroke

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Stroke Is Best Managed by Neurologists

Louis Caplan, MD

neurosurgery, vascular surgery, endovascular, cardiology, hematology, and pulmonary specialists.

Less-advanced units take excellent medical care of patients and have CT scan availability and experienced nurses and therapists but do not have advanced diagnostic and therapeutic capabilities always available during the acute period. B-type physicians (usually internists) are quite capable of managing these units. Some stroke units are mostly geared to rehabilitation and can be manned by any physician trained and experienced in facilitating stroke recovery. Some rehabilitation units are managed by geriatricians, internists, and physical medicine specialists as well as by neurologists. Physical therapists are essential. Physicians manning these units should be very familiar with the causes, treatments, and time courses of recovery of the various stroke subtypes. All too often the stroke patients in these units are assumed to be stable and all energy is focused on facilitating recovery. They are considered to have “graduated” from acuteness. The medical details of the acute stroke are all too often out of sight and out of mind.

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Stroke Is Best Managed by a Neurologist: Battle of the Titans
Kennedy R. Lees, MD, FRCP

The world was created out of chaos. Early after the first immortals appeared on the scene, the titan Cronus and his brothers defended themselves against the future gods of Olympus for dominion, and lost. The titans were imprisoned in the bowels of the earth, while the victorious Olympian gods ascended, bringing new values and concepts into the world. —Greek mythology

The Clinical Argument
The deficit in stroke is neurological but the cause is vascular, complications are medical, and treatment should be multidisciplinary: no single aspect is overriding. Stroke patients require holistic care, expertly delivered. Neither American nor European stroke management guidelines mandate that a neurologist should deliver care.1,2 Let us examine the neurologist’s potential role in the patient journey.

Clinical Assessment
Although management is rarely influenced directly, lesion localization may be a specialist neurology task. The accuracy of clinical localization improves with the seniority of the neurologist, but modern cerebral imaging is supplanting this role. Severity scales are well applied by stroke nurses.3 Disability assessment is not the sole province of neurologists; indeed, few have undergone formal training in Rankin, Barthel, FIM, etc. Vascular risk factor assessment can be ably undertaken by internists and cardiologists: serious concomitant disease is typically cardiovascular.

Investigation
Stroke clinicians can order CT or MRI scans and learn to interpret stroke signs on imaging.4 The various ultrasound tests are often performed by technicians or specialist radiology staff. Few tests needed for TOAST classification directly involve the brain.5 The increasing use of protocols further limits the role of the diagnostician.

Differential Diagnosis
This is the primary argument used to support neurologist involvement.6 While the common differential diagnoses for stroke patients attending neurology departments include other neurological conditions, these form the minority of alternate diagnoses for patients presenting via emergency departments, TIA clinics, and specialist stroke wards.7 Just as neurologists are judged able to diagnose nonneurological stroke mimics such as syncope, hypoglycemia, hyponatremia, acute confusion due to drugs, or sepsis, so internists and ER staff can identify epilepsy, migraine, tumor, transient global amnesia, encephalitis, etc.

Early Management
The general measures of early management (fluids, blood pressure, oxygenation, plasma glucose, temperature, feeding, mobilization) may best be delivered by an internist. Safe thrombolysis requires specialist training, but neither the trials nor the registers supporting its use have identified any systematic safety or efficacy benefit from delivery by a neurologist as compared with a generic stroke specialist.

Complications and Concomitant Disease
Management of common stroke complications, such as aspiration pneumonia, dysphagia, pulmonary embolism, urinary tract infection, and hip fractures, has limited neurological aspects. The concomitant conditions are typically cardiovascular, eg, peripheral vascular disease, angina, heart failure.

Rehabilitation
A multidisciplinary team approach is proven to improve functional outcome and survival after stroke. Remarkably few of the Stroke Unit Trialists were neurologists.8

Secondary Prevention
Secondary prevention is a long-term activity. Few neurologists play a direct practical role in management of blood pressure or atrial fibrillation, use of statins, PFO closure, carotid stenting, or endarterectomy.

The Historical and Geographical Argument
Stroke management has developed variously in different countries. For example, UK neurologists traditionally declined interest in stroke or epilepsy, leaving acute stroke management to internists with input from geriatricians for rehabilitation. A shortage of neurologists precludes rapid reversal of this trend. Even in countries with a stronger vascular neurology tradition, elderly patients infrequently are admitted to acute neurological wards. Rehabilitation facilities are rarely under neurological supervision. Demographic changes in developed countries will increase the need for future stroke physicians to manage comorbid conditions and complications of the elderly.

The Future: Tartarus or Olympus?
Instead of sterile arguments over the optimal parent specialty, we need clinicians with expertise across the disease spectrum, able to manage the whole patient. The UK has established a subspecialty...
training system that may be a model for other countries. We recognize that stroke is a developing field, that interest is arising from many parent specialties, and that services—and future jobs—develop through local need. We accept that enormous benefits will accrue from sharing care across traditional specialty boundaries. We believe that existing training programs neglect aspects of stroke care, but propose to manage these inherent weaknesses by supplementing exposure to missing elements during an additional 1 to 2 years’ stroke subspecialty training. A similar program, termed vascular neurology, has recently been announced in the United States. By implication, general neurologists may offer more restricted stroke care.

Conclusions

The stroke world is no longer in chaos. The titan Caplan and his brother neurologists are right to defend their essential contribution to stroke management, but few neurologists have enough breadth of training to manage stroke comprehensively. Stroke specialists are needed, irrespective of their background. These specialists are the future Olympian gods, bringing new values and concepts; those who cling to the old order of parent specialty will join the titans in Tartarus.

References


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Neurologist, Internist, or Strokologist?

Geoffrey A. Donnan, MD, FRACP; Stephen M. Davis, MD, FRACP

After all, clinical medicine is above all the study of the difficult aspects and complexities of diseases. When a patient calls on you, he is under no obligation to have a simple disease just to please you.

—J.-M. Charcot, 1887

Stroke is a complex disease involving not only the brain, but many other organ systems. Hence, special skills are required. So who cares for the 20 million strokes that occur each year globally? The reality is that only a small proportion are managed by neurologists, although this varies from country to country. Even so, of all the disease entities treated by neurologists, stroke is by far the largest public health problem. Are the skills required for stroke management unique to neurology? Probably not.

The revolution in imaging and better understanding of cerebrovascular pathology has underpinned a radical change in stroke neurology, from elegant localization and clinical phenomenology to an emphasis on therapy. Neurologists were the quintessential specialists with unique skills linking alterations in brain anatomy with their clinical expression, exemplified by the detailed traditional

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and hierarchical neurological examination. While they were undoubtedly equipped to service Rolls Royces, they often showed little interest in less prestigious vehicles. Neurology has, therefore, traditionally been a consultant specialty with much less involvement in ongoing management. Even in the era of urgent therapeutic intervention, typified by thrombolysis, many neurologists have been slow to embrace this changing role. Indeed, probably the most important therapeutic advance in stroke medicine, namely coordinated care in stroke units, has often been championed by physicians, rather than neurologists. This does not diminish the seminal contribution of neurologists, from the time of Charcot, to our understanding of the stroke process.

Caplan nicely emphasizes the unique role that can be played by the neurologist in understanding the impact of vascular disease on the brain. We would agree that a neurologist with specific stroke training is perhaps ideally placed to lead a stroke team. However, it does seem unlikely that sufficient neurologists will be trained in time to meet the demands of the impending stroke epidemic and its ever-expanding therapeutic implications. Furthermore, many of our most expert colleagues in stroke medicine are not neurologists. Hence, the view of Lees that there need to be more stroke specialists, regardless of background, makes good sense.

We agree with both protagonists that our patients require a broad-based expertise in all aspects stroke medicine. Neither a "general" physician nor a "general" neurologist is truly qualified to care for all aspects of stroke, without special training. We are attracted to the concept of "strokology" as a discipline with specific accreditation.

What of Rolls Royces and Olympian gods? What better way to ascend to the stars! Strokologists are the Titans of the future.
Neurologist, Internist, or Strokologist?
Geoffrey A. Donnan and Stephen M. Davis

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