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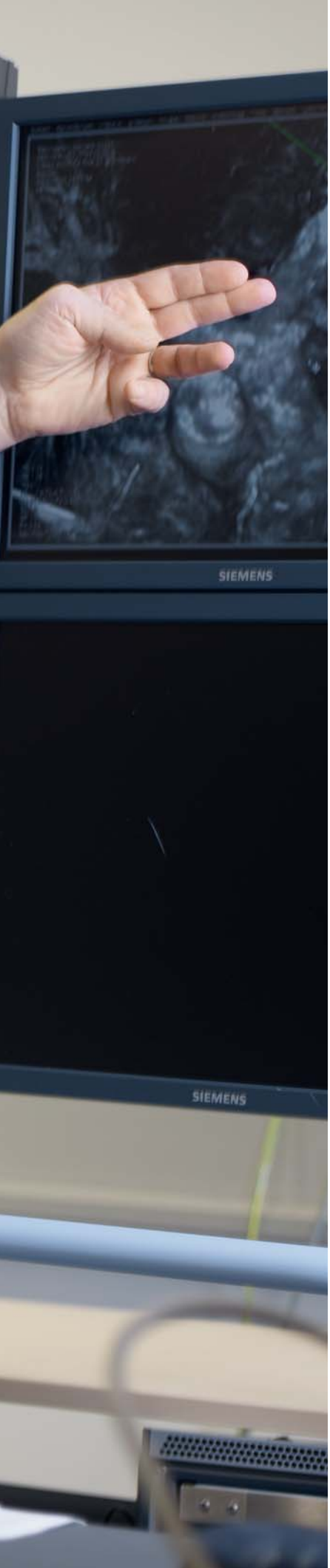

The innovative Siemens *syngo* DynaCT Cardiac software is revolutionizing the degree of precision that interventional cardiologists can achieve in procedures involving heart catheterizations, providing new therapeutic dimensions.

By Martina Lenzen-Schulte, M.D.

Optimized Orientation in Cardiology Labs

Three-dimensionality is the crown of medical imaging, especially when dealing with orientation for interventions. When dealing with organs such as the heart, which move themselves, it is immediately obvious how vital continuous position awareness is. Seeing exactly where one is navigating with the catheter increases confidence and speed. Just how clearly this accelerates workflow is evident with atrial fibrillation therapy supported by the new *syngo* DynaCT Cardiac software.

Angiographic ablations are not for beginners

"Visitors at our clinic are immediately impressed when they see the system effectively working in vivo," says Dr. Johannes Brachmann M.D., head physician of the 2nd Medical Clinic for Cardiology, Angiology and Pneumology at the Coburg Clinic in Coburg, Germany, describing the reaction of colleagues. After the software was proven in other disciplines, such as in interventional radiology, the new tool was first introduced in Coburg to the work domain of cardiologists. "The ablation of arrhythmic fibers in atrial fibrillation is technically a very demanding intervention," explains Brachmann. The expert needs to obliterate or electrically isolate heart muscle fibers in critical areas of the left atrium, especially at the ostia of the four pulmonary veins.
Using the advanced angiographic equipment, *syngo* DynaCT Cardiac delivers

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cross-sectional images with CT-like quality. The user moves the C-arm in a semicircle around the patient and obtains a 3D reconstruction exactly when needed – during the intervention. "This has three decisive advantages," explains Brachmann: "First, it saves us having to do a CT a day before the examination. Second, one is not confronted with the danger of falsely assessing the location of anatomically variable structures – such as the esophagus – when the image information is no longer correct because it is simply too old. Third, we ultimately minimize complications risk, because the location of the catheter tip can be checked at any time."

Reduce costs, increase capacity ...

Based upon a study with 25 patients, the Coburg team demonstrated that every procedure could be shortened by a half hour, or up to a quarter of the total required time. Cost savings for an additional CT-scan or an overnight stay at the hospital add up to cost savings of 52 percent thanks to 3D imaging directly in the cath lab. With the patient volume at Coburg, the clinic expects a benefit of 500,000 euros over eight years.
Since the optimization of atrial fibrillation treatment at Coburg, capacity has noticeably increased: Instead of the previous 200 ablations per year, 400 such procedures are foreseen in 2009. "We anticipate a continuous growth in need, since in Germany only about one percent of the more than one million affected persons currently receive such a treatment," predicts Brachmann. Increasingly, not only experts, but also patients see this as an alternative to drug treatment. The success rate of electrical ablation using conventional procedures already exceeds that of drug therapy, with a success rate of 60 to 70 percent compared to about 50 percent. "Thanks to the improved 3D imaging, we have even been able to increase efficacy – we are now able to successfully treat 84 percent of those affected by atrial fibrillation," reported Brachmann, quantifying the procedure's effectiveness.
We already expect a reduction in the incidence of complications due to improved orientation. Exact statistical evidence will be available only when the planned evaluation of data gathered from the 8000 cases so far by the German ablation registry is completed.

... and broaden indications

Experts have long suspected that atrial fibrillation, with its increased risk of clot formation, could be responsible for 20 to 25 percent of all strokes. If this is confirmed by the analysis of the currently ongoing studies, Brachmann predicts that the need for ablations will instantly jump to high levels: "We find ourselves at a point of simultaneously having a development that will progressively optimize an already very effective procedure, and a rapidly increasing number of those who require it."
In the meantime, the improved orientation increases confidence among cardiologists in cardiac cath labs to weigh treating ailments that used to be considered taboo for their area of specialization. This includes chronic total occlusions (CTO), currently a clear domain of heart surgeons. Opening these occlusions with a catheter demands precise knowledge of the position of the catheter tip, which *syngo* DynaCT Cardiac provides.
The team around Brachmann is active in preliminary studies to explore these possibilities as well as studies involving bundle branch block. Treatment for this complex heart rhythm disturbance presents an especially tricky challenge, involving a special vein in the left heart chamber that needs to be reached for an electro-physical obliteration. "Also, here we see that the new system helps to master the task," says the pioneer. Especially the youngest cardiology patients can profit from the new possibilities – children born with heart defects. In these cases, ablations are not uncommon due to preconditions – in order to spare the youngsters from drug therapy. The omission of the comparatively high radiation levels of CT, as well

as increased efficiency in treatment, opens new perspectives for this group of patients.

One for everything – an interdisciplinary tool

Seeing the many different advantages of a fully equipped C-arm system allows one to imagine many and diverse interdisciplinary applications. Vascular surgeons value three-dimensional orientation for difficult-to-reach sinuses, as do gynecologists for removing benign tumors from the uterus. Brachmann also sees the advantages in such joint applications: “At our clinic, an additional lab will shortly be equipped with *syngo* DynaCT software. We plan to share it with the interventional radiologists.” Thanks to technicians mastering both disciplines, the new lab will rarely be empty, the dream of all wishing to optimize procedures in clinics.

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She writes for medical journals as well as for publications for general audiences. She was recently awarded the 2009 Helmut Stickl Prize from the German Academy of Pediatrics for her work in medical journalism.

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