Go HYBRID!

The magazine for decision makers in image-guided therapy

Shaping the hybrid future

Page 12

Room Planning

Top Ten: What you should consider when installing a hybrid OR

Page 24

Quality

A hybrid OR dedicated for spinal surgery only: Discover the results of the pioneers

Page 26
In our first issue of Go HYBRID! we focused on the integration of interventional and surgical techniques in hybrid operating rooms. As of today, Siemens has installed close to 900 hybrid ORs worldwide, and so even more surgical disciplines are experiencing the benefits of image-guided treatment in these rooms.

This issue features image-guided therapy beyond hybrid operating rooms, with a special focus on combining different modalities like CT and MRI with an angiography system.

The second edition of Go HYBRID! shows Dr. David L. Lacey from Iowa Medical Center in Des Moines, who is using a combined imaging suite with CT and angiography to treat liver cancer. He explains how this combination lets him extend the range of medical options, manage complex cases, and treat patients who would previously have required surgery or referral to a specialist. Start reading on page 18 to find out how this room is impacting his department’s performance.

In surgery, hybrid ORs are now used for much more than just cardiovascular and endovascular procedures. Their utilization for VATS, trauma, and spine surgery has become a clinical fact.

Dr. Raphael Bueno at Brigham and Women’s Hospital in Boston uses intraoperative 3D guidance to remove small pulmonary nodules to improve the treatment of lung cancer. Learn more about his experience on page 4.

Prof. Florian Gebhard, medical director of trauma surgery at the University Hospital Ulm in Germany, discusses his first experiences with hybrid rooms for trauma surgery on page 28 and explains why training is a crucial factor.

At Shonan Fujisawa Tokushukai Hospital in Japan, Prof. Sohei Ebara reports significantly reduced complication rates in spine surgery when using a hybrid operating room. Spine surgery is one of the most prominent examples of how image guidance during surgical treatment has the potential to improve not only clinical outcomes but also positively impact the hospital’s return on investment by reducing OR time and decreasing the patients’ length of stay. Learn more on page 26.

A more comprehensive view of minimally invasive surgery is presented by Prof. Jacques Marescaux, head of the IRCAD Foundation, a competence center for minimally invasive surgery in Strasbourg. He is working on new procedures that utilize 3D image guidance for a variety of surgical disciplines, and he is convinced that hybrid ORs will be mandatory in the future.

I hope you very much enjoy reading this second edition of Go HYBRID!

Peter Seitz,
General Manager Therapy Systems
After his long experience with the use of mobile C-arms, Dr. Sohei Ebara has built a hybrid operating room dedicated solely for spinal surgery.

The purchase of a MIYABI Angio-CT suite was an extremely worthwhile decision for Iowa Methodist Medical Center.

To Prof. Jacques Marescaux, augmented reality is the most important improvement for treating patients. That’s why he is counterbalancing the idea of health expenditure control by prioritizing research and innovation.

The MIYABI Angio-CT suite was an extremely worthwhile decision for Iowa Methodist Medical Center.

Built to your needs

European premieres and innovations

Discover Go HYBRID!
A true surgical strike: syngo DynaCT-guided removal of small pulmonary nodules

Worldwide, cancer is a leading cause of death, with lung cancer causing more deaths than stomach, liver, colon, and breast cancer. Biopsy and resection of small pulmonary nodules at an early stage poses an opportunity and a challenge at the same time. The smaller the nodule, the higher the survival probability of the patient, but the more difficult the resection if a tissue-sparing minimally invasive wedge resection is chosen. An efficient solution lies in guided navigation. syngo DynaCT provides excellent soft-tissue contrast in three-dimensional imaging to determine location and margins of small pulmonary nodules. Dedicated software allows intraoperative marking of the tumor.
The new technique that brings CT-like three-dimensional imaging into the operating room will allow surgeons to precisely demarcate and remove small subcentimeter lung nodules, leaving as much healthy tissue as possible, according to Raphael Bueno, Chief, Division of Thoracic Surgery, Brigham and Women’s Hospital, Boston. A recent study, the National Lung Cancer Screening Trial, indicated that screening with low-dose computed tomography (CT) scans in smokers, who have certain risk factors, results in a 20 percent reduction in mortality. Lung cancer screening with CT will detect many more small lung lesions that may be cancerous and should be removed surgically.

Preserving as much healthy lung tissue as possible

The goal is to remove these small cancerous lesions but at the same time spare as much healthy lung as possible. To do so requires being able to precisely determine the location of the nodule and appropriate margins. In this phase-III clinical study conducted in conjunction with researchers from the Siemens Corporation, 25 patients were identified who had small pulmonary nodules in the outer half of the lung. Previous CT scans showed that the lesions were very small, ranging from 0.6 to 1.8 cm. Nodules of this size are not easily palpated or seen.

Using an Artis system in the operating room, surgeons first marked the location of the lung nodules by inserting two small markers (T-bars) through the skin and placing them next to the nodule. The markers have attached wires that make them visible to surgeons during the resection process.

iVATS to become a new standard procedure?

Image-Guided Video-Assisted Thoracic Surgery (iVATS) appears to be safe and successful for nodule localization and all patients underwent complete removal of the lesions with minimal removal of healthy lung tissue. “C-arm CT guided lung surgery is an accurate and efficient way to precisely identify and surgically remove early lung cancers and pre-cancerous nodules,” says Dr. Bueno, who is using the AMIGO (Advanced Multi-modality Image-Guided Operating) Suite, combining MRI, CT, and angiography in one room.

The new technique that brings CT-like three-dimensional imaging into the operating room will allow surgeons to precisely demarcate and remove small subcentimeter lung nodules, leaving as much healthy tissue as possible, according to Raphael Bueno, Chief, Division of Thoracic Surgery, Brigham and Women’s Hospital, Boston. A recent study, the National Lung Cancer Screening Trial, indicated that screening with low-dose computed tomography (CT) scans in smokers, who have certain risk factors, results in a 20 percent reduction in mortality. Lung cancer screening with CT will detect many more small lung lesions that may be cancerous and should be removed surgically.

Preserving as much healthy lung tissue as possible

The goal is to remove these small cancerous lesions but at the same time spare as much healthy lung as possible. To do so requires being able to precisely determine the location of the nodule and appropriate margins. In this phase-III clinical study conducted in conjunction with researchers from the Siemens Corporation, 25 patients were identified who had small pulmonary nodules in the outer half of the lung. Previous CT scans showed that the lesions were very small, ranging from 0.6 to 1.8 cm. Nodules of this size are not easily palpated or seen.

Using an Artis system in the operating room, surgeons first marked the location of the lung nodules by inserting two small markers (T-bars) through the skin and placing them next to the nodule. The markers have attached wires that make them visible to surgeons during the resection process.

iVATS to become a new standard procedure?

Image-Guided Video-Assisted Thoracic Surgery (iVATS) appears to be safe and successful for nodule localization and all patients underwent complete removal of the lesions with minimal removal of healthy lung tissue. “C-arm CT guided lung surgery is an accurate and efficient way to precisely identify and surgically remove early lung cancers and pre-cancerous nodules,” says Dr. Bueno, who is using the AMIGO (Advanced Multi-modality Image-Guided Operating) Suite, combining MRI, CT, and angiography in one room.

The new technique that brings CT-like three-dimensional imaging into the operating room will allow surgeons to precisely demarcate and remove small subcentimeter lung nodules, leaving as much healthy tissue as possible, according to Raphael Bueno, Chief, Division of Thoracic Surgery, Brigham and Women’s Hospital, Boston. A recent study, the National Lung Cancer Screening Trial, indicated that screening with low-dose computed tomography (CT) scans in smokers, who have certain risk factors, results in a 20 percent reduction in mortality. Lung cancer screening with CT will detect many more small lung lesions that may be cancerous and should be removed surgically.

Preserving as much healthy lung tissue as possible

The goal is to remove these small cancerous lesions but at the same time spare as much healthy lung as possible. To do so requires being able to precisely determine the location of the nodule and appropriate margins. In this phase-III clinical study conducted in conjunction with researchers from the Siemens Corporation, 25 patients were identified who had small pulmonary nodules in the outer half of the lung. Previous CT scans showed that the lesions were very small, ranging from 0.6 to 1.8 cm. Nodules of this size are not easily palpated or seen.

Using an Artis system in the operating room, surgeons first marked the location of the lung nodules by inserting two small markers (T-bars) through the skin and placing them next to the nodule. The markers have attached wires that make them visible to surgeons during the resection process.

iVATS to become a new standard procedure?

Image-Guided Video-Assisted Thoracic Surgery (iVATS) appears to be safe and successful for nodule localization and all patients underwent complete removal of the lesions with minimal removal of healthy lung tissue. “C-arm CT guided lung surgery is an accurate and efficient way to precisely identify and surgically remove early lung cancers and pre-cancerous nodules,” says Dr. Bueno, who is using the AMIGO (Advanced Multi-modality Image-Guided Operating) Suite, combining MRI, CT, and angiography in one room.

The new technique that brings CT-like three-dimensional imaging into the operating room will allow surgeons to precisely demarcate and remove small subcentimeter lung nodules, leaving as much healthy tissue as possible, according to Raphael Bueno, Chief, Division of Thoracic Surgery, Brigham and Women’s Hospital, Boston. A recent study, the National Lung Cancer Screening Trial, indicated that screening with low-dose computed tomography (CT) scans in smokers, who have certain risk factors, results in a 20 percent reduction in mortality. Lung cancer screening with CT will detect many more small lung lesions that may be cancerous and should be removed surgically.
“Don’ts” limit utilization
Planning hybrid operating rooms for only one discipline will limit the future utilization of this highly equipped OR. There are currently more and more minimally invasive procedures developed in neurosurgery, spine surgery, orthopedic and trauma surgery, urology, and even general surgery that can be best performed in a hybrid operating room. Imaging needs, patient positioning, hygienic requirements, room layout, and integration of additional devices like surgical robots and navigation systems should be considered. Hybrid operating rooms are more commonly shared with interventionalists including cardiologists, interventional radiologists, electrophysiologists, neuroradiologists, and pediatric cardiologists. Their specific needs have to be carefully considered and weighted when planning the hybrid theatre. An investment into a hybrid operating room should be planned for high utilization from different disciplines for enhanced clinical and financial value added.

Your investment should pay off as expected
Hospitals don’t have money to lose. Hybrid ORs require a high initial investment. “Hospital executives who want to offer competitive cardiovascular care in terms of both quality and cost should consider having a hybrid OR now or in the future” – “The hybrid OR may be justified for relatively few procedures today, but trends in cardiovascular care will make the room’s amenities increasingly valuable,”.

“Looking five or seven years down the road, if a hospital wants cardiovascular services to be a key service line, it may be important to establish the infrastructure and reputation to be in the hybrid OR space, even if it means taking a bit of a loss on the investment today,” – Thomas Skorup, ECRI’s vice president of applied solutions. With an aging population and developments in medicine, the number of patients to be treated with new minimally invasive procedures that are best performed in a hybrid OR will continue to grow. This will lead to increasing usage of the room’s capacity and consequently a quicker return on investment.
Teamwork is the key to success

One of the biggest challenges to running a hybrid operating room successfully is managing the OR team. Compared to the mobile C-arm, the operation of fixed imaging equipment including intraoperative 3D imaging and guidance requires well-trained personnel to operate the system. The typical OR personnel have to be intensively trained, including fellowships in other institutions for this task. A team approach with the interventional department is also a successful solution that many hospitals have already established. Most of the new minimally invasive procedures require a lot of technical equipment beside the imaging system. There should be a core team that evaluates the best positioning of devices and the OR personnel during every procedure to enable an optimized workflow.

An imaging system that suits your OR

Finding the ideal location and room size can be very challenging when you try to retrofit an existing OR suite as a hybrid OR. One solution: The Artis floor system with Siemens OR table can be installed in most existing ORs without huge construction costs. The minimum room requirement is only 38 m², and the installation does not require major ceiling reconstruction. An imaging system can be operated inside the OR, so there is no need for a separate control room. The technical room can be planned even outside the operating room. This saves a lot of real estate in the surgery department. With hybrid operating rooms for multidisciplinary use, where greater position flexibility and more technical equipment are required, the room size should be big enough to allow a smooth workflow.

Source: http://betterhealth.mckesson.com/2013/09/driving-a-hybrid/

Watch the interview

Discover the essentials of room planning.

Find out more: www.siemens.com/hybrid-room-planning

Go HYBRID! | June 2015 | www.siemens.com/gohybrid
Go HYBRID! Facts & figures

According to WHO, lung tumors are often diagnosed in the advanced stages, resulting in poor prognosis. However, a study from the American Cancer Society shows that if they are discovered early enough, the overall survival rate is 88 percent, making precautionary, precise, and reliable diagnosis essential. Read more about cancer therapy on page 4.

Source: American Cancer Society, Cancer Facts & Figures; The New England Journal of Medicine: Reduced Lung Cancer Mortality with Low-Dose Computed Tomographic Screening, June 29, 2011

Paradigm shift

To ensure the success of the hybrid approach, the multidisciplinary team approach has been developed. It facilitates joint preoperative and intraoperative collaboration,” says Francesco Maisano, University Hospital Zürich.

Dr. Sohei Ebara remembers:
"Initially, it took us eight hours or more for scoliosis surgery with endoscope. Now, since we implemented zeego, it takes only four hours."

0.18% is the ultralow complication rate at Shonan Fujisawa Tokushukai Hospital for spine surgery since the introduction of Artis zeego in October 2012. Dr. Sohei Ebara, vice president of the hospital and medical director of the spine and scoliosis center, chose to use a fixed C-arm for his hybrid operating room dedicated solely for spinal surgery and almost doubled the number of procedures from 463 to 768 in only two years! But to him, the most important aspect is the superior outcome quality: To fix the screw right, Dr. Ebara can use syngo DynaCT to precisely control it. The result: From 5,041 implanted screws, only nine screws had to be reinserted, which means an ultralow complication rate of only 0.18%. Read more on page 26.

ECRI Institute, a nonprofit organization which assists hospitals with strategic planning and technology assessment, has seen approximately 10% annual growth in requests related to hybrid ORs among its 3,500 hospital members. The trend to more hybrid ORs – including those in community hospitals – is likely to continue.

Source: www.ecri.org/hybrid, ECRI Institute. Hybrid Operating Rooms with a Focus on Endovascular Hybrid ORs, 2013.
... FOR COMPLEX ENDOVASCULAR TREATMENT

A study from Stanford University Medical Center hypothesized that standard elective EVAR performed in a hybrid suite would improve procedural efficiency and accuracy, as well minimize patient exposure to both contrast and radiation. The results showed that compared with a conventional OR using a mobile C-arm, the hybrid suite allowed the average dose to be reduced by 40 percent, cut operating time by 30 minutes, and decreased contrast media by 30 ml.


FUSION IMAGING DECREASES RADIATION EXPOSURE, PROCEDURE TIME, AND CONTRAST USE DURING FENESTRATED EVAR

A team from the University of Florida found another ace in the hole: The routine use of fusion during endovascular aneurysm repair significantly reduces radiation exposure for patients and operators and lowers contrast volume during complex repairs, without jeopardizing the overall procedure workflow.

Many surgical treatments for chronic low-back pain that is refractory to medical treatment focus on spine stabilization. One of the main surgical procedures consists of placing an interbody cage with bone grafts associated with pedicle screws. This technique can be performed using a large open posterior approach, tubular approaches (minimally open), or percutaneously (minimally invasive). One of the main difficulties is to precisely place the screws in the pedicle, particularly to avoid inferomedial pedicle breaches. Performing minimally invasive percutaneous techniques under control of intraoperative three-dimensional fluoroscopy (i3DF) images allows surgeons to drastically reduce the rate of percutaneous pedicle breach from 14.2 percent to 4.7 percent, with or without a computer-assisted navigation (CAN) system.


“Since we installed the MIYABI system we have gone from 530 exams to 630 exams per month. And those are added patients,” says Todd Kranpitz, Executive Director of Radiology at Iowa Methodist Medical Center. The new technology came with an unexpected beneficial side effect: it has made the radiology department more attractive when hiring new radiologists. Read more on pages 20-21.
Since the founding of IRCAD (Institut de Recherche contre les Cancers de l’Appareil Digestif – Research Institute against Digestive Cancer), a center for original research and training for surgeons in partnership with industry, Professor Jacques Marescaux has always geared his work toward integration of 3D patient data with tomorrow’s operating rooms. Consequently, he encouraged the development of virtual and augmented reality combined with robotic-assisted surgery.

In September 2001 he had already revolutionized the global surgical community by performing the first robotic-assisted operation between New York and Strasbourg, known as Operation Lindbergh.

In July 2012, as part of the IHU program, his team performed a world premiere in robotic-assisted liver surgery using augmented reality intraoperatively. To him, augmented reality is the most important improvement for treating a patient. That’s why he is counterbalancing the idea of health expenditure control by prioritizing research and innovation.
“The mixture of the imaging and the capacity of the robotic system could really lead to the ideal operation.”

Professor Jacques Marescaux
Founder and President of IRCAD and EITS, CEO of IHU Strasbourg
What is WeBSurg?

WeBSurg is a virtual surgical university. The concept was launched by Professor Jacques Marescaux and his team at the European Institute of TeleSurgery (EITS) in Strasbourg, France. The goal is to provide the surgical community, scientific societies, medical teaching centers, and industries with the first worldwide online training in surgery, information on the latest surgical breakthroughs, and the ability to chat with experts from all over the world.

Discover www.websurg.com

Watch the interview

Complete training is key when introducing a hybrid OR. Jacques Marescaux on the surgical training website “WeBSurg”: www.siemens.com/training-is-key
“I’m sure that if we come to show that it is an additional benefit for the patient and for the surgeon, it will be mandatory for a hospital to have a hybrid OR.”

How would you define a hybrid operating room?

J. MARESCAUX: You always have a treatment to propose to your patient. Especially cancer: we can propose flexible endoscopy, laparoscopic surgery, or interventional radiology. During the operation, a surgeon wants to have any possibility to take a closer look inside the patient. Using flexible endoscopy plus surgery or flexible endoscopy plus 3D image guidance or interventional radiology plus surgery – that is the idea of the hybrid operating room.

How will the evolution of surgery continue?

J. MARESCAUX: A few years ago, all the companies developing imaging technology were focused on the radiology department. Today it is totally different. The surgeon wants to look at all the details of the picture. He doesn’t depend anymore on the interpretation by the radiologist. For surgeons, the Artis zeego is a fantastic tool. You have everything you want in real time. But in the future, the majority of surgeons still might not have access to a hybrid room. So they will need to have at least an intraoperative ultrasound system – that will be a good first step.

How can we optimize patient care in the future?

J. MARESCAUX: One core topic in optimizing patient care is the availability of all patient data from before, during, and after surgery along with the option of combining this data. Several projects are under way with the goal of superposing image data from different imaging modalities: the fusion of image data from an endoscopic camera with DynaCT data, and the fusion of ultrasound images with preoperative CT data, are both particularly valuable for minimally invasive procedures.

IRCAD – a competence center for minimally invasive surgery

Located within the compounds of Strasbourg’s University Hospital, the IRCAD minimally invasive surgery training center has acquired an international reputation over the past 20 years. Each year, the institute welcomes over 4,300 surgeons from 106 countries. A pool of 800 international key opinion leaders in their surgical specialties supervise the IRCAD courses, and the IRCAD has gained fame as a leading research and education institute. Jacques Marescaux also created branches of the IRCAD in Taiwan and in Barretos, Brazil.
What is the role of 3D patient data in that respect?

J. MARESCAUX: Virtual reality is one of our institute’s most important axes. It translates real data into digital data, thus allowing us to turn a medical scan into a virtual 3D clone of the patient. The surgeon can then prepare the procedure on the patient’s virtual clone, as these simulations are becoming increasingly realistic. During the intervention, augmented reality permits a transparent view that should soon allow for the automation of complex surgical movements. This automation will only be possible by developing the field of surgical robotics.

What opportunities do you see for augmented reality?

J. MARESCAUX: To me, augmented reality is the most important improvement for treating a patient. One example is complex pelvic surgery: A surgeon must see the different structures he has to preserve: the urethra, the vessels, and the nerves.

In some complex cases, it is impossible to see these three elements. Therefore, we want to have the best image of each structure before the operation. The concept of augmented reality makes everything transparent. We need to have an intraoperative imaging system that allows us to see all details even if the organ moves. I’m sure that if we come to show that it is an additional benefit for the patient and for the surgeon, it will be mandatory for a hospital to have a hybrid OR. What we have to prove now is its efficiency!

Can you give us an example of proving that efficiency?

J. MARESCAUX: Today, a lot of money is still paid in the event of complications. When we prove that a surgeon has a better view during the operation and we can thus decrease the complication rate, then paying two or three million Euros for a hybrid room is not too much. You never will be the “gold standard” in the future without that new concept of the operating room.
What advice would you give a decision maker who is planning an operating room?

J. MARESCAUX: The most important thing is to have enough space to place all the devices and allow the team to access the patient. It is impossible to know what kind of equipment we need for each surgical discipline in the future. But for the general surgeon, it is important to collaborate with several disciplines on the same platform. When you have the opportunity to do several steps during one operation, you don’t need two or three anesthesias for the patient.

What skills will the surgeon of the future need?

J. MARESCAUX: In the USA, there is a lot of specialization, but the majority of surgeons are generalists working in smaller hospitals. I think, the surgeons in Europe are more specialized today. One example: We have the “hepato-biliary surgeon” working together with surgeons who only do transplants. And the future will probably bring even more specialization.

So what will be the real challenge then?

J. MARESCAUX: All surgeons like new technologies. And the operating room of tomorrow with the robotics will look like the cockpit of an airplane: There is the robotic system, the 3D visualization and a lot of screens. You push the button and the technology will work for you. It will be very easy. But it will be a challenge for the surgeon to know everything about radiation protection. Today, surgeons don’t have enough knowledge of radiation. We want to organize courses to make them understand how to manage the new kind of OR best. WeBSurg is a platform for that.

How much do robots change the operating rooms?

J. MARESCAUX: Today, we are still in the prehistory of robotics. At the moment, the robot just improves the capacity of a surgeon. Sure it is more precise, but that is really just “peanuts”. But there is another advantage that will change everything: A robot interface can analyze 1,000 signals per second. When you integrate the preoperative image and 3D image guidance with the skill of the surgeon, it will be a huge benefit for the patient.

Are we on the way to the ideal operation then?

J. MARESCAUX: Today, with the 3D image that we take from the CT scan, we have the option to do the operation before the operation. It is like producing a movie. You do one minute of the operation – then you stop – do another minute – stop again and cut the best parts together. The mixture of the imaging and the capacity of the robotic system could really lead to the ideal operation. Maybe in 20-30 years you’ll have an automatic surgery.

What is your wish for the future of surgery?

J. MARESCAUX: The real success of surgery is the day when you really don’t need surgery anymore in some cases. The progress of imaging and the further development of targeted therapy – that is really my wish!
The Iowa Methodist Medical Center in Des Moines installed one of the first MIYABI Angio-CT systems from Siemens in the U.S. in October 2013. This smart solution brings an Artis Q and a SOMATOM Definition AS sliding gantry CT together in the same room. Radiologist David L. Lacey, MD, finds this expands the range of medical options open to him and lets him safely treat cases that would previously have required surgery or referral to a specialist.

Dr. David L. Lacey, MD, has been an interventional radiologist at the Iowa Methodist Medical Center for 17 years. During this time his department has grown from two to five interventional radiologists. Here, about 600 patients are treated every month. Nearly a third receive treatment in the new interventional hybrid room. Lacey made a case for the MIYABI Angio-CT: "There isn’t necessarily any one case that you couldn’t do without it, although there are many cases that wouldn’t nearly go as well as they do with the MIYABI Angio-CT system," he says. There are a wealth of advantages to the setup, both from a medical angle and in terms of workflow – and no fishhooks: "There really is no downside to using this room, as opposed to the other rooms. If you park the CT against the wall, it is in fact just a standard angio suite."

TACE with hybrid imaging

TACE with hybrid imaging Transarterial chemoembolization, or TACE for short, is one of the key treatment methods for liver cancer. A successful treatment outcome depends heavily on how much is known about the patient's vascular anatomy. "I use the angio system to put a catheter into the vessel supplying the liver," says Lacey, describing the procedure. "Then we use the CT scanner to do a scan of the liver in the arterial..."
“Many cases wouldn’t go nearly as well as they do with the MIYABI Angio-CT.”

Dr. David L. Lacey, Interventional Radiologist, Iowa Methodist Medical Center, Des Moines, Iowa, USA

phase, and that defines all the arterial anatomy — all the vessels that go into the various tumors — as a 3D model.” Having the CT provides an extra margin of safety and confidence in these cases. A CT’s higher soft-tissue contrast and fast rotation speed offer more accurate targeting — even if patients don’t respond to breathing commands. The 3D CT data is then fed into the guidance tools of the angio system providing roadmap support to navigate the catheter accurately into the lesion. Once the catheter is in place, the CT is used to ensure that the right vessel really has been selected. “We have to make sure that we are treating the entire tumor or decide to go hunting for another vessel that supplies that tumor.” Adding CT helps establish this goal.

Even the combination of different modalities has long been the norm for radiologists — although an ultrasound unit is much easier to transport from room to room than a CT, for example. Previously, if patients had to be taken from the angio to the CT system, they had to be lifted carefully from the table, with all the cables and needles, to be taken into the other room.

It was a difficult endeavor that always involved a vast amount of advance planning. Critical situations like this clearly show the advantage of a MIYABI Angio-CT system, even to patients: quicker and safer treatment — using new methods which would have been too risky with conventional means.

MIYABI versus experience

“It has to do with better visualization,” answers Lacey, when asked why some procedures would be too risky without the new MIYABI Angio-CT. “I can take on cases where there are intervening structures that previously would have been too dangerous to traverse.” Where vascular specialists with decades of experience would otherwise have been required, Lacey is now able to produce comparable results himself. “This MIYABI Angio-CT system allows me to be better than I would be, because I have better visualization.”

Easy, accessible, time-saving

“The great thing about the MIYABI Angio-CT is that it is not hard to run. Within an hour you can learn how to use it and make these two units work together.” This user-friendliness that Lacey attributes to the MIYABI Angio-CT is connected mainly with the fact that both the angio system and the CT unit have been standard equipment in the hospital for years.

Hospital portrait

Iowa Methodist Medical Center was established in 1901 in a single building. Today, Iowa Methodist has become an important regional medical center and teaching hospital. Located in downtown Des Moines on a 42-acre campus, Iowa Methodist employs nearly 4,000 people and has 370 staffed beds. Iowa Methodist is well known throughout the Midwest for cancer care. In 1956, it opened Des Moines’ first radiation therapy department. In 1993, the John Stoddard Cancer Center became the first Central Iowa facility to house all radiation, oncology and ancillary services in one location.
“With the MIYABI Angio-CT we increased our patient volume by 20%.”

Todd Kranpitz, Executive Director of Radiology at Iowa Methodist Medical Center, Des Moines, USA

Watch the interview

“It’s all about value” – Todd Kranpitz on how to increase capacity with current space: www.siemens.com/MIYABI-Angio-CT-value

Todd Kranpitz is the Executive Director of Radiology at Iowa Methodist Medical Center. The purchase of a MIYABI Angio-CT was, in his opinion, an extremely worthwhile decision, both economically and medically. The installation of the innovative system has even made it easier to recruit new doctors.

Todd Kranpitz, what was the main reason for you to buy a MIYABI suite?

T. KRANPITZ: We had the opportunity to replace one of our four interventional radiology suites and discussed this in detail. Most important is to have a plan. You can’t buy the equipment and hope that everything works out; it is too expensive to do that. We had a plan. The doctors knew what their practice needed for them to attract other physicians, and to attract more patients, they needed proper tools. And, like any company, we looked around and saw what our competition was doing.

So you got the MIYABI Angio-CT primarily to keep up with the competition?

T. KRANPITZ: More and more of our procedures are becoming CT-guided. Most interventional procedures take an hour or more, and our two CT scanners were getting tied up. We are a level-I trauma center, meaning that we get a lot of injured people. Sometimes we had to delay patient care, because our two CTs were busy all the time. To handle the patient volume we needed another CT. We finally seized the opportunity to combine the CT and the interventional procedure and decided to go for the MIYABI Angio-CT.
What factors play a role in an investment like this?

T. KRANPITZ: Part of my job is to look into the future: For example, how are we going to manage upgrades? Time is also an important factor. We were able to utilize the room within five days of being turned over. A big part of the success is Dr. Lacey [read more about Dr. Lacey on pages 18-19]; we have a champion, someone who took the time to learn each of the devices and is able to meld that data together to produce something that is clinically useful. This isn’t just an intellectual exercise – we utilize this equipment to improve patient care.

How do you measure this improvement?

T. KRANPITZ: We treat approximately 600 patients a month, and our complication rate is probably just two patients. We don’t even express them in percent, because the number is so small.

But what does it look like in terms of costs?

T. KRANPITZ: Today, we all worry about lowering the cost of healthcare. With our purchase of the MIYABI Angio-CT, we have improved the quality of care, we have improved the safety, and we are able to do things that were only done in surgery before. And because we can treat patients on an outpatient basis, we have been able to decrease the costs. Patients can stay in their communities because they no longer have to travel to another hospital, and that lowers their costs. I anchored all of this in the business plan for the hospital, and that is also the reason why we bought this unit.

How has the patient volume developed since then?

T. KRANPITZ: Since we installed the MIYABI Angio-CT we have gone from 530 exams to 630 exams per month. And those are added patients.

And all that just because you’ve set up a MIYABI Angio-CT room?

T. KRANPITZ: The radiologists have increased their numbers by a third – and the new system was an important recruitment tool. Let’s face it, nobody wants to work with antiquated equipment in an antiquated department. It’s hard to be the best with old tools. That has been an unanticipated benefit. This has made the radiology department more attractive for hiring new radiologists, and by having more radiologists and a greater catalog of what we can do, more people come here.

When you walk through the Medical Center, you see a lot of medical technology from one German manufacturer. Why is that?

T. KRANPITZ: We have a lot of Siemens equipment, because we have a lot of people trained on it. It is kind of like Southwest Airlines – they have one type of plane, so they don’t need to retrain their pilots; they buy one piece of equipment and it matches every single airplane. I heard the president of Southwest speak and I asked myself, why aren’t we doing that? Why do we have four different CT scanners, three different ultrasound machines? I have been on my own little crusade about that, and now we have a single vendor and rarely have downtimes. It works very well.

The latest medical technology is good for patients – what does the balance sheet look like?

T. KRANPITZ: I’ve probably had this conversation a dozen times. Our organization is interested in all those things that I have talked about: How can we bring new patients into the building? How can we support our physicians? I am sure you have heard the term “Obamacare,” which is the Affordable Care Act. One of the requirements is to provide better-quality care at a lower cost. We are doing it! It is very near and dear to my heart.
Contributing to the advancement of medicine

To Prof. Dittmar Boeckler (MD, Vascular Surgery at Heidelberg University Hospital), one thing is for sure: Vascular surgeons who want to play in the premier league will not be able to keep up without access to a hybrid suite. This is why he placed his hopes on establishing this type of room in Heidelberg right from the beginning. However, the best outcomes can be achieved only if the administrative and medical staff pull together. And administrative director Irmtraut Gürkan proved to have a good sense of timing.
From the outset, Irmtraud Gürkan, administrative director of the Heidelberg University Hospital, supported the idea of investing in a technology that would not pay for itself during the first year, and stated clearly: “As a university hospital, it is our duty to provide high-performance medicine. At the same time, we also have to implement and evaluate innovative procedures. That’s why we are prepared to cross-subsidize innovations to make a contribution to the advancement of medicine.” Because Germany is cutting back on subsidies for research and teaching, Gürkan is often required to change structures that already work well together and skillfully reallocate resources, boosting one area and trimming another – which led her to invest in the hybrid technology in 2010.

Treatment quality drives economic freedom – and vice versa

Gürkan recalls that no third-party consultants were involved in the investment decision: She found the skills to objectively evaluate this type of project within her own ranks. She makes it clear, however, that an investment in hybrid technology is not a practical option for every hospital: “I think these devices belong mainly in very large facilities, not just because they are expensive but also because of the highly complex procedures they can be used for. I don’t just mean university hospitals: Other likely users are maximum-care facilities or various full-level care hospitals that have special expertise in the area of vascular surgery. After all, to perform these complex vascular surgical procedures, you need the appropriate infrastructure in addition to the special OR in order to cover everything from intensive care as needed to the proper training of nursing staff.” To convince the administration that the hybrid OR idea was worthwhile, Dittmar Boeckler put forward a simple rule of three: Better imaging is reflected in the result achieved through quality treatment. And better quality ultimately means economical healthcare. As he put it: “We will have fewer repeat interventions. Fewer complications. Better long-term results in terms of clinical progress. All of these factors are reflected in the bottom line.” And, expressed in figures, performance is up at least 10 percent.

A climate of cooperation

In Heidelberg, the vascular surgeons in particular quickly acclimated to the system, and utilization of the hybrid room is running at more than 90 percent. They also share the facility with cardiac surgeons to offer disease-based treatment. Boeckler says: “These days, we as vascular surgeons enjoy close collaboration in particular with interventional radiology, angiology, and heart surgery here in Heidelberg. We discuss indications of complex arch and thoracoabdominal aortic pathologies together and even operate together. But there is still room to bring down old, traditional psychological barriers even more.” Urology and visceral surgery are now also starting to realize the potential the suite offers.

“Having a climate of cooperation at our facility is especially important to us.”

Irmtraud Gürkan
Commercial Director/Vice Chair,
Heidelberg University Hospital, Germany

Dittmar Boeckler: “The hybrid OR has catapulted us forward in many areas. At a personal level, I believe that maximum-care facilities in the future will always need a hybrid OR. In my view, the hybrid OR can be used wherever there is a need to minimize the scalpel traces you leave behind. In neurosurgery, for instance. Pediatric surgery would be another possibility. Likewise traumatology and oncology.” As a result, Gürkan has observed another interesting effect following the establishment of the hybrid room: It is encouraging collaboration in Heidelberg. “Having a climate of cooperation at our facility is especially important to us. This is why we make specific procedures available to different hospitals. And experience shows that services for interdisciplinary use are welcomed.”

Three hybrid rooms are currently being constructed in Heidelberg’s surgical department.

Watch the interviews

Read the QR code with the QR code reader in your mobile phone!

Dittmar Boeckler currently heads a certified vascular center in Heidelberg. He points out five important factors in setting up a hybrid OR. Watch the whole interview: www.siemens.com/setting-up-hybrid-or

Heidelberg is where Germany’s first EVAR and TEVAR procedures were performed in 1994. Dittmar Boeckler’s vision today: “Robots and precise imaging will enable us to work more gently and with less trauma.” Watch the whole interview: www.siemens.com/cooperation-hybrid-or

Irmtraud Gürkan says: “If a service is available for interdisciplinary use, it will be welcomed.” Watch the whole interview: www.siemens.com/cooperation-hybrid-or

Hospital portrait

Heidelberg University Hospital is one of Germany’s largest medical centers. The Department of Vascular and Endovascular Surgery has treated patients with acute and chronic arterial disease including venous disease for more than 25 years, with a focus on treating carotid artery stenosis, aortic aneurysms and peripheral arterial occlusive disease (PAOD). It has been a trailblazer in the field of transcatheter, minimally invasive endovascular surgery since 1994.
Top Ten: What you should consider when installing a hybrid OR

There is no “one-size-fits-all” solution for installing a hybrid OR. There are many variables that need to be taken into account (e.g. hospital size, case mix, level of IT adoption). These lists provide a rough overview of typical factors to consider when installing a hybrid OR.

1. Planning
   - Interaction:
     › Clinicians and technicians
     › Specialized architects
     › Vendors of OR equipment and imaging systems
     › Engineers: power supply, infrastructure
   - Virtual visualization (3D room planning)
   - Visits to existing reference sites
   - Consultation with experienced users
   - Study of published cases

2. Team and organization
   - Interdisciplinary cooperation and usage
   - Awareness of the advantages among future users
   - Coordinator (case-by-case or long-term)
   - Committed team: team-oriented, communicative, responsive

3. Logistics and infrastructure
   - Storage space next to hybrid OR
   - Minimizing storage in the room
   - Sufficient supplies for all specializations

4. Location
   - Next to existing ORs (logistics; staff; availability of intensive care, perfusionists, anesthesia, hygiene)
Room Planning

5. Room
- Size: the larger, the better
- Additional control and equipment rooms
- Additional preparation and washrooms
- Data processing ideally in a separate room

6. Installation
- Efficient space usage
- Integration of existing IT systems
- Ceiling plan for collision avoidance
- Optimal room design for all disciplines

7. Anesthesia
- Inclusion in planning
- Ability to adapt to different procedures
- Devices as small as possible

8. Hygiene
- Consideration of country-specific standards
- Flexibility of room utilization
- Laminar airflow-related system restrictions
- Suitability of ceiling-mounted systems
- Heat production of in-room devices

9. Operating table
- Compromise: interventional – surgical
- Carbon fiber tabletop (radiolucent)
- Ability to accommodate obese patients
- Motorized table height adjustment
- Horizontal mobility
- Vertical and lateral tilt
- Rails for mounting surgical equipment
- Compatibility: imaging system and table
- Rotatable: patient access from all sides

10. Monitors
- Ceiling-mounted, mobile, flexible
- Multiple video inputs in various sizes

Source:
Hybrid OR, Courtesy of Center for Cardiovascular Diseases, Rotenburg a. d. Fulda, Germany.
Dr. Sohei Ebara, vice president of the Shonan Fujisawa Tokushukai Hospital and director of the spine and scoliosis center, is a pioneer in developing safer, less invasive image-guided procedures for spine surgery.

From 2004 to 2014, Dr. Sohei Ebara performed 2,330 spine surgeries, including cervical, thoracic and lumbar spine, and scoliosis surgeries. But 2012 was a game changer: After his long experience with the use of mobile C-arms, Dr. Ebara built a hybrid operating room dedicated solely for spinal surgery. The Artis zeego robotic imaging system allows a smoother workflow during the procedure.

The effect: operation time shortened by almost half. And he was able to nearly double the number of procedures from 463 in 2011/12 to 768 in 2013/14 – an increase of 66% in only two years! But to Dr. Ebara, the most important aspect is the superior clinical outcome in the hybrid operating room compared with the procedures performed in a conventional operating room.
What effect did the introduction of Artis zeego have on your workflow?

S. EBARA: Initially, it took us eight hours or more for scoliosis surgery with endoscope. Now, since we implemented zeego, it takes only four hours. The reason: In the past, we needed to turn the body two times to scan in endoscopic scoliosis surgery (anterior approach) and three to four times to scan in open scoliosis surgery (posterior approach). But with zeego, it is possible to do 3D images from ilium to thoracic vertebra No. 6 or 7 by two turns. In the past, we could handle only one scoliosis surgery per day. But the duration of the surgery is crucial. Four or eight hours makes a big difference. And when the surgery is finished in three to four hours, we can even perform one more surgery per day!

How did you convince the management that the investment will really pay off?

S. EBARA: We emphasized the advantages of zeego. Our system was the world’s first system specialized for spine — great for public relations! We realized that even if the system is used solely for the spine surgeries, it can pay off. With zeego, the stress for the surgeon is dramatically reduced. And we could also reduce the complication rate: From 5,041 screws implanted, only nine screws had to be reinserted, which means an ultralow complication rate of only 0.18%.

“A complication rate of less than 0.2% is an amazing result. How is that possible?”

S. EBARA: With the metal artifacts from the implants, usually image quality declines. But with zeego, the image is clear so that we can quickly make an accurate and smooth decision. That reduces stress to the surgeons and increases patient safety. Zeego memorizes the system position so that we can immediately scan with intraoperative DynaCT. In the anterior scoliosis surgery, there is the aorta at the other side of the vertebral body. If it is low back, there are great vessels. The screw needs to be carefully penetrated through the bone cortex into the other side, but it should not touch the great vessels by pushing it too much. To fix the screw right, we can use DynaCT to precisely control it. The image is very accurate: That makes us confident.
The Ulm University Hospital has the second-oldest trauma surgery teaching chair in Germany. The Trauma, Hand, Plastic, and Reconstructive Surgery Clinic, which was founded in 1973, has over 100 beds and serves a broad range of surgical patients. This includes inpatient and outpatient treatment of injuries to the extremities and joints, spine, pelvis, hand, and soft tissue, as well as sequelae of injuries.

Specific referrals, such as osteoporotic pelvic fractures for which screws can be applied in a minimally invasive procedure using navigation support. One advantage of intraoperative 3D imaging is that we can make post-operative checks in the OR as long as the patient is still under anesthesia. We verify whether our surgical interventions were correctly done or monitor the position of the implant. No matter how the surgery goes, we can be sure at the end that the patient received the best possible treatment and that we achieved the desired result.

Let me give you one example of the quality of the process. Since we perform spinal surgery exclusively in the hybrid OR, not one single screw position has required revision. The superiority of these systems is obvious. Unfortunately, the high quality provided by this expensive technology is not always compensated properly. That is why I recommend that decision makers first think about which disciplines would use the system. If two or three different disciplines in one organization can use the system, then it makes sense to get one.

What trending topics are currently on the agenda at AO?

F. GEBHARD: AO is the cradle of modern trauma surgery, so we always want to teach ultramodern methods and focus on tissue-sparing surgery. There are already courses on computer-aided surgical systems and a webcast on 3D imaging. But AO is also thinking of another aspect: The shorter the access paths become, the greater our dependence on reliable imaging. That’s why we want to increase awareness about the need to protect against radiation exposure during surgery, which means teaching people who attend our training programs how to handle radiation from imaging. It’s a very important subject, especially because we want to promote the concept of the hybrid operating room.

What advantages does a hybrid OR offer for trauma surgery?

F. GEBHARD: The combination of a full operating room and imaging equipment that is usually available only in a radiology department enables 3D imaging that offers quality similar to a CT. This allows us to see large joints and abdominal structures in images of unprecedented quality during trauma surgery. Since we began working with the technology, we have been receiving specific referrals, such as osteoporotic pelvic fractures for which screws can be applied in a minimally invasive procedure using navigation support. One advantage of intraoperative 3D imaging is that we can make post-operative checks in the OR as long as the patient is still under anesthesia. We verify whether our surgical interventions were correctly done or monitor the position of the implant. No matter how the surgery goes, we can be sure at the end that the patient received the best possible treatment and that we achieved the desired result.

Let me give you one example of the quality of the process. Since we perform spinal surgery exclusively in the hybrid OR, not one single screw position has required revision. The superiority of these systems is obvious. Unfortunately, the high quality provided by this expensive technology is not always compensated properly. That is why I recommend that decision makers first think about which disciplines would use the system. If two or three different disciplines in one organization can use the system, then it makes sense to get one.

Quality

The hybrid OR in trauma surgery

Three questions – three answers

Professor Dr. Florian Gebhard is a member of the AO Foundation Board and medical director of trauma surgery at Ulm University Hospital. His team was among the first to recognize the advantages of the hybrid operating room for modern trauma surgery. Gebhard hopes to facilitate progress in this area at AO and promote training for surgeons in the environment of a hybrid OR.
“Since we perform spinal surgery exclusively in the hybrid OR, not one single screw position has required revision.”

Prof. Dr. Florian Gebhard
Medical Director, Trauma Surgery, Ulm University Hospital

How is a team trained to work in a hybrid OR?

F. GEBHARD: I am happy to recommend the way we first approached the technology. We trauma surgeons had the most experience with the hybrid system. We then gradually trained other colleagues in specific departments. Today every specialty department has two or three full teams that have been trained in using the hybrid OR. Training in the hybrid OR is of particular interest in the context of fellowship programs. Training on such complex equipment cannot be simulated, because we would have to switch off the radiation source. In its best version, we can really only demonstrate the procedures directly in the hybrid OR. That means young physicians come to us for two to four weeks of training exclusively in the OR. We teach them which system is best for which injury, and then they take that knowledge back with them to their own centers.

Background

The Arbeitsgemeinschaft Osteosynthese – Association for the Study of Internal Fixation (AO/AO-ASIF) is a nonprofit organization led by an international group of surgeons specialized in the treatment of trauma. Founded in 1958, AO today fosters one of the most extensive networks of more than 12,000 surgeons, operating room personnel, and scientists in over 100 countries. The AO Foundation Institutes deliver value-added products and services to its clinical divisions, surgical network and partners. The focus is on producing new concepts for improved fracture care, delivering evidence-based decision making, guaranteeing rigorous concept and product approval as well as timely and comprehensive dissemination of knowledge and expertise.
Alan Lumsden, MD, is a leader in the field of endovascular surgery, Medical Director of the Methodist Hospital DeBakey Heart and Vascular Center in Houston, Texas, USA, and Professor of Cardiothoracic Surgery at Weill Cornell Medical College of Cornell University. Lumsden says 3D imaging in the operating room, robotic catheter guidance, and other advanced technologies have the potential to revolutionize endovascular surgery by improving accuracy as well as safety.

About 3D imaging and its potential to revolutionize endovascular surgery

Which early advances in imaging have been most consequential for surgeons?

A. LUMSDEN: The single most important piece of equipment was the portable C-arm. That has, in my opinion, transformed what we could do. No hospital is going to invest three or four million Dollars in building a hybrid room before you have significant patient volume and reimbursement to justify building that. The next level really was fixed imaging suites in the operating rooms. Or I should say, access to fixed imaging, because not all of them are in the operating room.

Tell us about some of the more recent milestones in imaging.

A. LUMSDEN: I think the next one is syngo DynaCT image fusion; that’s the next revolution that’s about to take place. We had angio suites, but we
didn’t have CT scanners in the angio suite until syngo DynaCT. Now we have a whole new set of imaging modalities that we can work from.

Can you give us an example in which syngo DynaCT is particularly beneficial?

A. LUMSDEN: Type-II endoleak management is one example in vascular surgery. Another example would be for the thoracic surgeon. Rather than having a patient undergo a needle biopsy, and possibly bringing the patient back for a scope if the needle biopsy is nondiagnostic and then having a third procedure to resect the tumor, I think it could all be done in one shot. You could import the initial CT scan, fuse it on top of the patient, use something like needle guidance, stick a needle in it for a biopsy, and possibly bringing the patient back for a scope if the needle biopsy is nondiagnostic and then having a third procedure to resect the tumor, I think it could all be done in one shot. You could import the initial CT scan, fuse it on top of the patient, use something like needle guidance, stick a needle in it for a biopsy, and possibly bringing the patient back for a scope if the needle biopsy is nondiagnostic and then having a third procedure to resect the tumor, I think it could all be done in one shot. You could import the initial CT scan, fuse it on top of the patient, use something like needle guidance, stick a needle in it for a biopsy, send it to the pathologist, keep the patient asleep, look at it. If it’s nondiagnostic, we’re going to stick a scope in there, take a biopsy, and send it to the pathologist. And if it’s a lung cancer, it needs to be resected and it’s going to happen right there. I think the technology is transformational.

How can 3D imaging aid procedural planning?

A. LUMSDEN: Let me give you a vision, although the pieces aren’t all necessarily meshing together yet. One of the advantages of syngo DynaCT is 3D reconstruction, but we don’t look at it in 3D. We have a 3D rendering on a 2D model. We would really like to be able to look at that 3D image and interact with it in 3D with tools that allow us to plan the operation. We would then push it to the simulators and practice on Mrs. Smith’s renal artery angioplasty today. We could then take that same data set and push it to the Artis zeego tomorrow, fuse it on top of the patient and do the procedure, having planned it in 3D in a cave environment and having practiced on our simulator. Now you may not have to do this in every case, but it’s the opportunity to do this on the more sophisticated cases that’s significant.

What are some benefits of the robotic movement of the Artis zeego?

A. LUMSDEN: Right now, I think it’s the ease of positioning the patient. But in the future it’s going to be in the speed of the rotation of the C-arm. The faster we can acquire the images, the less motion artifact. It also may allow you to start measuring flow in vascular territories in 4D by looking at the speed at which they are being filled. So that’s why the robotic component of the Artis zeego is pretty exciting.

How do the 3D imaging capabilities of syngo DynaCT improve your ability to treat patients in the hybrid suite?

A. LUMSDEN: I think it can improve accuracy and safety. I’ll give you an example of splenic and renal artery aneurysms. There was a patient recently whose CT scan I viewed in the office and it looked like this was a sacular aneurysm that was fairly easy to treat. When we did the 3D reconstruction and looked at it, there were actually several branches coming out of this aneurysm. It was marginal whether we should be treating it or not and we backed out of treating that patient because we thought the risk/benefit ratio was in favor of leaving it alone.

What do you see on the horizon for the future of imaging in surgery?

A. LUMSDEN: Right now, I think that you’re beginning to see vascular surgeons using these tools and beginning to present and talk about them. But orthopedics, urology, general surgery, and thoracic surgery all have potential applications.
Built to your needs

Here are some ideas for you!

Reduce the effort to upgrade your conventional OR to an endovascular hybrid OR by installing a floor-mounted imaging system – or: increase utilization of your hybrid OR by integrating an OR table with the robot-supported imaging capabilities of the Artis zeego.

Artis floor-mounted systems

Easy upgrade of existing ORs

Conventional operating rooms are mostly limited in space. In order to conduct complex endovascular procedures most existing ORs that are larger than 38 m² can be upgraded with Artis floor-mounted systems. An integrated Siemens OR table with free-floating tabletop perfectly supports all endovascular procedures in vascular and cardiothoracic surgery.

min. room size: 38 m²

That fits: OR table from Siemens

Cardiothoracic surgery

Vascular surgery

No problem!
Free laminar flow ceiling
Artis zeego
The perfect environment for multidisciplinary use

A hybrid operating room is a perfect working environment for endovascular procedures, but can also be used for other surgical disciplines, like spine surgery and neurosurgery, orthopedic and trauma surgery, and in the future even for laparoscopic surgical procedures. Artis zeego allows even intraoperative image guidance during open surgical procedures, because the laminar flow is not interrupted. When imaging is not used, the C-arm can be moved to various park positions in just a few seconds, allowing free access to the patient.

Neurosurgery
Cardiothoracic surgery
Vascular surgery
Orthopedic surgery
Trauma surgery
Spine surgery
Laparoscopic surgery

No problem!
Free laminar flow ceiling

min.
room size: 68 m²

That fits:
OR tables
from Siemens,
from Maquet
or from Trumpf
European premieres and innovations

Little premiere: Treating ENT cases hybridly

For the first time surgeons performed ear, nose, and throat (ENT) cases in a multidisciplinary hybrid OR. The Artis zeego enabled them to place a cochlear implant with a level of accuracy impossible to achieve with common ENT imaging.

As Prof. Hoffmann, Director of the ENT Department of the University of Ulm, heard about the hybrid OR on his campus, he got curious. And the more he learned about the high-contrast imaging capabilities of the Artis zeego, the more he pictured how such a setup could prove beneficial in his field of work – for example when placing cochlear implants: "Although the electrophysiologic measurements can tell you if the cochlear implant device is working, it cannot tell you that you are in the correct position," Hoffmann explains. "With a syngo DynaCT run on the Artis zeego we can be 100 percent sure that the implant is positioned in the scala tympani of the cochlea." While he has already successfully put this knowledge into practice, he also comes up with ideas for future applications:

- Stapes insertion, using syngo DynaCT to measure the distance between the long process of the incus and the stapes footplate
- Imaging middle-ear malformations before insertion of implantable hearing aids
- Imaging inner-ear malformations for cochlear implants
- Complex skull base pathologies (involving neurosurgeons) such as clivus chordoma

Norway’s first hybrid trauma OR

At Oslo’s Ullevål University Hospital, the largest trauma center in Norway, a game-changing concept has been introduced: a hybrid operating room built around an Artis zeego for the treatment of acute trauma patients with often life-threatening injuries.

In the Ullevål University Hospital in Oslo everything from traffic accidents to gunshot wounds can now be imaged and treated in the same room – where all necessary procedures from minimally invasive treatment to open surgery can be performed under direct 2D and 3D image guidance.

The Artis zeego angiography system, based on robotic technology, offers outstanding positioning flexibility and imaging capabilities: 3D images of both sides of the lung, skull, or the complete pelvis can be acquired with syngo DynaCT to assess bone and soft-tissue or vessel trauma. With a surgical table from Maquet, the hybrid room can be used flexibly as a conventional OR whenever indicated. Consultant Interventional Radiologist and Head of Diagnostic and Interventional Radiology, Gunnar Sandbaek, MD, on their expectations:

"Especially in patients with the most severe traumata, we are convinced that treatment in the hybrid OR will improve the quality of care and outcome."
Discover Go HYBRID!

webfeature

• Watch interviews with decision makers in surgery.
• Watch success stories from different medical facilities.

Go HYBRID!

Discover Go HYBRID! online:
www.siemens.com/gohybrid

Read the QR code with the QR code reader in your mobile phone!

magazine

• Meet hybrid operating room experts and pioneers.
• Successful hospital managers look back on the milestones of their hybrid project.
• Useful info graphics and figures support you with your investment decision.

How to get the magazine

Did you miss the first issue of Go HYBRID? Find an order form at:
www.siemens.com/gohybrid