

# Flexible Flash for a Forward-Thinking Hospital

In the Regional Hospital of Bolzano, Italy, trauma victims from skiing, hiking and other accidents often present. Others are suffering from a stroke, cardiac disease, or cancer. Thus sophisticated diagnostic imaging capabilities are required for adequate patient care. SOMATOM® Sensation 16 and SOMATOM Definition Flash together with *syngo.via* and dedicated clinical software applications help to manage this great diversity of clinical tasks in Bolzano.

Text: Claudia Flisi, Photos: Toni Anzenberger



Patrizia Pernter, MD, is radiologist at the Regional Hospital of Bolzano in Italy. She and her team are among the first in Italy to use SOMATOM Definition Flash with *syngo.via*.



1 Aortic dissection, type Stanford A – VRT and MIP images clearly demonstrate an aortic dissection involving the ascending aorta and the aortic arch. The intimal tear extends into the brachiocephalic artery. Courtesy of Regional Hospital of Bolzano, Italy

When Patrizia Pernter, MD, was studying medicine at the University of Innsbruck in Austria in the late 1980s, she wanted to pursue a specialization in pediatrics. She had no idea that she would wind up as a radiologist.

Radiology became an option when Pernter returned to her hometown of Bolzano, Italy, in 1991. Training at the Regional Hospital of Bolzano included a stint in radiology, which she found fascinating. Since more openings existed for young physicians in that area than in pediatrics, she accepted a position in radiology at the hospital.

Ötzi the Iceman also emerged in 1991, literally, when two tourists stumbled across a human corpse half frozen in the ground in the Ötztal Alps, about 60 kilometers from Bolzano. This discovery turned out to be one of the oldest mummies in the world, and a rare “wet mummy” because humidity can still be found in his cells, making him a prime candidate for medical research.

The fortunes of Patrizia Pernter and Ötzi intersected in 2005 when the

Iceman was scanned with the SOMATOM Sensation 16. This enabled researchers to do a complete body analysis of the mummy in excellent resolution for the first time, revealing details not previously discernible. One major finding is that Ötzi anatomically resembles modern man rather than a primitive ancestor.

With *syngo.via* Patrizia Pernter works interactively with a greater volume of super-thin slice images. She and her colleagues see more in greater detail and finish diagnosis faster than before.



## A flash of uncertainty

Ötzi is not the reason that the hospital invested in the SOMATOM Definition Flash and *syngo.via*<sup>1</sup>, however. The SOMATOM Sensation 16 arrived in 2004 and proved its worth as an all-around CT scanner, reliable and easy to use. So it was decided to purchase the Dual Source CT SOMATOM Definition Flash in 2011, in part to replace an older CT. *syngo.via* was acquired at the same time, and the idea was to use the scanner and software primarily in cardiology, as in Bolzano hospital about 2,400 coronary angiography exams a year are done.

“We were among the first hospitals in Italy to try the Dual Source CT SOMATOM Definition Flash with *syngo.via*,” recalls Pernter. “Being among early users always comes with a bit of uncertainty. Nevertheless, we wanted the best equipment available, and so we decided to try it out.”

Today, every single one of the hospital’s vascular exams is done with this system. “We could already read vessels without Dual Energy, but now with *syngo.via* we can remove extraneous details to clarify our results,” Pernter elaborates.

Ironically, the system has wound up being used for less than one-third of the hospital’s cardiac cases because it is so much in demand by other departments, notes Giampietro Bonatti, MD, Bolzano’s Head of Radiology. *syngo.via*



is used in oncology, neurology, and especially trauma – the latter significant in Bolzano because of its mountain setting. The area is a magnet for skiers in the winter, hikers in the summer, and motorcyclists anytime.

### When timing is everything

“In the ER, timing is everything and our speed has improved with *syngo.via*,” Pernter points out. She gives the example of a recent trauma victim, a man in his fifties who had been hit by a truck and arrived in the ER unconscious. Medical technicians had alerted the staff to probable trauma to his thorax, but the extent of his injuries was unknown. The patient was stabilised and a CT was done with the SOMATOM Definition Flash. “As doctors, we want to see what is going on *in toto* and there is no better way to see what has happened with the vascular system,” she observes.

The CT revealed a life-threatening lesion to the victim’s aorta and a hematoma in his superior abdomen. Also, almost all his ribs were broken and there was non-critical pelvic damage. “We needed to know the dynamic of these injuries and the system provided it,” Pernter continues.

In addition, *syngo.via* provided measurements to determine the size of the prosthesis needed for the aortic repair. Because the aorta is curved,



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accurate calculation is not easy, and, in the past, surgeons have resorted to their own ways of measuring. *syngo.via* makes these calculations precisely and consistently, and helped save the patient’s life.

### Enhanced confidence after stroke intervention

Stroke victims are like trauma patients in that speed is of the essence. Pernter and Giampietro Bonatti, an interven-

tional neuroradiologist, cite one feature of *syngo.via* – in combination with Dual Energy – that has excited them: They can determine immediately whether a patient is suffering from post-procedural bleedings. This happens when a stroke victim comes in with an acute ischemic stroke. The patient is sent for an angio CT; if the blockage is in an area where intervention is possible, the thrombus will be aspirated. Then a CTA is performed. Afterwards, the doctors want to know if the patient has bled during this procedure, because follow-up treatment depends on the answer.

But analysis can be tricky, as Pernter explains: “Contrast is used in the angiography so it can be difficult to distinguish between bleeding and contrast medium. What you see on the gray-scale images could be blood or contrast medium, you don’t know. With *syngo.CT DE Brain Hemorrhage*, we can remove the dye from the images and thus differentiate between bleeding and contrast medium. This is a concrete, immediate benefit and we are very pleased with it. We can tell the neurologist whether the procedure was successful and then a therapy of anti-coagulants can be started right away. We take advantage of this feature with about 50 stroke patients a year.”

### Imaging in oncology

In the oncology department, speed is not necessarily as important as it is for trauma and stroke. However, detailed resolution and low radiation dosage are crucial. For example, hepatic tumors require multiphase imaging, a sequence of CT scans without contrast, 30 seconds, 80 seconds, and five minutes after an injection of contrast medium. “You can see the development very well on our workstation,” reports Patrizia Pernter.

With the system using Dual Energy, it may be possible to skip the first phase without contrast entirely, do a scan, then generate the non-contrast phase virtually. This approach is currently being tested at a hospital in Turin, Italy, and is being followed closely by Bolzano. The advantage would be a further reduction of the patient’s exposure to radiation. The one possible drawback is that accuracy is compromised if the patient is too large, but “very few cancer patients who would be undergoing this test are obese,” the doctor observes.

From oncology to cardiology, stroke to trauma, *syngo.via* has proved its worth throughout the hospital. Because it arrived together with the SOMATOM Definition Flash, Pernter is hard-pressed to attribute every improvement to one versus the other. “The SOMATOM Definition Flash is fast, and so is *syngo.via*. For example, with the Flash we can do a whole body scan from top to bottom in a single sweep. We couldn’t do that before. With all the tubes sticking out of the patient, measuring blood pressure, and so on, then repositioning for another scan, you could lose 15 minutes between one scan and another. Now we don’t have that problem.”

The system handles at least 40 patients a day over 12 hours, not markedly different from the volume before 2011. What has changed most in terms of workflow for the radiology department is the speed and accuracy of reporting. Before 2011, the CT scan would be performed, the technician would put together a packet of 200 to 500 images, then the physician would examine these images and make a report.

“Now we work interactively with a greater volume of super-thin slice images, one millimetre thick or less. Obviously we see more and in greater detail,” notes Pernter, adding, “If I had to generate my reports in another way, it would take longer.”

### Information overload?

The problem, if any, according to the doctor, is that one may get lost in the information because there is so much and it is so interesting. Occasionally,

This customization helps radiologists tailor their exams to the focus of the clinician, the pathology, and the organ or area under scrutiny.

Doctors love it, claims Pernter, and so do radiology students. “When our students come here for training, you can’t peel them away from the *syngo.via* workplaces,” she says.

Since the hospital will be extended further there may be more of these workplaces in the near future. ■



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Patrizia Pernter and her colleagues use the data they generate for discussion purposes. They discuss a case and decide in a multidisciplinary environment how to proceed in the treatment of the patient.

More of an issue is the temptation to elaborate the data. “You say, ‘Oh, if I look at this in a slightly different way’ ... because you can. It happens often, and does take up time that you might not otherwise spend. But, on the other hand, we don’t have to change from one workstation to another to view the results of different elaborations, because *syngo.via* is multi-disciplinary and fully integrated,” she reports.

Another advantage is that every operator who works with *syngo.via* can personalize it to his or her requirements. Images can be manipulated to a degree not possible before. Distortions can be corrected and precise measurements taken.

Based in Italy, **Claudia Flisi** writes about the intersections of science and technology for the International *New York Times* and many other publications.

The statements by Siemens’ customers described herein are based on results that were achieved in the customer’s unique setting. Since there is no “typical” hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

<sup>1</sup> *syngo.via* can be used as a standalone device or together with a variety of *syngo.via*-based software options, which are medical devices in their own right. *syngo.via* and the *syngo.via* based software options are not commercially available in all countries. Due to regulatory reasons its future availability cannot be guaranteed. Please contact your local Siemens organization for further details.

## The Iceman Scan

At first glance, Ötzi the Iceman would appear to be an ideal patient for scanning – slender, quiet, and cooperative. But his age and physical state present certain disadvantages to radiologists. Because the mummy is maintained at a temperature of – six degrees Centigrade and a relative humidity of 98 percent in his chamber at the South Tyrol Museum of Archeology – in effect sheathed in ice – he

must be “defrosted” before scanning. To hold this disruption to a minimum and to ensure that his skin does not dry out, scientists have only scanned him three times since 2001, for brief sessions, and only during winter months. As his left arm extends awkwardly across the front of his chest, two passages are needed for a full body scan. Fortunately, the Iceman is not the type to complain.

### Further Information

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