



How Can Intelligent and Personalized CT Scanning Ease Radiology Workflow?

Increasingly, hospitals are aiming for more than just precision, quality, and speed in radiology. They want to go one step further – a step that the university hospitals of Erlangen and Navarra have now taken.

Text: Manuel Meyer | Photos: Stefan Hobmaier, Markel Redondo

Francisco Cubo was desperate: Two years ago, the 52-year-old Spaniard was diagnosed with cancer of the kidney and malignant lung nodules. “The doctors in Madrid didn’t give me much hope,” he remembers.

The real estate broker from the Madrid suburb of Majadahonda took matters into his own hand and sought out the best possible treatment and medical care. Soon, he found the Clínica Universidad de Navarra. This clinic in Pamplona, in northern Spain, is among the country’s most prestigious hospitals and a referral hospital for the treatment of cancer and heart diseases.

Within a week, he underwent surgery. The kidney cancer was successfully dealt with. But recently, new metastases have formed in his lungs, which are now being treated and checked regularly. The journey from Madrid is a long one, but for Francisco Cubo, it’s worth the effort. “I know that here, I will be treated by the country’s top specialists with the latest technology,” he says in the waiting room of the radiological unit.

At 10:30 a.m., the computed tomography (CT) scan is performed. And by 11:20, Francisco has already received the good news: The metastases have not spread any further. The treatment in the test phase seems to be effective. “In a regular hospital, I would have waited a week for the result. That’s an eternity when you’re in fear of your life. Here, I get the result within 50 minutes. That’s priceless,” says Francisco.

Seeking quality and personalized treatment

Such rapid diagnostics, however, require more than just quick CT scan procedures and excellent coordination between the radiology department and the treating physicians, as Gorka Bastarrika, MD, Head of Radiology, points out. “Our findings must also meet the highest possible standards of quality and precision if the doctor in charge needs them within hours in order to decide on the further treatment ahead of her consultation with the patient.”

Professional excellence combined with short waiting times and fast, personalized treatment

Matthias May, MD,
Assistant Professor
at the radiology
department of
University Hospital
Erlangen and Laura
Schwarzfaerber,
radiology
technologist.



Radiology nurse Begoña Sara finds that especially corpulent or less mobile patients can be positioned more easily thanks to the bigger gantry opening.

are the hallmarks of this internationally renowned university clinic. This is why patients from all over Spain and even from other European countries and Africa come to Pamplona. They are also the three reasons why banker António Assis de Almeida travels all the way from Angola to Clínica Universidad de Navarra once a year for a checkup. The clinic has many such screening patients who come for preventive examinations. However, the radiological unit is also in high demand among those seeking second opinions in cases of uncertain diagnoses. The clinic collaborates with external physicians around the globe. Results are sent out within 24 hours to anywhere in the world.

Complex scans – rapid and accurate

“In order to be able to work both rapidly and with high precision, we need not just first-class personnel, but above all the latest scanning technology. That also helps us with our pioneering work in further developing the latest treatment and scanning methods,” explains Bastarrika. And that’s exactly what the patients want.

Thus, the clinic is always equipped with the latest scanner technology. Since August, Bastarrika’s radiology team has been using the new SOMATOM X.cite* from Siemens Healthineers, which has undergone worldwide testing in five facilities and will be soon available on the market.

“Thanks to the intelligent support from the new myExam Companion as well as the automated capture of imaging and reconstruction settings, less experienced personnel can also carry out even the most complex scans quickly and accurately”, says the radiology chief. He notes that especially with cardiology patients suffering from arrhythmias, arteriosclerosis, or high heart rates, it is now much easier to standardize settings through intelligent decision trees.

This is a crucial factor for his department, since cardiac CT scans are becoming more and more frequent. “We live longer, we exercise less, and our diets are getting progressively worse. As a result, heart diseases are on the rise. At the same time, more and more physicians rely on

radiological cardiac diagnostics, which has seen massive improvement over the past few years,” explains cardiologist Juan José Gavira, MD. Accordingly, the demand for cardiac CT imaging is rising, too.

A new era in computed tomography

But what are the concrete advantages of the new CT scanner for the patient? “The examination is faster and more comfortable, and the new system generates a quicker reconstruction, which means that the patients get their results sooner,” says Bastarrika. He also points out that the scanner’s automated voice commands for patients are available in many languages, which is ideal for the Clínica Universidad de Navarra and its many international patients.

Another example is the bigger gantry opening: Larger and less mobile patients in particular, or those attached to medical devices can be positioned more easily, says radiology nurse Begoña Sara. “It’s much more comfortable. You no longer feel like you’re imprisoned,” agrees cancer patient Francisco Cubo. For him, however the biggest advantage is this: He wears a hearing aid, which he had to remove before each scan, making it difficult to understand the breathing instructions. “The new visual color codes indicate when you must breathe in or hold your breath, makes it much easier for me,” he explains.

“We are a clinic that emphasizes the personalized treatment of our patients. That’s also what our patients expect. Thus, SOMATOM X.cite is perfect for us. It’s not just one of the most versatile devices on the market, but it is also the first to facilitate personalized, individualized scanning. This marks an improvement for the doctors, for staff, and for the patient. As far as I’m concerned, this machine marks the beginning of a new era in computed tomography,” says Bastarrika.

Human-centric focus

Matthias May, MD, Assistant Professor at the radiology department of University Hospital Erlangen, Germany, which also took part in the SOMATOM X.cite pilot study, agrees: “The scanner

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Gorka Bastarrika, MD, Head of Radiology, Clínica Universidad de Navarra



For Gorka Bastarrika, MD, Head of Radiology, Clínica Universidad de Navarra, the new scanner marks a new era in computed tomography.

Laura Schwarzfaerber and Matthias May, MD, appreciate the patient-centric workflow the new system allows.



“Many of my colleagues spend most of their working hours operating MRI scanners or X-ray machines, and they often feel out of their depth when working with the CT scanner. But with this user concept, nearly all of them find it easy to switch to CT.”

Laura Schwarzfaerber, radiology technologist, University Hospital Erlangen, Germany

is definitely the first step toward personalized radiology.” Thus, he had no reservations about taking part in the current test phase. For years, he has been working closely with Siemens Healthineers on the development of the latest scan protocols and procedures at the Imaging Science Institute.

“As a university hospital, we have a clear mandate for training and research in addition to medical care, which we can only fulfill if we also have the latest technologies at our disposal.” In order to research new treatments or to introduce the next generation of radiologists to future technologies, May explains, it is necessary to have state-of-the-art in technology. Moreover, he notes that University Hospital Erlangen is a specialized facility. “We also need the latest technology in order to be able to treat cases that exceed the capabilities of regular communal hospitals.”

The SOMATOM X.cite is a “good all-rounder”, says May, incorporating the technical innovations of the past decade. However, as he explains, scanning time and image quality are no longer the main issues in radiology today. Rather, the goal is now to make scanning easier, thus making the experience more pleasant for patients, while relieving staff members from additional tasks and allowing them to use more of their time to spend with the patient. After all, he notes, the focus here is on individuals who are worried about their health.

“And where can we save time or relieve the burden on staff? On the periphery, when it comes to preparing the patient, the scan, or the reconstruction,” says May. It is here that the new intelligent user concept myExam Companion really comes into play. Currently, the companion guides users with up to 20 default decision trees.

Good guidance for all experience levels

“By using these predefined decision-making criteria, and assisted by automated capture and reconstruction settings, even less experienced staff are able to scan rapidly and flawlessly with the optimal image quality, X-ray dose, and contrast medium dose,” says the radiologist. This, he believes, is the upcoming trend in CT imaging. “We envision a future where you won’t need to be an expert to operate a CT scanner. This will be crucial not only in regions lacking a radiologist, but even here in our hospital: For instance, if less experienced personnel find themselves in stressful emergency situations or alone during their night shift.”

On the other hand, this very aspect is also of particular importance for a German university hospital with a training mandate as affects not only students, interns from other hospitals, or staff in training. “Many of my colleagues spend most of their working hours operating MRI scanners or X-ray machines, and they often feel out of their depth when working with the CT scanner. But with this user concept, nearly all of them find it easy to switch to CT imaging,” says Laura Schwarzfaerber, who works as a radiology technologist in Erlangen. She believes that the system is highly intuitive, self-explanatory, and easy to learn. Users are no longer required to familiarize themselves with as many technical details. “Really, all you need to do is answer a series of questions, and then – based on your responses – click through the system, which will pick the appropriate scanning protocol,” Schwarzfaerber explains.

Whereas a thorax CT scan used to require up to seven different protocols, she now only needs to select one. The scanning process is not only personalized for each patient, but is even tailored to their specific requirements. On the tablet, Schwarzfaerber clicks through the decision tree for the thoracoabdominal CT scan. Should the scan be restricted to the epigastric region or the abdomen? Is the patient able to hold his or her breath for more than 12 seconds, or not? Does the patient have any metal implants? Should the scan be done with dual or single energy?

Huge time savings in positioning

Automated algorithms read the patient’s ECG and feed it directly into the user system, which calculates the appropriate protocols and doses

of radiation adjusted for ECG data, weight, size, and age. Schwarzfaerber, holding her tablet, stands beside the patient, who is already lying on the scanner table. The fully automated positioning program, supported by a 3D camera, places the patient in the optimal position. “We save loads of time at this stage, since all of these steps had to be done manually before,” says Schwarzfaerber.

With the advanced tablet functionalities, she can now remain at the patient’s side even longer – “and that makes them much more calm and relaxed, which also assists our scanning process.” For the scan itself, Schwarzfaerber returns to the control room. With the scanner’s 2D camera, she can continue to monitor the patient carefully. “Looking at his face, I can see immediately whether he is uncomfortable, in pain, or nervous, and can react quickly.”

While one radiology technologist is already busy with automated reconstruction and archiving in the diagnostic room, another can get to work in the treatment room with the tablet, position the next patient, and prepare the scan. “The mobile environment means that work processes can be carried out in parallel, more flexibly, and with optimal use of time,” says May, the senior physician.

The time savings also benefit the university hospital as a whole: As a referral and specialist hospital for a catchment area including about one million potential patients, it has a considerable scanning workload of 40 CT scans per day. “Now, consider that we are also a training hospital. This means that we senior physicians always have to re-check the findings of our younger colleagues and doctors in training before they are passed on to the attending specialist.” This additional expenditure of time can be compensated for, according to May, as the work processes are accelerated. ●

Manuel Meyer is an independent journalist. He reports for Deutsche Ärztezeitung and other media from Madrid, Spain.

The statements by Siemens Healthineers 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.

*SOMATOM X.cite with myExam Companion is pending 510(k) clearance, and is not yet commercially available in the United States. Some products and features are not commercially available in all countries. Due to regulatory reasons, their future availability cannot be guaranteed. Please contact your local Siemens Healthineers organization for more details.