By now every neurologist knows some of the basic statistical numbers of stroke: how it’s the third leading natural cause of death and the leading cause of long-term disability, how one occurs every 45 seconds somewhere in the country, and that its estimated direct and indirect cost on our economy was $56.8 billion, according to the American Heart Association. It’s also commonly known that only about two to five percent of stroke patients receive this treatment for myriad reasons ranging from a late arrival to a fear of exposing themselves to a lawsuit.

A recent study from Jeffrey Saver, MD at UCLA adds a new set of numbers sure to become common knowledge among vascular care specialists by providing further proof to the old adage, “Time lost is brain lost.” By using quantitative neureostereology and stroke neuroimaging coupled with data from previous research, he determined that 32,000 nerve cells per second, or 1.9 million per minute, die during an ischemic event. This comes to a pea-sized portion of tissue dying every 12 minutes that treatment is delayed. During the 10 hours it typically takes a stroke to run its course, the brain loses an average 1.2 billion neurons, 8.3 trillion synapses and 4,470 miles of myelinated fibers, which amounts to a space of lost brain matter the size of one and a half ping pong balls. The results of his innovative study are published in Stroke 2006;37:263-266.

Hospital administrators may not be aware of these statistics, but they are aware of another set of numbers preceded by a dollar sign. They know one usable dose of tPA costs almost $2,000 by itself. After they take into account the resources allocated for emergency care, including the $500 usually paid
to the treating physician, they often ended up losing money on each patient because the Centers for Medicare and Medicaid Services (CMS) only reimbursed an average $5,700 per patient.

This situation changed on Oct. 1st when CMS revised its policies under Medicare part B to pay hospitals $6,000 more, to a total of almost $11,578, if tPA therapy is used. The commonly-heard argument about the treatment not being profitable is now invalid. Many administrators may change their positions so that instead of shying away from the treatment, they may now encourage physicians to use it. The results may look good in accounting, but whether or not the neurologist will see any windfall from this new revenue stream could depend their individual negotiations with the hospital and how well they are currently coding.

However, cost is only one of the reasons mentioned to explain why tPA is so seldom administered. Many patients simply do not arrive at the ER within the narrow three-hour window where this treatment is available. New research may theoretically help physicians differentiate between those who could still benefit from thrombolytics to those who will only be put at unnecessary risk, but so far these ideas are still undergoing trials. Even if they do prove effective, there are still unanswered questions about how effective this
Acute Stroke Care

treatment is in any situation.

While some neurologists and many emergency room physicians may have reservations about this treatment, those who support the only FDA-approved acute stroke treatment may want to use these recent developments to encourage their medical center (and themselves) to get more involved in stroke care. In this article, we’ll look how the new developments surrounding tPA therapy, from the coding desk to the ongoing research, could influence the state of stroke care in 2006.

Double the Money for One Shot

Justin Zivin, MD, PhD, Professor of Neuroscience at University of California San Diego, was one of the foremost pioneers studying the effectiveness of tPA as a clot buster 20 years ago. He recently sent data from his research to CMS when the agency was considering increasing the reimbursement amount.

“I hope the new reimbursement rates will put more pressure on hospitals to administer tPA,” he says. “Before, hospitals lost money on every treatment; now they will be making money on the treatment.”

The prospect of a cash infusion could go a long way towards making it easier for hospitals to seek stroke center certification. Jean Range, Executive Director for Disease Specific Care Certification at the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), says the reimbursement rates are not included in the assessments for her organization’s Primary Stroke Center Certification program but it could help make it more popular. “My personal opinion is that it’s a positive development that essentially aligns the only FDA approved treatment for stroke with a provider reimbursement,” she says. “I think there is a likelihood hospitals will pay attention to the new rate, and they may be more willing to formulate a stroke plan.”

David Tong, MD, Medical Director of the CPMC Stroke Institute in San Francisco, says he hopes the new rate will be an incentive to hospitals to start treating patients. He says there is already a great deal of interest in stroke care certification throughout the nation but the new reimbursement could still make the administration more willing to work with a neurologist who wants to get a center established. The increased reimbursement rate would help cover some of the other expenses associated with stroke treatment, such as the allocated intensive care resources and subsequent inpatient monitoring.

Although many neurologists have been asking if this additional revenue will trickle down to them, Dr. Tong says the attending neurologist is unlikely to see any more money, especially if they are using the correct coding methods. “If physicians are billing the procedures properly as critical care proce-

Physicians who are paid a fee from a hospital with its own coding department and hence do not receive the set reimbursement rates may still have something to gain. Dr. Zivin says in some cases neurologists may be able to get more money for treating stroke. “Physicians should negotiate with the hospital to get more money to see stroke patients, but this is an individual, hospital-by-hospital case.”

While the new DRG code may lead to profits for facilities in the short term, some neurologists are still cautious about the long-term liability concerns of this treatment. However, Dr. Zivin says he recently completed a study showing that the practitioner’s legal risk for not administering tPA is greater than their risk for administering thrombolytics with a harmful result. The full study will appear in Archives of Neurology in the coming months.

Although this study is not likely to answer all the arguments raised by tPA opponents, the new reimbursement rate has been hailed as good news by proponents of the treatment. Predictions abound among practitioners for what this could mean in the long-term for stroke care.

Carissa Pineda, MD, Co-director of the Stroke Center at Thomas Jefferson University Hospital in Philadelphia, says that while the new rate could put more pressure on neurologists to administer the treatment, there will be more emphasis on administering it correctly by being wary of the bleeding risks. “More people may get tPA, but there will also be a more careful look at the inclusion criteria,” she says.

Making administrators aware of the benefits may depend on the neurologist acting as an activist. Scott Kasner, MD, Director of the Comprehensive Stroke Center at the University of Pennsylvania in Philadelphia, says the new rate may help physicians to pay more attention to stroke treatment, “but we have to keep beating the drum.”

Seeing a New Opportunity

The new reimbursement rates may help administrators get more aggressive towards offering tPA, but the cost was never the primary limitation this treatment has faced. Rather, almost 73 percent of patients are excluded for presenting after the three-hour window from onset to arrival according to an analysis reported in Neurology 2001;56:1015-1020, which can be remarkably frustrating, especially when the problem comes down to the patient or the caregivers not recognizing the symptoms of an incident until too late.

For years, neurologists have debated whether this window is a rule or a suggestion, delving into the finer points of possible harm from bleeding to the ethics of doing nothing as the brain slowly dies. Recent research suggests the answer may
come down to evaluating each patient via imaging to see if busting the clot after three hours would do any good. Of the existing therapies, PET is currently the gold standard because it provides spatially detailed, highly quantifiable data, but it is only available in a few centers and it is seldom available in acute stroke situations (Stroke 2004;35[suppl 1]:2657-2658). Much of the recent research has focused on MRI, with diffusion imaging showing the extent of the damage and perfusion showing what could be the threatened area. CT scanning may also prove useful.

Dr. Pineda recently took part in study that measured which parts of the brain are damaged during a stroke as observed via CT perfusion. While she said the prospect of increasing the window is interesting, the use of imaging is also showing many of the nuances of an ischemic episode, such as whether the clot is intravenous or intra-arterial and the location, as whether it is in the posterior or anterior region could prove significant. Learning more about these points, she says, may help physicians to not only determine the extent of the damage as well as the area still left to be saved but also could provide some clues pertaining to the risk of bleeding from thrombolytic therapy.

Dr. Kasner says the idea of using MRI to select which patients may benefit from tPA after three hours has interesting clinical applications. “If you can determine which patients still have an area to save, the penumbra, that may be more important than the time,” he says, noting that there is still much more research to be done before it can be deemed effective.

While imaging may be the best hope for widening the tPA window, Dr. Zivin is very skeptical about the current findings. “It would be nice if the studies worked out, but they haven’t proven anything yet,” he says. “It’s still not clear what the benefit could be and no trial has shown the imaging.”

The main problem, Dr. Zivin says, is that there is no clear pattern between what the scans reveal and what the effect is on the patient. “The technology lacks specificity. The techniques are showing something, but it’s not clear what they’re showing us,” he suggests.

What’s more, Dr. Zivin says he doesn’t see clear, clinically usable answers coming through anytime soon, even from the ongoing research. Future studies will also be difficult to conduct, he says, due to the high cost involved in the trials and the slow recruitment among stroke patients who miss the three-hour window.

Dr. Tong also says that while the imaging research conducted on stroke patients is interesting, it is still a long way from being applied, since for now it is still unclear what the param-
What’s more, he says we will not have these answers any time soon, as the recently completed National Institutes of Health pilot trial took five years to conduct, which means the large-scale trials could take 10 years or longer to complete. And with the way medical technology is advancing, he says the information could be obsolete by the time it is presented.

“It will basically be bypassed by some other technology, whether it’s new imaging technology or management techniques. It’s uncertain how this will pan out,” Dr. Tong says. “Assuming that’s not the case, it will be a long time before we can use imaging for stroke in the clinic. Nonetheless, it is very interesting.”

To be effective, Dr. Tong says a stroke imaging technique would need to give an answer quickly and accurately, ideally in the same way an EEG can deliver reliable activity with minimal invasion. The fundamental problem with imaging, he says, is that with even the most streamlined NIH protocols it can take 15 minutes to have the patient in the machine and the images taken, while it typically takes most hospitals 30 to 45 minutes, assuming they have the technology present at the facility and they can get the patient to cooperate. Even CT scanning, which puts less stress on the patient than being loaded into an MRI does, can take 20 to 30 minutes, and he says this often lacks the sensitivity currently sought by clinicians.

Given that a physician often has fewer than three hours to treat a patient who presents with a stroke, he says these methods often take more time to employ than the physician can give. Hence, a faster technique would prove invaluable under the current restraints of thrombolytic therapy.

The State of Stroke in 2006
Stroke remains a frustrating condition to treat and, although there are some prospects in the pipeline that could offer new possibilities, there will be many more stroke sufferers between now and the next clinically applicable breakthrough. The latest research in imaging can show not only the extent of the damage and how it happens, which can lay the foundation for furthering understanding of how strokes work, but this information for now is more academic than practical.

However, the new stroke reimbursement rates may give neurologists interested in stroke care more leverage when asking their facilities to improve or upgrade their treatment programs. Making tPA more profitable may go a long way towards winning over administrators, which in turn could make them receptive to implementing whatever new management techniques we learn from ongoing research. 

The New tPA Codes
Under the old inpatient prospective payment system approved by the CMS, strokes were assigned to DRG 15 (TIA and precerebral occlusions), DRG 14 (specific cerebrovascular disorders except TIA) and DRG 524 (transient ischemia). The new DRG 559 (Acute Ischemic Stroke with the use of a thrombolytic agent) pays far more than these, but unless the use of tPA is documented and the stroke is appropriately diagnosed the hospital could miss out on the reimbursement.

The following codes built into its structure for principal diagnosis:
- 433.01, Occlusion and stenosis of basilar artery, with cerebral infarction
- 433.11, Occlusion and stenosis of carotid artery, with cerebral infarction
- 433.21, Occlusion and stenosis of vertebral artery, with cerebral infarction
- 433.31, Occlusion and Stenosis of multiple and bilateral arteries, with cerebral infarction
- 433.81, Occlusion and stenosis of other specified precerebral artery, with cerebral infarction
- 433.91, Occlusion and stenosis of unspecified precerebral artery, with cerebral infarction
- 434.01, Cerebral thrombosis, with cerebral infarction
- 434.11, Cerebral embolism, with cerebral infarction
- 434.91, Cerebral artery occlusion, unspecified, with cerebral infarction.

An old non-operating room procedure cure, 99.10 (Injection or infusion of thrombolytic agent) is also behind the new DRG. Putting emphasis on this during coding update sessions could keep you from undercoding.

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