

Hybrid Rooms: Benefits for the Patient – Assets for the Clinic

A hybrid room provides an ideal environment for work process optimization and for the gentle treatment of patients. In terms of treating cardiovascular diseases, it means both catheter laboratory and operating theater in one. Up to now, university hospitals such as the Heart Center Leipzig have been particularly interested in these installations. However, smaller hospitals may equally profit from such equipment, as the example of Immenstadt in Germany has demonstrated so well.

By Ingrid Horn

In Europe, more and more people are suffering from cardiovascular diseases. This has long been a leading cause of death. Looking at the statistics, we cannot expect a reversal of this trend in Western societies with an aging population. In this context, minimally invasive therapies have moved to the center of attention in recent years. The Heart Center Leipzig in Germany also uses such therapies. This is a way of giving morbid and elderly high-risk patients in particular an option of improving their quality of life. The Leipzig cardiac surgeons are highly experienced in carrying out gentle surgical procedures in a hybrid room, where they can perform catheter-supported procedures as well as classic surgery.

Hybrid means interdisciplinary

One example is the method of heart-valve implantation in patients with aortic stenosis performed at the Leipzig clinic for cardiac surgery. Professor Dr. Thomas Walther, Assistant Medical Director, is one of the pioneers of a method by which the new heart valve is put into position by means of a catheter. Access is created transapically, via the femoral artery or the apex of the heart. With this procedure, the surgeon makes only a few small incisions and the patient no longer needs to be connected to a heart-lung machine. "We have made real progress here thanks to the fact that we are able to work together with a cardiologist at the operating table," the cardiac

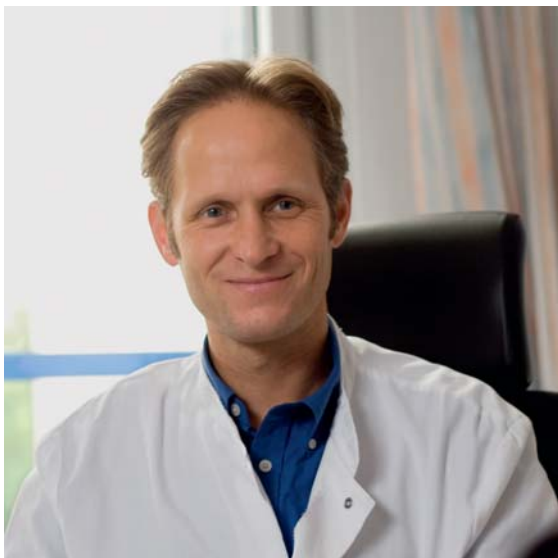
surgeon says with utmost conviction. He has already performed more than 250 transapical aortic valve implantations, and working side-by-side with a cardiologist saves time. "Procedures that used to take three hours now only take two," Professor Thomas Walther adds.

The Artis family offers top technology

Hybrid rooms are a prerequisite for such a collaboration, as they provide the appropriate integrated imaging system technology for 3D imaging. Many years ago, the hospital management equipped an operating theater with a Siemens C-arm mounted to the ceiling. This highly-developed angiography system allows for an illustration of the vascular situa-



Hybrid room at the Heart Center Leipzig, Germany equipped with a ceiling-mounted system from Siemens.



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Prof. Thomas Walther, M.D., Assistant Medical Director, German Heart Center Leipzig, Germany

tion before, during, and after the procedure. In addition, another special application, *syngo* DynaCT is used. *syngo* DynaCT delivers three-dimensional, CT-like images of the heart and thus facilitates both the planning of the procedure and the control of results. For the purpose of recording images, the C-arm rotates around the patient, generating CT-like cross-sectional images. These images are then reproduced and projected onto the monitors in the operating theater which each participating doctor has full view of.

With its Artis **zee** and Artis **zeego** imaging systems, Siemens offers extremely efficient angiography systems that make an impression mainly due to their outstanding image quality. In parallel, the radiation load is very low so that it is possible to screen the patient continuously for several minutes during the procedure. The most innovative member of the Artis family, the Artis **zeego**, is a technological revolution. The C-arm is moved via a multi-axis robot arm and provides the surgeon with almost

unlimited freedom of movement in the operating theater. The flat detector rotates around the patient's whole body at high speed and with great precision, which allows for the generation of highly precise cross-sectional images of the soft tissue.

University hospitals, such as the Heart Center Leipzig are highly committed to being up-to-date with the latest technology: “This is why we have already opted for the next generation of this system,” Professor Thomas Walther states. “Artis **zeego** will continue to improve the workflow in our team and will also make it easier for us to treat obese patients for example,” the cardiac surgeon says with conviction.

Hybrid expands the patient base

For hospitals wishing to install a hybrid room, profitability is one of the most important factors. One of the decisive factors for return on investment is the hybrid room's capacity utilization rate. The less time it takes to perform a single

operation, the more patients can be operated on in one day. In Leipzig, approximately 50 percent of all heart valve operations are now performed using the minimally invasive method and the trend is upward. Approximately 19 percent of all patients with highly severe aortic stenosis have their heart valve prosthesis implanted by means of a catheter. Taking these figures, the Heart Center Leipzig is the market leader both in Germany and internationally. Performing operations using the minimally invasive technique also expands the patient base. Especially the elderly and patients with multiple diseases profit from spending less time in surgery and thus being subjected to less physical strain. An 80-year old diabetic with a mitral valve defect whom the cardiologist would have considered unfit for surgery even a few years ago can now be treated by Professor Walther and his surgical team. And the statistics collated for the Heart Center Leipzig speak for themselves: In 2007, the number of patients with mitral valve defects who

received minimally invasive surgery was four times higher than the number of patients who had to undergo conventional surgery. However, the number of conventional operations has remained the same throughout the years. This is a clear indication that the patient intake at the Heart Center Leipzig has increased, with patients now coming from all over Germany.

More patients – higher income

The clinic at Immenstadt has also registered a higher patient intake. In 2008, it set up the Oberallgäu Cardiovascular Center relying on top technology from day one. It is the first rural clinic in southwest Germany to feature a hybrid room. The investment decision has already surpassed everyone's expectations. "Having treated 600 patients in the first six months alone, we will be able to increase that figure to 1200 in the first operative year," Andreas Ruland, Managing Director of the Oberallgäu Hospitals, which the Immenstadt hospital is affiliated with, reports. "According to our calculations, we were due to reach this figure in three years' time, as we have allowed for a two-year patient intake start-up period." Now Andreas Ruland is confident that the investment in technology and refurbishment amounting to almost one million euros will be amortised in as early as three to five years.

A thorough analysis is required

Careful investment planning is a prerequisite for economic success. An expert appraisal on the economic development informed the hospital's decision-making process. The assessment showed that the local population was underserved as far as the treatment of cardiovascular diseases was concerned, which is why patients went to the surrounding clinics instead. The challenge was to win them back. Furthermore, the Oberallgäu area is one of the most popular holiday regions in Germany and we therefore

had to ensure that emergency treatment would be available to the tourist population as well. A heart catheter measuring station is a prerequisite for the adequate treatment of acute life threatening conditions. The demographic development of the population and the age range of the tourists also contribute to the supposition that the number of cardiovascular diseases will continue to increase in the future. Consequently, the estimated number would be more or less 1200 patients a year according to the experts. They set the break-even point at 600 patients. At the same time, they issued a recommendation to establish a department for vascular surgery in addition to the

cardiology and angiology departments, in order to improve the capacity utilisation rate.

Single-source implementation

The clinic had five offers prepared and assessed before opting for Siemens. Not only did Siemens offer product engineering, but also an entire service package comprised of space planning and technical training for staff. In cooperation with the clients and the users involved, Siemens worked out a tailor-made space and technology solution. The various Artis zee systems require rooms of different sizes. While the floor-mounted Artis zee is a less expensive

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solution for smaller rooms under 50 m², the flagship Artis **zeego** requires more than 60 m².

For this reason, the Immenstadt clinic installed the floor-mounted Artis **zee**. The C-arm can be moved from the acquisition position to the park position without getting in the way of the anesthesiologist. "Furthermore, the system's operating table can be tilted on two axes and turned horizontally," Dr. Wulf Ito, one of the two Medical Directors of the Oberallgäu Cardiovascular Center explains. The scope of movement of the C-arm and the variable positioning of the operating table enables the surgeon to work with optimal and relaxed control before, during and after the intervention, without having to reposition the patient.

At the same time, the hybrid room is equipped with everything a surgeon normally needs to perform a vascular operation. The time-consuming movement of patient and operating team to another room in case conventional surgery is required is thus a matter of the past. With this hybrid catheter laboratory

the Immenstadt clinic can now provide treatment to patients locally with the same quality offered by university hospitals.

Attracts the best medical staff

Modern technology alone is not enough to win patients over. However, it is a prerequisite to acquire qualified personnel who, at the end of the day, account for the hospital's reputation. The hybrid room was also one important factor in Dr. Wulf Ito coming to Immenstadt in order to assume management of the new cardiovascular center together with his colleague, Professor Dr. Jan Torzewski. They are both cardiologists and complement each other perfectly. Jan Torzewski is also a trained intensive care physician and Wulf Ito an angiologist. "In the mid-term, we also intend to use our hybrid room to perform heart valve implantations," says Dr. Wulf Ito, explaining the hospital's future perspectives. In this area, the hospital is currently cooperating closely with the University Hospital Ulm. Professor Jan Torzewski used to

work there as part of a team of doctors who operated using a method by which the new heart valve is guided to the heart via the arteria femoralis (femoral artery) by means of a catheter. This particularly gentle method is characteristic of the current developments in heart surgery, which will not be able to manage without hybrid rooms in the future.

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Wulf Ito, M.D., Medical Director of the Oberallgäu Hospitals, Immenstadt, Germany



Hybrid room at the hospital in Immenstadt, Germany. Artis zee floor-mounted system was just the right fit.