

Impressed by the 3.0T
MAGNETOM Vida MRI
scanner's usability:
Radiologic technologist
Sarah Moritz.



Light at the Start of the Tunnel

Thanks to a state-of-the-art magnetic resonance imaging (MRI) scanner, Aarau Cantonal Hospital has been able to broaden its diagnostic spectrum, speed up the scanning process, improve working conditions, and make exams more comfortable and convenient for patients. The hospital's radiologists are now fully equipped to meet the challenges of the future.

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Half-way between Basel and Zurich, the 680-bed Aarau Cantonal Hospital (Kantonsspital Aarau or KSA) is one of the three biggest non-university hospitals in Switzerland. But until recently its three MRI scanners had been giving the hospital a veritable headache. Even though the two 1.5-Tesla (T) and one 3T machines were scanning without a break, waiting times of four weeks or more had become a source of annoyance and frustration, even for in-house referrers. The problem of space had also become acute: "The situation was intolerable, particularly for parents and their children. This also rubbed off on staff," explains Professor Thomas Roeren, Head of Radiology at KSA.

Closing diagnostic gaps and optimizing screening processes

Against this backdrop, it was clear that the hospital would have to increase its capacity by procuring a fourth MRI scanner. "But it wasn't just about increasing capacity," says Alexander Cornelius, MD, Deputy Head of Radiology and Senior Consultant in charge of MRI. "We would have been able to reduce waiting times with any scanner. But we also wanted to close gaps in our diagnostic capabilities, as well as optimiz-

ing workflows to give patients, particularly children and inpatients, greater comfort and convenience."

KSA therefore opted for a truly high-end piece of equipment, the new 3T MAGNETOM Vida MRI scanner from Siemens Healthineers. It went into operation in April 2018. "The scanner has integrated tablet control, which means that staff can accelerate workflows and thus be closer to the patient and don't have to devote so much attention to the system itself," adds Cornelius.

Greatest benefits for children, older people, and anxious patients

Radiologic technologist assistant Sarah Moritz is full of praise for the scanner's usability. She's particularly impressed by the dockable table with eDrive assistance: "We used non-motorized gurneys before, and had to move inpatients four times. Now we position them directly on the MRI table in the preparation room, where we can already arrange any masks, coils, and drips correctly. So we only have to move them twice." In addition, the table is equipped with motorized assistance so that even heavy patients can be



Sarah Moritz adjusts the scanner's innovative head coil.

effortlessly moved to and from the scanner. While one patient is being scanned, the next patient is already being prepared on a second table. This expedites the process even for patients under anesthesia. "Doing that systematically would enable us to scan twice as many patients as previously, provided anesthesia had the necessary staff," says Cornelius.

Moritz explains that three groups of people benefit particularly from the new scanner: Children, older people, and anxious patients. Patients who are prone to anxiety are helped by the fact that the scanner's 70-centimeter wide opening is illuminated, "which makes it appear even wider, meaning fewer problems for claustrophobic patients," Moritz says. "We've already had patients we couldn't work with on the other scanners who are okay with the Vida." The innovative

"Performing at university level in radiology"

With 35 physicians and around 100 additional staff, Aarau Cantonal Hospital (KSA) boasts one of the biggest departments of radiology in Switzerland. It offers the entire range of radiological diagnosis. Every year, its radiologists and radiologic technologists perform a total of around 120,000 exams of all sorts on both in- and out-patients. In 2017, around 11,000 of these were MRI scans. In the future, this figure is set to increase to 15,000 a year. The department's main areas of focus are intracranial and musculoskeletal MRI. However, it also offers special exams such as breast MRI and oncological diagnostic MRI imaging of the liver and prostate. "At KSA, we aspire to perform at university level in radiology," says Head of Radiology Professor Thomas Roeren, MD.

head/neck coil, which can be tilted 9 or 18 degrees and ensures that this challenging region is automatically and optimally shimmed. This makes a particular difference for older people. "We used to have to take a lot of care to give them the extra cushioning they needed. Now, we simply tilt the coil. This makes things more comfortable, especially for older women who often have problems with their spine. There are some patients we only scan on the new system because of its head/neck coil."



Above: Professor Thomas Roeren, Head of Radiology at Kantonsspital Aarau. Below: Alexander Cornelius, MD, Deputy Head of Radiology and Senior Consultant in charge of MRI.



Positive feedback, even from very critical parents

The patients for whom KSA's new MRI scanner makes the biggest difference are children (who are often intubated) and their families – for several reasons. For one thing, the new room arrangements and the dockable table greatly improve workflows: “Almost monthly, I used to get complaints from families because scanning required many steps and coordination was often difficult. Everyone was frustrated,” reports Roeren. Since installation of the new MRI, not only have there been no more complaints; there has even been praise. Roeren is thinking particularly of Alina, a little girl with early childhood brain damage who needs regular MRI scans: “We used to have a lot of discussions with her mother. Now we only get positive feedback.”

But in addition to the space arrangements, the MRI technology itself also makes a difference. For children who need a whole-body MRI scan every six months following cancer, larger areas of the body can be covered thanks to the large $55 \times 55 \times 50 \text{ cm}^3$ field of view. “This allows us to complete the scan for metastasis in two steps taking less than 20 minutes, and we're often finished before the child starts moving,” says Cornelius. One child who has benefited from this is Alessia, a girl who needs regular scans because of a lymphoma.¹ In the future, it might even be possible for her to have scans without intubation. It remains to be seen whether the improved image quality will allow imaging to be done without contrast agent.

Liver and heart patients can breathe easy

The new scanner marks a qualitative leap in the diagnosis of liver tumors. As Moritz explains, this applies in particular to the dynamic phase of tumor imaging with contrast agent: “We used to do a prescan with 20 seconds of instructed breathing before injecting the contrast agent, and then another three 20-second sets of instructed breathing in relatively quick succession. The resulting images were often blurred. Now we can do the entire sequence in only a few minutes without instructed breathing.”

This kind of imaging with free and unrestricted breathing is possible thanks to the new sensing technology of the MAGNETOM Vida's Compressed Sensing GRASP-VIBE.² According to Cornelius, it helps not just when it comes to

MAGNETOM Vida's BioMatrix technology

Thanks to its innovative BioMatrix technology, MAGNETOM Vida better accounts for differences from person to person to provide consistent quality independent of patient or user. The scanner is based on a modern MRI platform that, thanks to a new magnet, larger field of view, high gradient power, better software with new applications, and easier access to postprocessing, boosts diagnostic accuracy, speeds up examinations, and improves the signal-to-noise ratio. Among other things, sensors in the table automatically capture respiratory signals, accelerating the workflow for respiratory triggered examinations. The BioMatrix head/neck coils further allow automatic optimization of image quality in areas that are especially challenging for MRI, like the neck area. Additional features of BioMatrix, including semi-automatic positioning of the patient on the basis of stored body models, can make the patient positioning process up to 30 percent faster. An easy-to-move, motorized, dockable MRI table greatly simplifies the procedure for obese, immobile, and trauma patients.

perfusion scans of the liver, but also with other scans where respiratory movements are relevant: “Compressed Sensing is an enormous advance, especially in terms of cardiac imaging, which in some cases used to involve patients having to hold their breath twelve times. Now, they can breathe freely.” ●

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¹ MR scanning has not been established as safe for imaging fetuses and infants less than two years of age. The responsible physician must evaluate the benefits of the MR examination compared to those of other imaging procedures.

² Compressed Sensing GRASP-VIBE for other regions than liver is not for sale in the U.S.

Intended Use: Compressed Sensing GRASP-VIBE (GRASP = Golden-angle Radial Sparse Parallel MRI) is intended to be used in dynamic and/or non-contrast liver examinations to support patients who cannot reliably hold their breath for a conventional breath-hold measurement.

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.