

ANGIO CT MIYABI: The Promising Fusion of Two High-Tech Units

The Japanese word “miyabi” is often translated as “elegance.” And Siemens’ new ANGIO CT MIYABI system is nothing if not an elegant union of complementary imaging technologies: angiography and CT imaging.

By John Casey

More than two years in the making, the ANGIO CT MIYABI combines the powerful benefits of Siemens’ SOMATOM® 16-slice CT on rails with its AXIOM® Multistar angiography unit. Both systems use the KOORDINAT M angio table, which can be switched between a floating DSA position and a fixed CT position. It promises to be a winning combination.

“What we’ve seen so far with the system is that the whole is greater than the sum of its parts,” says Dr. James V. Manzione, Jr., an associate professor of clinical radiology, surgery, and neurosurgery, and director of interventional and therapeutic neuroradiology at Stony Brook University Hospital, part of the State University of New York at Stony Brook.

Dr. Manzione says the potential results of seamlessly joining these two technologies are greater workflow efficiency, better diagnostic capability, and increased patient comfort.

When it is necessary to acquire high-quality CT scans during an angiographic intervention or treatment, the patient can be more easily scanned with the CT system moving on rails.

This allows the physician to deliver a more accurate treatment without repositioning the patient, making the overall procedure faster and more tolerable.

Dr. Manzione is excited about the implications of this new system. “The ability to combine the technology of the units enhances existing applications of the individual units and permits new imaging and interventional applications not otherwise obtainable,” he declares.

After more than a decade of experience in neurointervention procedures, Dr. Manzione recognized the need for combining angiography technology with CT scanning to generate three-dimensional (3D) images. Working with engineers at Siemens for two years, Dr. Manzione guided the development of the system, which combines a multislice SOMATOM Sensation 16 CT scanner mounted on rails with a single-plane angiography suite in adjacent rooms. The system allows the CT scanner to be rolled into the angiography room as needed while the patient remains stationary.



JAMES V. MANZIONE, JR., M.D., says the system has been enthusiastically received. "We've got researchers lining up to get a chance to use the system."

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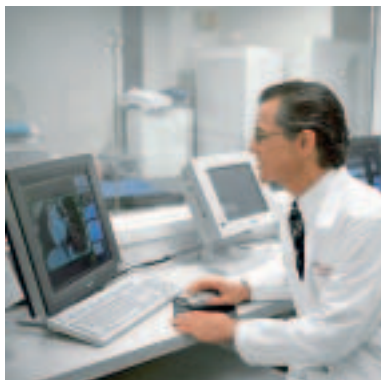
James V. Manzione, Jr., M.D.,
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The goal, says Manzione, is "to be able to image patients' blood vessels, organs, and tissues to evaluate their problems, and then use imaging to guide the least-invasive treatment or to provide the best approach for a surgical solution." During angiography, the CT is located in the park position. When a physician needs to confirm the coordinates of the target tissue, the gantry moves into the room in less than a minute and the patient can be scanned. All scan options – such as sequence, spiral acquisition, or gantry tilt – are available. Thus, the physician can always generate a control image during the intervention without repositioning the patient. "CT scanners are very good at looking at cross-sectional anatomy, and angiographic and fluoroscopic systems are great for taking pictures of blood vessels after you've introduced contrast with the catheter," notes Dr. Manzione. "The MIYABI idea was to combine these technologies to take them to the next step."

While the combined units function as one, offering new and innovative applications, they are also fully capable of being used in a solely CT or angiographic capacity. Dr. Manzione calls the system the "multipurpose interventional room of the future."

Developing MIYABI

The system was initially conceived to perform 3D imaging of the intracranial vessels during neurointerventional procedures. Unlike conventional, single, biplane, and rotational angiography, this system provides a computer-generated 3D rendering of the entire intracerebral circulation from a single nonselective injection of contrast material. The 3D model can then be rotated in space, allowing the physician to evaluate the intracranial vessels and vascular pathology at any angle or orientation. Evaluation of the 3D model allows the physician to determine whether a neurointerventional procedure is feasible and, if it is, to determine the optimal imaging planes for



EVALUATION of the 3D model allows the physician to determine the optimal imaging planes of an intervention.

the intervention. Once selected, the coordinates of the optimal planes are transferred to the angiographic C-arm for the neurointerventional procedure. This eliminates the need for multiple selective catheterizations and multiple views of each vessel catheterized as compared to conventional techniques. The new technique can decrease procedure and catheter time, contrast dose, and radiation exposure. In neurosurgical cases, these techniques can optimally visualize cerebrovascular and surrounding anatomy, improving surgical planning.

Wide-Ranging Applications

Dr. Manzione anticipates that 3D imaging will become a part of many angiographic procedures in the future. He believes this combined technology will also play a significant role in cardiac and coronary artery imaging. There will be significant applications in stroke, organ, and tissue perfusion studies and quantification of vascular flow.

And even though Stony Brook's ANGIO CT MIYABI has only been operational since May 2004, Dr. Manzione and his colleagues are busily mapping out the system's capabilities. "Tumor biopsy is another area where the MIYABI will be very useful," he predicts. "It lets us do the CT scan, make a model, show where the tumor is, and map out the location of the structures we need to avoid. Then, once we've found a safe pathway to the tumor – the optimal projection – we can insert a needle into the tumor and get a needle biopsy without having to use conventional surgery."

Similarly, the Stony Brook researchers are looking at using the system to guide less-invasive draining of abscesses. "We'll be able to do the CT scan, find the abscess and determine the best projection to the abscess," Dr. Manzione predicts.

Streamlining Treatment

Another important potential application for the ANGIO CT MIYABI is the swift treatment of stroke. "When a patient comes into the emergency room with symptoms of stroke, you want to find out quickly if it's a blood clot that has traveled to the brain and is stopping

the flow of blood or if it is due to bleeding," he says.

Conventional stroke treatment, he adds, has a lot of limitations. "You bring the patient to the CT scanner, and then you take them to the MRI – but the clock is ticking. You've got to get this treatment within a couple of hours. Each of these systems may be in different areas of the hospital, and transportation setup wastes a lot of valuable time. With our system, you do a CT scan. If there's no bleeding, you inject an X-ray dye for a study of the brain. Instead of going on to an MRI, the MIYABI's CT system can make a complete vascular study of the brain. And if you want to perform a catheterization, the patient is already on the table and you can roll in the angiography equipment."

The Stony Brook researchers believe that much the same as stroke victims, trauma patients may also benefit from the streamlined evaluation and treatment that the MIYABI allows.

Multiplication of Utility

"This system is all about taking two pieces of conventional equipment and combining them to deliver better patient care with less-invasive methods," declares Dr. Manzione. "It's a kind of multiplication of utility." He points out that from a hospital administration standpoint, one of the beauties of the system is that the two pieces of equipment can be used independently of each other. "You've never lost on your investment," he says. "Typically, hospitals have an angiography lab and a CT lab. You can use the CT for all of its everyday capabilities, and the angiography room for all of its everyday capabilities. But when you use them together, you're fusing the capabilities of the two units into a very high-tech piece of equipment. It's almost like you've developed an entirely new way of imaging that benefits everyone involved. The system is being very enthusiastically received; we've got researchers lining up to get a chance to use it."

Author: John Casey is a freelance medical writer living in New York City.