



syngo DynaCT Cardiac supports catheter ablation therapy for atrial fibrillation.

A Sound Heart and a Sound Budget

Atrial fibrillation is a cardiac arrhythmia that, given the aging population, is sending an increasing number of patients to physicians. Currently, catheter ablation is the only treatment that provides a long-term cure. *syngo* DynaCT Cardiac software provides cardiologists with a tool that not only makes treatment faster and more efficient, but can also result in significant cost savings. This has been proven in a study at Coburg Hospital, Germany.

By Martina Lenzen-Schulte, MD



Catheter ablation procedures place high demands on the entire cath lab team. More efficient treatment planning better utilizes both the cath lab facilities and the skills of the experts.

Given the pessimistic economic mood, those asking for high-tech investments in their operations are currently being advised with resignation to “tighten their belts and save money.” This does not apply to Professor Johannes Brachmann, MD, Head of the II. Medical Clinic for Cardiology, Angiology, and Pneumology at Coburg Hospital (Klinikum Coburg). Although his department is already equipped with four highly modern catheter labs, expansion with an additional interventional angiography lab is about to take place.

This hospital is willing to generously invest in equipment purchases, due in no small part to the fact that Brachmann can prove the organization saves money through such investments. The innovative *syngo*® DynaCT Cardiac software is the story here. It is being used in Coburg in the treatment of cardiac arrhythmia, specifically atrial fibrillation, and is revolutionizing C-arm angiographic imaging during catheter ablation.

Lowering Costs, Saving Time, Improving Workflow

Immediately prior to a catheter intervention, this new method generates a three-dimensional image of the patient’s heart within seconds, as well as an image quality almost on par with computed tomography (CT). It also supports mapping to locate electroanatomical points critical for the procedure. As a result, the examination costs and time previously required for

the mandatory CT examination have been eliminated, along with the time required to transport the patient to the CT system. In addition, more than half of the patients do not have to be admitted to the hospital a day before the intervention. “Using a group of 25 patients, we found that these three factors alone resulted in a cost reduction of approximately 52 percent compared to the conventional procedure,” says Brachmann, explaining the savings. He can even calculate it down to the last cent: “Assuming an eight-year investment period, the hospital can recoup up to 500,000 euros during this time.” His calculations only assume a 20-percent annual increase in the number of patients. However, in the second year in which *syngo* DynaCT Cardiac is being used at Coburg, the facility may double the number of patients it treats. Instead of 200 catheter ablations (due to atrial fibrillation) performed annually, it is conceivable that 400 will be performed in 2009. This doubling is primarily due to the improvements in workflow. Savings and profit could therefore be even higher.

Economics in the Service of Effective Care

That a cardiologist juggles numbers like an experienced economist is no contradiction in Brachmann’s view: “It is completely unrealistic to hope that physicians can make progress with existing therapy resources if we ignore the financial aspects. For me, however, it is not simply

Catheter Ablation: Switching off Damaged Electrodes in the Heart

The rhythm of the human heart – some 60 to 80 beats per minute – is generated in specific centers and forwarded electrically. In the case of atrial fibrillation, a section of the heart no longer moves with regular contractions. Instead, the muscle walls quiver lightly at a frequency of more than 350 per minute. This not only reduces the vigor of the heart, it brings with it the danger of blood clot formation. For this reason, attempts are made to destroy these pathologically changed arrhythmogenic centers, for example, by applying heat at 70 degrees Celsius at the tip of a catheter. These centers are located in the interior wall of the left atrium, primarily at the end of the four pulmonary veins. It is important not to damage these vessels during electrical isolation; scar tissue formation can result in their occlusion. Therefore, good orientation is essential when the cardiologist is using the catheter to look for the locations he wants to cauterize.



“We have been able to increase the success rate of catheter ablation therapy to 83 percent.”

Professor Johannes Brachmann, MD, Director, II. Medical Clinic for Cardiology, Angiology, and Pneumology, Coburg Hospital, Germany

a matter of keeping costs down. Increasingly, more efficient treatment planning better utilizes both our cath lab facilities and the skills of our specialists, thereby enabling us to offer the necessary interventions in sufficient quantities.”

These interventions are complex and place high demands on the abilities of a cardiologist. “We save a total of 30 minutes for each intervention, up to a quarter of the total time,” says Brachmann in estimating the quantitative benefits of the shortened workflows. As a result, a specialist can treat more patients. This will be necessary in the future considering the increasing number of patients who require treatment for atrial fibrillations, which will likely increase even further as the population ages.

Insufficient Capacity for Catheter Ablations

“We suspect that a large number of strokes – possibly 20 to 25 percent – is due to this type of cardiac arrhythmia,” says Brachmann. If an international study that is currently underway confirms this, the specialist from Coburg expects cardiologists to be faced with a torrent of catheter ablations. This would mean eliminating atrial fibrillation as a risk fac-

Treating Liver Tumors Faster

One-third of all liver transplants in Australia and New Zealand are performed at the Royal Prince Alfred Hospital (RPAH) in Sydney. John Magnussen, MD, Head of the Research Department and an interventional radiologist, as well as Richard Waugh, MD, Head of the Radiology Department of the RPAH, wanted to know whether the use of *syngo*[®] DynaCT-supported angiography would improve workflow and reduce costs.

Malignant tumors of the liver are localized via angiographic display and occasionally selectively treated prior to liver transplant. The conventional procedure always required arterial portography using CT (CTAP). Thanks to their excellent image quality, the slice images from *syngo* DynaCT are on par with CTAP, making the CT examination unnecessary.

As a result, all diagnostic and therapeutic activities can be per-

formed in the interventional suite. The improved workflow and cost savings can be quantified as follows:

- Instead of two hours, the intervention takes only 40 minutes
- Previously, the catheter was misaligned in ten percent of patients and had to be corrected; this took an additional 1.75 hours
- Personnel costs (e.g., for transportation to the CT) have been reduced by 83 percent, the cost for routine consumables is down 31 percent
- Costs for keeping patients overnight have been virtually eliminated

In total, the use of *syngo* DynaCT software has helped reduce the cost for diagnosing and treating liver tumors by an average of 33 percent.

tor for stroke in a sustainable, preventative manner. Strokes cause the highest number of disabilities among the elderly and represent one of the greatest drains on our healthcare system.

In Germany, however, there are only 60 centers offering such treatment, and only a few hospitals have the same capacity as Coburg and can treat more than 100 patients annually. It was in Coburg that the *syngo* DynaCT Cardiac software was codeveloped and installed for the first time worldwide. "As much as we welcome having this unique feature for our hospital, for patients, we hope that other facilities will soon ramp up their capacity," says Brachmann. At present, only one percent of those affected can be treated using ablation. However, more than one million patients are already suffering from atrial fibrillation. It is the arrhythmia most frequently responsible for hospital admissions because those affected lose consciousness. Medications not only are less efficient, but many patients also only respond to them after ablation therapy. Blood-thinning substances such as Markumar® help suppress the formation of blood clots in the fibrillating atria of the heart. However, they are poorly tolerated and carry with them the risk of serious bleeding, including in the brain.

Patient Advantage: Greater Comfort, Less Radiation Exposure

Catheter ablation using *syngo* DynaCT Cardiac is more than just an ideal combination of cost reduction and improved workflow. Its real benefit to the physician and patient is medical in nature. The excellent 3D images before and during the intervention represent a 70-percent reduction in radiation exposure for the patient because the CT scan has been eliminated. Using *syngo* iPilot, the physician sees where the tip of the catheter is located, making orientation much easier. There is reason to believe that this will further reduce the rate of complications for this intervention. A clear scientific answer to this question will have to wait until the data from the German ablation registry have been evaluated. To date,

information on more than 8,000 interventions has been entered. The same is true for the success rate, which is approximately 60 to 70 percent. This means that two-thirds of patients are free of atrial fibrillation after catheter ablation. However, in some cases, the intervention has to be repeated. "In Coburg, we have been able to increase the success rate to 83 percent," states Brachmann.

The more the side effects of this intervention are reduced and its effectiveness is increased, the sooner it will be indicated. He continues, "When advising patients, it is becoming increasingly easier for us to enumerate the advantages of catheter ablation. This is important because many patients are under severe psychological strain due to atrial fibrillation. It also affects job performance should they, for example, begin to panic because their heartbeat suddenly goes crazy."

New Applications in Sight

"It is already apparent that this technique's high level of success has significantly accelerated cardiologists' learning curve for this electrophysiological intervention," stated Brachmann. As someone who trains future cardiologists, he particularly appreciates this advantage. Even experienced specialists are taken with it: "Everyone who has seen the new system in action here is impressed," the pioneer says.

Greater comfort and fewer complications will also expand the application spectrum for ablation. Improved imaging during the procedure is already helping to better master arrhythmias that previously were difficult to handle, such as the bundle branch block. And Chronic Total Occlusion (CTO), previously the domain of surgeons, can now be treated in the catheter lab. Coburg is a lead participant in the corresponding studies. Clearly, there is no need for belt tightening right now.

Martina Lenzen-Schulte, MD, is a physician, author, and medical journalist. She writes for medical magazines and the general media. For her medical journalism, she recently received the 2009 Helmut Stickl Award from the German Academy of Pediatrics (Deutsche Akademie für Kinder- und Jugendmedizin).

Summary

Challenge:

- Handle the growing number of cases for catheter ablation through better use of existing resources
- Improve the structuring of interventions
- Avoid unnecessary imaging and time-consuming transports

Solution:

- Current, high-resolution imaging immediately before and during catheter ablation
- *syngo* DynaCT Cardiac, a software that provides real-time, three-dimensional images of the heart for interventions in conjunction with C-arm angiography and enables continuous adjustment of orientation directly in the cath lab

Result:

- Cost savings up to 50 percent or up to €500,000 over the course of eight years
- Potential savings of 30 minutes per intervention, allowing for more interventions
- Up to 70 percent less radiation exposure for the patient
- Increased treatment success because the cardiologist's orientation is improved during the intervention
- Lower rate of complications is expected

Further Information

www.siemens.com/DynaCT