

As Radiation Dose Goes Down, Attractiveness of CT Rises

In recent years, Siemens scanners have steadily decreased radiation dose in CT exams, making CT use in everyday diagnostics all the more interesting. Now, for example, cardiac CT can be performed with doses as low as the “gold-standard”, cardiac catheterization and below, as studies at the University Hospital Zurich have shown.

By Oliver Klaffke

Hatem Alkadhi, MD, radiologist and associate professor at the University Hospital Zurich, is excited. Together with his colleagues he performed tests on patients with cardiac computed tomography (CT) utilizing two of Siemens newest high-end scanners, the SOMATOM® Dual Source Definition and the SOMATOM Definition AS. The radiation doses required were no higher than cardiac catheterization or scintigraphy. “This opens totally new perspectives for cardiac diagnostics with CT,” Alkadhi says. “Excellent images and low dosage is what physicians have always wanted,” he adds.

His findings are in line with the general trend in CT in recent years. The radiation dose needed for reliable diagnoses was considerably reduced when Siemens, the leader in the field of CT, pushed the frontier of progress forward with new Siemens dose-saving technologies such as the Adaptive Dose Shield, CARE Dose4D, ECG-Pulsing and Adaptive Cardio Sequence that are used today to deliver optimal images with as low dosage as possible. This, of course, is of great benefit for patients. “Dosage is always an issue, especially for children and patients who need a number of consecutive CTs,” says Prof. Borut

Marincek, MD, head of radiology at the University Hospital in Zurich. “For the sake of our patients, we will always opt for the latest technology that offers the best results with the lowest possible dosage,” he says. This was one of the main reasons why he and the hospital decided to purchase two Siemens high-end CT scanners, the Dual Source SOMATOM Definition and the SOMATOM Definition AS. Both of them provide unique technologies to significantly reduce patient exposure in both clinical routine and advanced applications and, therefore, assure better patient care.

Economic benefits of using CT

In addition to the main health issues criteria such as dose reduction, there are significant financial reasons for investing in CT. This is especially true for cardiac diagnostics. “Through the increased use of CT for cardiac diagnostics, a large hospital can clearly reduce costs,” says Marincek. The increased use of computed tomography has a great number of advantages for hospitals. “With a stronger emphasis on CT, it’s possible to save on expensive investments for the procurement and maintenance of various other equipment that, so far, has been primarily used for diagnostics,” he points out.



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For his department at the University Hospital in Zurich, Marincek calculates that CT represents lower procurement and infrastructure costs than an additional gamma chamber or further installations for cardiac catheterization testing. His conclusion: “The costs of the individual tests are much lower with CT than with the other procedures.”

As in other fields of CT, the dosage needed in cardiac diagnostics can now be kept very low. “Radiation exposure is no longer a reason to refrain from using CT for cardiac testing,” asserts Alkadhi.

The Zurich-based physicians completed their tests using very low doses. On average, only 2.5 mSv were required to obtain high-quality, meaningful images. As a result, the radiation exposure remained well under the values that have previously been typical with CT-Angiography. Depending on the test conditions, these have ranged between 9 and 21 mSv. “The radiation doses of our tests are below those currently necessary with cardiac catheterization,” says Alkadhi. He and his colleagues applied CT to 120 patients suspected of coronary heart disease. They were able to obtain diagnostically valuable and unrivaled data at minimal radiation exposure.

This was possible as the result of technical advances in Siemens’ CT technology and through the development of intelligent software applications for CT. The tests in Zurich used the Siemens SOMATOM Definition, a CT equipped with two X-ray tubes functioning simultaneously. “It is a significant advancement that dose can be kept so low using for example the step-and-shoot procedure,” says Alkadhi. This and also other new features, such as the Adaptive Dose Shield, are implemented as well in the SOMATOM Definition AS, offering dose reduction in every spiral exam. This means that the patient is not subjected to radiation not needed for the diagnosis.

“Using the lowest possible dose is of definite benefit to the patient,” Alkadhi says. Because computed tomography technology will surely be more frequently used in the future, dose reduction becomes a more compelling issue. This is one of the reasons Zurich University Hospital always opts for the latest technology in computed tomography. It should not be assumed that dose reduction has been accomplished only in this area. Such Siemens innovations are used today to deliver optimal images with as low dosage as possible. All together, they bring CT into the

mainstream of clinical routine making the SOMATOM Definition and the SOMATOM Definition AS scanners intelligent buying decisions. “With future purchases, dose will be one of the most important criteria when deciding in what system to invest,” Marincek says.

Oliver Klaffke is a science journalist in Switzerland.

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