

DynaCT: Angiographic Computed Tomography Revolutionizes Interventional Radiology

At the Methodist Hospital in Houston, Texas, a remarkable new angiography technology for interventional radiology called DynaCT is providing unprecedented, CT-like views into the human body while helping doctors to save time – and most importantly – lives.

By Patrick Kurp

Late in September 2004, a 76-year-old man from Houston, Texas, who was otherwise feeling healthy and fit, had been experiencing dizziness for nearly a month when he suddenly collapsed in his home. He was rushed by ambulance to the second floor of the Methodist Hospital in Houston, to the endovascular department, where a team of interventional radiologists conducted a series of emergency diagnostic tests on the patient.

Shortly after the examinations were over, at a viewing station Dr. Strother commented on the outcome of the tests: "Using angiography with DynaCT we were quickly able to

pinpoint the problem. He was suffering from bleeding in the posterior region of the brain, about the midline. The diagnosis was fast and focused, and without any difficulties. Treatment could begin at once."

"With the aid of the hospital's newly installed Siemens AXIOM Artis dBA DynaCT system, we were readily able to isolate a dural arteriovenous fistula which appeared on the computer screen as a dark, irregularly shaped mass at the center of a tangled web of blood vessels. The bleeding was quickly repaired using a microcatheter that sealed the fistula with an injection of acrylic glue, and the patient, three days after admission to the

DR. CHARLES M. STROTHER,
Department of Interventional
Radiology, The Methodist
Hospital in Houston, Texas.





A SPECIAL CHALLENGE for designers and engineers: a biplane system for use in neuroradiology where two different sizes of flat detectors have to be operated in one system.

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Methodist Hospital, was tired and weak but scheduled to return to his family.” Dr. Strother attributed the man’s rapid recovery and optimistic prognosis largely to the speed and acuity afforded by the AXIOM Artis DynaCT’s capacity for clearly and quickly visualizing detailed anatomy.

“When we didn’t have DynaCT, we had to leave the sterile room of the angio lab, relocate the patient, perform a control CT and then go back to the lab...,” recalls Dr. Strother. “Now, for the first time, with DynaCT we can get a CT-like image immediately. We are able to achieve some of the sensitivity of a CT with an angio system. It changes everything about what goes on in the angio lab. Endovascular techniques are becoming the treatment of choice for cerebrovascular disease, and this new technology enhances this treatment,” reports Strother, who, with other colleagues at the Methodist Hospital, has been consulting with Siemens engineers in Germany on the design of the AXIOM Artis DynaCT.

The Methodist Hospital in Houston is the first hospital in the world to have the system fully operational.

Enhanced Diagnosis and Treatment

Since the introduction of the AXIOM Artis DynaCT system at the Methodist Hospital in mid-September, Dr. Strother and his colleagues feel they are on the cusp of a revolution in interventional radiology called Angiographic Computed Tomography (ACT), enabling them to perform soft tissue imaging during the angio procedure, thus skipping an entire time-consuming step in the treatment process. When fitted with flat detectors as part of a thoroughly integrated system, AXIOM Artis DynaCT reduces the need to move the patient to CT during or after an interventional procedure.

The interventional radiologists at the Methodist Hospital routinely use the device to enhance the diagnosis and treatment of such condi-



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tions as aneurysms, carotid disease, arteriovenous malformations, stroke and occasionally tumors – all in the familiar setting of the angio lab. “The old angio system was essentially like a plain old X-ray. Now, we still inject dye to visualize the blood vessels, but are also able to observe soft tissue. We not only see the vascular abnormality, we also see all of the surrounding environment with a degree of detail we never could have before,” says Dr. Strother, who during his long career has personally witnessed an extraordinary revolution in imaging technology from the introduction of the first generation of CT scan systems in the mid-1970s. He remembers the seemingly prehistoric, predigital days when, even at the most advanced healthcare facilities, angiographs were shot on film and required a delay of 10 or 15 minutes before the developed images could be returned. “Now, we get almost instant images, and they have so much more information,” he observes. Perhaps the system’s principle advantage over

earlier technologies, Strother and several other interventional radiologists agree, is an increased sense of orientation combined with enhanced visual detail, the result of its unique biplane design. Richard Klucznik, M.D., one of Strother’s colleagues at the radiology department at the Methodist Hospital, explains: “Each plane is a two-dimensional projection. You can very easily get lost about where you are in space when you rely on a single plane. In a very literal sense, we are creating a new dimension with this technology, a new, improved way of viewing reality. We see something other than just the blood vessels.”

Minimizing Risk, Maximizing Accuracy

Dr. Klucznik especially singles out for praise the AXIOM Artis DynaCT system’s increased capacity for contrast sensitivity. Gradations of soft tissue density are readily identifiable in the high-resolution image, permitting



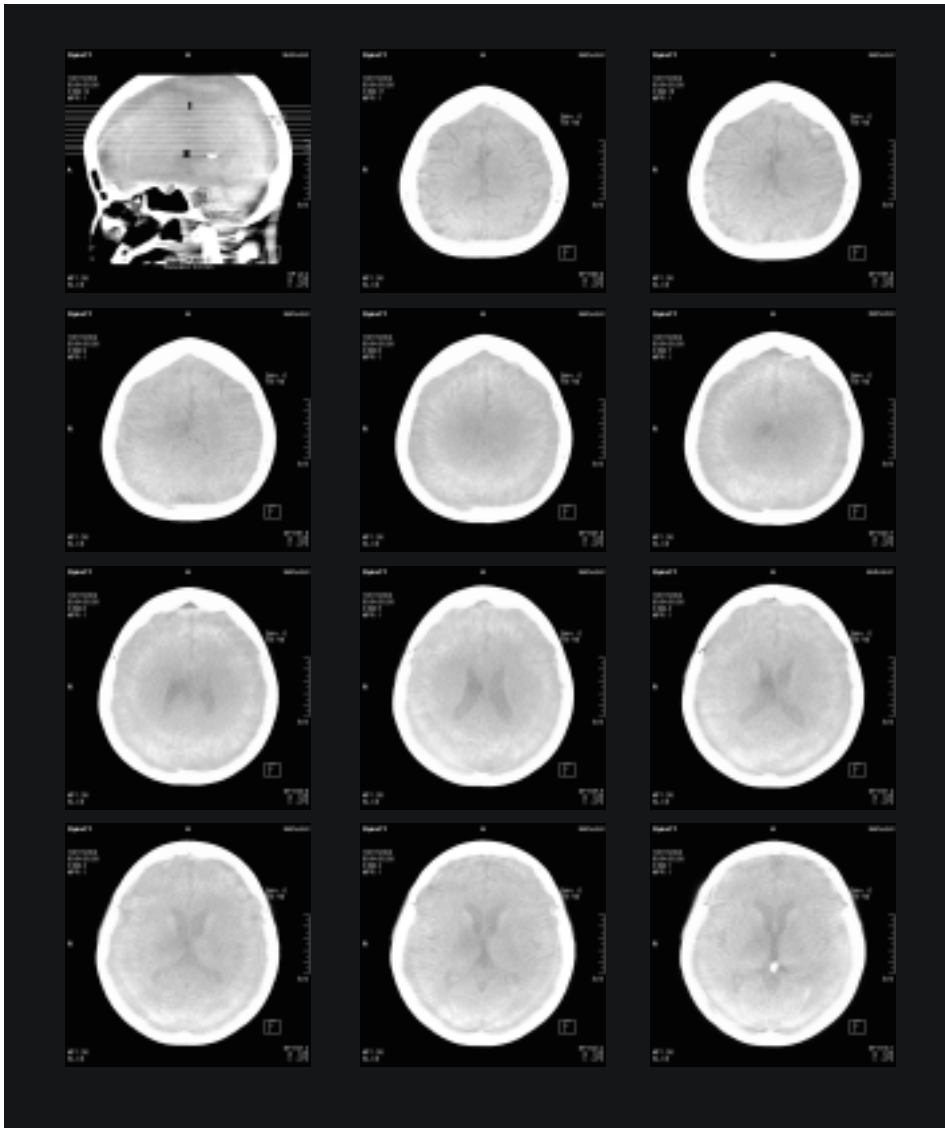
THE METHODIST HOSPITAL'S angiography team:
Dr. Charles M. Strother (right), and Dr. Richard Klucznik (left).

physicians even to distinguish various matters in the brain – a capacity unimaginable with earlier technologies. Also earning kudos from the radiologists is the AXIOM Artis DynaCT system's compactness and openness in the angio lab setting.

"Since we have the flat detector system, it is much less crowded in the room, which is already filled with equipment and people. It gives you much better access to the imaging equipment itself and to the patient," notes Klucznik. "And that brings up another point: patient safety. Because we are better able to visualize, for instance, the brain itself and the damage it has suffered, our procedures go far more smoothly, with much less risk of error or risk of any sort for the patient."

Dr. Klucznik finds using the AXIOM Artis DynaCT system liberating: "What we can see, we can do. We have been limited in the past

by what we could see. The more information you have about such delicate procedures, the more judgments you can make and the better and more informed they will be." Dr. Strother cites a further advantage to the new system: speed, especially during the critical minutes immediately following, say, a stroke or aneurysm. "There's less need to move the patient to another room or to another imaging modality somewhere else. We can stay right where we are, in the angio lab, and not have to waste time shifting the patient about. In the case of a ruptured blood vessel, for instance, that might easily be a matter of life and death. We're getting images comparable to CT during the angio procedure. On top of that, we have already made a quantum leap forward in getting a 3D image, which enables us to give patients the best care there is," says Dr. Strother.



■ DYNACT IMAGES showing slices of the skull.

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Both interventional radiologists agree that the AXIOM Artis DynaCT system represents the state of the art in their business – the standard against which all other similar technologies must now be measured. Dr. Klucznik speaks for them all when he says, “The Methodist Hospital has made a very wise decision to commit itself to this equipment. It is certain to be the best for the patients, and that must always be our foremost consideration, but it is also the best

for the staff and for the hospital itself. The presence of such a system brings us all great prestige.”

Dr. Strother echoes his colleague’s sentiment: “It makes the environment we work in far more robust than ever before. It’s like being able to see a new world in a new way.”

Author: Patrick Kurp is a freelance medical and science writer based in Texas. A former AP correspondent, his work has also appeared in the Houston Chronicle.