

A portrait of Radiologist Ralf Bauer, a middle-aged man with short brown hair and glasses, wearing a dark suit jacket over a light blue shirt. He is standing outdoors with a blurred background of buildings and trees.

Radiologist Ralf Bauer believes that innovative digital technologies are important tools to assist doctors in providing quality patient care.

Artificial Intelligence Leads to Greater Confidence in Diagnostic Imaging

High-end devices in outpatient care?
For Professor Ralf Bauer, a partner at RNS Gemeinschaftspraxis in Wiesbaden, high diagnostic quality is an essential precondition for any application in radiology, including the use of artificial intelligence.

Text: Hildegard Kaulen | Photos: Carsten Büll

The radiologist Professor Ralf Bauer knows what he wants. Having consciously decided to leave his hospital career behind him, he has now become a partner in a joint practice. "Being a doctor is a liberal profession," he says. "I want to take advantage of that freedom so that my partners and I can make strategic decisions that we not only believe are prudent and correct, but that also allow us to provide maximum diagnostic quality for referring physicians and patients alike while remaining business-focused – which is of course essential." The radiologist studied medicine in Frankfurt am Main before qualifying as a university lecturer at the city's university hospital, where he also served as an attending radiologist. After a stint at the Cantonal Hospital St. Gallen, he has been one of four partners at RNS Gemeinschaftspraxis in Wiesbaden since July 2018. The joint practice maintains five centers in the Rhine-Main area, two of which are located in hospitals.

Focusing on the heart

Bauer and his partners perform the full range of examinations arising from private practice or through their close links with hospitals. Besides his diagnostic focus on cardio-thoracic, liver, and

vascular imaging, as an interventional radiologist himself, he also regularly performs procedures. A few months ago, St. Josefs-Hospital Wiesbaden acquired a SOMATOM Force Dual Source CT scanner, which is equipped with two radiation tubes and two detector systems. "We chose this amazing high-end device because we consciously want to further expand our cardiac imaging," says Bauer, who has been working with Dual Source technology for twelve years. "For me, SOMATOM Force is the best cardiac scanner on the market today."

The physicians who refer patients to him for a heart scan are typically cardiologists seeking answers to very specific questions. Can coronary heart disease be ruled out in a patient with unusual ECG readings or nonspecific chest pain? What state are the patient's bypasses in? How permeable is the stent? "With the cardiac CT scanner, we can answer these questions in ten minutes," says Bauer. "That's all it takes to examine the status of the coronary vessels in high diagnostic quality and without the risks associated with cardiac catheterization. On average, the resulting radiation dose is no higher than a quarter of the annual background radiation in Germany." Moreover, Bauer is noticing a change in people's preferences: "Many patients would

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RNS Gemeinschaftspraxis acquired the Dual Source CT scanner SOMATOM Force to expand their cardiac imaging.



rather be examined with the CT scanner than with a cardiac catheter. Some patients absolutely dread cardiac catheterization – and cardiologists are sensitive to that.”

Equipped for artificial intelligence

With a SOMATOM Force, Bauer and his partners are also ready for the arrival of artificial intelligence (AI) in radiology. “To some extent, AI applications disconnect the diagnostic process from the operator’s experience,” says Bauer. “I therefore expect that they’ll make diagnoses more consistent, even in the face of considerable time pressure and a heavy workload – after all, we’re now having to examine more and more patients in an ever-shorter time. This cannot be allowed to affect the quality of the results, regardless of the complexity of the examination.”

Radiology will benefit primarily from “deep learning” applications, in which algorithms are trained to recognize structures better and better over time. So-called computer-aided diagnosis (CAD) systems work in a similar way, although future AI applications will take these pattern recognition techniques to the next level. Will AI therefore threaten the role of radiologists? Bauer isn’t in the least bit concerned. “Algorithms don’t know what we don’t know,” he says. “They can’t recognize meaning. They simply see what we’ve trained them to see, although they are extremely good at it. We’ll still be responsible for making the diagnosis and for discussing it with the patients. I don’t buy into the idea that we’ll soon have an instrument that scans patients and simply reads the findings out to them,” Bauer adds. “When it comes to issues as important as sickness and health, which touch upon our most primordial fears, there’ll always be a need for doctors. Ultimately, that’s also my understanding of personalized medicine – consistent patient orientation in everything we do.”

Greater confidence thanks to artificial intelligence

That being said, this is another area where Bauer believes AI applications will be of assistance. “AI applications will allow us to diagnose patients faster, more consistently, and with fewer errors, so we stand to gain not only time but also confidence – confidence in the robustness of the

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diagnosis and time to talk to the patient. No one leaves our practice without receiving a detailed explanation of the findings.”

Time and confidence in the robustness of the diagnosis are also essential in terms of the radiologist’s growing influence on disease management, which goes well beyond simply detecting pathological changes. “Of course, we also participate in the tumor boards at the hospital locations – as highly specialized advisers on an equal footing with other clinical partners,” says Bauer. “We’ll have even more to offer in this role if we can use AI applications to gather more information from the scans with regard to therapeutic planning or the prognosis.” Thanks to the excellent quality of the scans, Bauer and his partners are also in a position to participate in the development

of new algorithms. RNS Gemeinschaftspraxis is currently one of only two centers in the world that are testing a new ultra-high resolution scan mode for chest CT imaging for the detection of small nodules and very early signs of fibrosis in the lungs. This would not have been possible without a high-end device. ●

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