Europe’s unequal healthcare

Six weeks after the EU admitted 12 new members, a study of hospitals in the new and old states shows that the healthcare system of the older EU members is still far better than in the new ones.

Christian Prusinsky reports from the 11th European Health Forum Gasten in Austria

Times higher than in Sweden and the cancer mortality rate in the new member states is drastically higher than in the old ones, you can actually talk about an ‘Iron Curtain’, said Alojz Peterle, former Slovenian Prime Minister and member of the Members of the European Parliament against Cancer initiative.

The EC is certainly aware of this problem, confirmed Andrej Rys, Head of the Department for Public continued on page 2

CO₂ Insufflator
for virtual coscopy

- completely automatic insufflation
- increase of patient comfort
- utilization of standard components

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- Beds and bedding

Parkinson Laboratories, Inc., World leader in ultrasound supplies

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38-43 Russian pages

Avian ‘flu research suggests vaccine should be used now, not stockpiled

UK – Governmental fear of an avian ‘flu pandemic remains high, and a certain amount of vaccine has been stockpiled to meet sudden demand. In addition, Department of Health guidance for hospitals is available to provide specific recommendations, planning strategies and tools for local public health and healthcare officials who would be in the front line for managing and containing an influenza pandemic.

However, new research published in the New England Journal of Medicine suggests that vaccination now, with the currently available product, could help save lives in a future bird ‘flu pandemic. The study, by researchers at Leicester University, indicates that, if a vaccination against one strain of avian flu is given years even earlier, this could prime the immune system to ward off many later avian ‘flu strains. They suggest that, in the event of a pandemic, a booster could be given to those pre-vaccinated people, thus protecting them far sooner than others who had not received the vaccine. ‘If a bird ‘flu pandemic erupted tomorrow it isn’t clear that we would have six weeks to vaccinate people before it arrived in this country, even if the vaccine was stockpiled,’ researcher Dr Iain Stephenson pointed out.

The researchers focused on people who were vaccinated against the H5N1 strain of avian ‘flu between 1996 and 2001. That vaccine contained MF59, an additional ingredient to boost its effectiveness. Some years on, this group were given jobs against the H5N1 strain of avian flu. Their immune system response was then compared with that of a group who had not received the earlier vaccination. Seven days later, 90% of the pre-vaccinated group showed signs that their bodies were protected against H5N1, compared with just 20% of the previously non-vaccinated group.

The researchers concluded that the initial vaccine against H5N1 strain of avian flu had not only provided protection against that strain, but enhanced protection against continued on page 2
Breast cancer’s technology for Europe’s unequal healthcare

Christian Pruzinsk homes.

were not killed by the disinfect molecules, not only removing the disinfectants, by ridding used in hospitals and in microbiological labs. And for virtual colonoscopy..." 

Please put a cross in the boxes to answer the following questions and we would like you to answer the following additional question: How much influence do you have on purchasing decisions? 

How many beds does your hospital provide? 

Yes / No 

Do you attend congresses or similar meetings for your speciality? 

Yes / No 

Are you given ample opportunities to update knowledge? 

Yes / No 

Do you consider that your equipment is state-of-the-art? 

Yes / No 

Do you consider that your equipment is relatively modern? 

Yes / No 

Do you consider your department is understaffed? 

Yes / No 

Do you attend courses or similar meetings for your speciality? 

Yes / No 

This information will be used only in an analysis for European Hospital Theodor-Althoff-Str. 39, 45133 Essen, Germany, and for the mailing out of future issues and the EH electronic newsletter.

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European Hospital

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Dr Marian Racina, gynaecologist/obstetrician at the Nemocnica Poprad Hospital in Poprad, Slovakia, has won the handsome seca quadra 808 weighing scale!

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Enter today! Simply fill in the Readers Survey (left), fill in your details as appropriate, then send as directed at the top of the coupon. How to enter:

● The closing date for entries to the EH 5/08 competition: 25th November 2008.

● Coupons received after that date cannot be entered in the draw.

● The winning coupon will be drawn from the correct entries.

● Only the winner will be contacted directly.

● The winner’s name and location will be published in a future issue of European Hospital.

● The prize is non-exchangeable for cash.

● The usual competition rules apply.

Find more information on the internet (www.orpha.net – in five languages) and ensuring that the study of rare diseases becomes part of the clinical curriculum for medical degrees. For cases of rare diseases are too low in number to enable all individual countries to provide the necessary facilities and experts, making international cooperation vital. However, treatment can be, and should be, organised on a national level. Efficiency doesn’t mean that patients should fly cross-over all over the continent,” he pointed out.

Jo Groves, Managing Director of the International Alliance of Patients’ Organisations lamented the current error rate and demaned open disclosure procedures, i.e. error analysis as well as better training for doctors and other medical staff, in terms of more communication and cooperation with patients and their surroundings.

A further prickly topic: Apart from normal legal reviews of mistakes, opportunities are needed for scientific reviews, where causes and effects can be discussed without consideration of possible legal implications. Ethics councils gain acceptance An ethics advisory council neither aims to impede nor prevent progress, it only wants to ensure that progress benefits society. However, those involved in medical and scientific ethics often have been viewed as potential antagonists by the healthcare industry. That scene is changing – they are increasingly accepted and even seen as “partners” to industry in the EU...
GERMANY: TACKLING CONTAMINATED WATER

Compared with private households, hospitals only produce 10–20% of wastewater containing the residue of drugs; however, tackling the problem is very necessary. One interesting project, developed at the 400-bed district hospital KKH Waldbröl, Germany, has involved the management, Environment Ministry, research institutions, engineers, to work as a team and produce an ecological and economic sanitation and sewage system.

Silvio Beier, head of the project and Director of the Institute for Settlement Management at RWTH Aachen University, pointed out that individual drugs, such as contrast media or cytostatics, make hospitals the main culprits in environmental contamination. Due to stricter legal requirements, veterinary medicines will become far less likely to enter wastewater, which is not the case for human medications – and their use continues to rise. The concentration of medical agents in drinking water is between a hundred to a million times lower than any one prescribed daily dose, but we don't yet know how these minute amounts, if consumed over a period of years via drinking water, affect our health, he added. Consumed by water organisms they can definitely have an effect. Artificial oestrogens, such as those excreted by women on the contraceptive pill, lead to a feminisation of male fish. But anticonvulsant and mood stabiliser Carbamazepine also has damaging effects on the ecosystem.

The team not only aims to produce a viable ecologically acceptable system at KKH Waldbröl, but also a ‘master plan’ to determine which hospitals could also economically benefit from this. Considering rising electricity and water costs, even comprehensive modifications could ultimately pay off. Sewage treatment costs are based on the pollution level and the amounts of waste and rain water drained at the same time and then purified by the communal sewage works," explained Christian Mauer of Pöyry GKW GmbH Essen, who is responsible for the economic evaluation of the project. Purely based on sewage charge reductions, he calculated an annual saving of around €80,000.

To date, rain water from roofs and car parks at Waldbröl has been separated from the general sewage system as far as possible. This is fed into a nearby stream via a rain retention basin, which not only limits the volume of wastewater but also means that the seepage water charge, levied on land areas in Germany, is inapplicable. Furthermore, highly concentrated wastewater is easier to purify than water diluted by rain water," said lead engineer Silvio Beier at the RWTH Aachen University.

The scientists developed a Membrane Bioreactor (MBR) for contaminated hospital wastewater. This has a membrane of fine pores rather reverse osmosis, and processes are nanofiltration, or ozonisation, in which oxygen radicals destroy the mostly large-molecule drug compounds. The elimination capacity for all these processes is determined. The Aachen scientists chose various, significant active ingredients from different indication groups, such as antibiotics, anticonvulsants, beta blockers, lipid lowering agents, cytostatics, anti-rheumatics and a few others.

The Waldbröl hospital research and modification project was expensive – estimated costs (including scientific research) after completion: €2.5 million. 80% of this will be funded by North Rhine-Westphalia State.

Nonetheless, Christian Mauer believes this type of project would be beneficial for other hospitals, first because costs can be reduced, particularly for larger hospitals where renovations or new buildings are already planned, as well as centres with increased wastewater contamination, e.g. cancer units. At the KKH Waldbröl, the sewage disposal cost reduced from €4.20 per cubic metre of wastewater to just fewer than 50 cents per cubic metre. ‘This equals to a savings potential of €81,000 per year,' Christian Mauer concludes.
MANAGEMENT: ENERGY EFFICIENCY

THE CZECH SCENE

Water and energy management (WEM) appears to be successfully handled by the majority of local healthcare institutions, because Czech hospitals do spend, on average 2–5% of their budget on these resources. Recent publicly available data on Czech hospital management confirm that the hospital management practices are widely developed and implemented to help improve hospital water efficiency. "We have important know-how," according to Varnsdorf before and after reconstruction opportunities for water savings without significantly changing any of the institutional settings. Regardless of hospital size, water saving measures need not be overly expensive, but there is always a strong need for constant attention to detail, because resources saved in one place may be easily wasted elsewhere. For this reason, a number of successful water saving programmes always include cover all potential losses, starting with easy steps taking the form of simple minor changes such as faucets, toilets, showers and gradually arriving at improvements for technical appliances, e.g. refrigerators, air-conditioning units, sanitisers, sterilisers, etc. in terms of lowering water consumption, faculty hospitals in particular adopted various measures including:

Installation of floor control fixtures on all floors and water saving shower heads

Replacement of high consumption toilets and urinals by modern sanitary equipments with four consumption valve kits

Installation of washwater and rinsewater systems and re-use water recycling systems to re-use water for consequent wash cycles

Management of washing-related processes, e.g. ensuring full loads in lab equipment washers, sanitising, cleaning, etc.

Installation of automatic valves, wherever necessary, to cut down on water consumption in similar machines (more or less pronounced) are fully implemented in all Czech hospitals.

Energy be praised

Importance of using rainwater is also widely recognised in Czech hospitals. One very good example of how to deal with ever increasing energy prices and environment-friendly thinking was a project developed through close cooperation between Prague Bulovka teaching hospital and the firm EPS CR (Energy Performance Consulting) which has implemented an exciting new project to provide an additional source of energy for energy efficiency services to the hospital. The project contracted long-term financing through the energy system a system of pumps and cisterns was developed not just to water the gardens, but also to cleanse toilets and beds— the latter supplied by Meiko from its Offenburg plant. Each of these bedpans comes equipped with a booster heater to bring the rainwater temperature up to the necessary operating temperature of 50 degrees. Two underground cisterns (capacity: 600,000 litres of rainwater each) were constructed and an overflow pond created in the hospital grounds. As required, the pumping system drives the water to wherever necessary. ‘The equipment works flawlessly. So far there have been no complaints,’ said Gabriele Plaasch, the hospital’s nursing director, who has seen the project evolve from its beginnings. Even if we don’t achieve a large economic advancement in the form of loans, in the region of two billion euros, to promote the environmental quality of building works by actively encouraging sustainable development. Even if an establishment already has a certificate of excellence awarded by the HSE (Health Authority) they can enter into the scheme by examining the environmental credentials of their existing buildings, energy consumption and CO₂ emissions (22 institutions have already committed their CO₂ quotas by more than 260,000 tonnes annually). Numerous bodies have been involved in the creation of certification specifically adapted and relevant to the particular needs of hospitals. Within the HQE certification process there are 14 environmental targets to be attained. From the management of energy, water, waste, air quality and the lighting of spaces, to keeping down nuisance levels, as well as visual pollution caused by building sites, these integrated parameters make the HQE scheme a cross-disciplinary and wide-ranging approach to the hospital environment.

Among reasons that health authorities choose to follow this initiative is the opportunity to improve the thermal and operational performance of new constructions, thus reducing running costs in terms of energy prices, maintenance and water consumption. The French Government considers support of the system not expenditure but a long-term investment in the planet’s future.

France: Ministry of Health initiative ensures emissions conformity

Following the Grenelle Environmental meeting in 2007, the French Ministry of Health has a specific mission to set an example to the public as to what can be achieved by investing in energy saving. New standards are to be applied in all public and private healthcare establishments in France – in the training of medical staff. These need to be managed in an environmentally-friendly way to reduce both pollution and resources of CO₂ emissions. Since 1st July this year, healthcare establishments can voluntarily take part in a scheme for a certification known as HQE (High Environmental Quality). The fruit of several years work, this acknowledges efforts hospitals are making to have cost-effective, energy efficient buildings. That have low CO₂ emissions. The environmental quality approach of the HQE, already applicable for other sectors since 1996, requires the environment to be considered at every stage of development and design of a building (planning, design, construction, demolition, etc.). The initiative is financially supported by the Hôpital 2012 plan, which has funds of 10 billion euros to improve the health and living conditions of employees over the next 10 years. Already operational, this ambitious programme covers new constructions and natural additions to existing hospitals. In a further effort to combat global warming, MAIMH (Mission Nationale d’Appui à l’Investissement Hospitalier) and the Caisse des Dépôts have provided another financial option for a £20 million upgrade. The 1,600-bed Bulovka hospital covers around 60,000 m². Its energy bills totalled 10–15% of its annual revenues (enormous amounts of energy were used to generate heat in the hospital’s own steam plants). The hospital underwent large scale reconstruction and modernisation of various energy-related equipment since 1996 and procedures including switching from steam heating to district heating systems and implementation of new computerised energy management system; the installation of modern air handler recovery systems, and high efficiency natural gas boiler and the installation of modern control and monitoring equipment and replacement of old piping. It is more than obvious now that, despite the initial high investment, all implemented changes led to vast savings resulting in its return in just a couple of years. Again, similar changes to energy consumption and related processes were established in all healthcare settings countryside. The Varnsdorf case – in this town, one of the smaller hospitals was extensively reconstructed in terms of energy efficiency in 1998. Reconstruction of the heating system occurred in 2002 and the project conceived the merging of the water treatment technology and equipment using an EPC (Energy Performance Contracting) model. The project team of the Idea Holec also included the manager of the Ruppiner Kliniken GmbH he commissioned the Groitzsch manager planning office to bring some of the technological ideas of his management team to fruition. At Groitzsch, Jörg Hennicke thought the rainwater concept so ‘brilliant’ that Germanys’s revitalisation, 23 of the 111-year-old Ruppin hospitals’ brick pavilions have been restored by a specialist employed year-round. You consider the use of rainwater ideal from a technical standpoint. It is especially soft and clean. A significant side-effect of using rainwater is that the equipment is not scaled.’ Jörg Hennicke remains convinced that the use of rainwater is an excellent energy alternative in an area little previously considered, but he does recommend anyone interested in its use should learn more first. In Ruppin, for example, a test system with artificially controlled bacterial exposure was built to determine the critical threshold of rainwater. He also points out that there is now a DHW for rainwater that must be considered.

BED PANS FRESH AS RAINWATER

Since Germany’s revitalisation, 23 of the 111-year-old Ruppin hospitals’ brick pavilions have been restored by a specialist employed year-round. You consider the use of rainwater ideal from a technical standpoint. It is especially soft and clean. A significant side-effect of using rainwater is that the equipment is not scaled.’ Jörg Hennicke remains convinced that the use of rainwater is an excellent energy alternative in an area little previously considered, but he does recommend anyone interested in its use should learn more first. In Ruppin, for example, a test system with artificially controlled bacterial exposure was built to determine the critical threshold of rainwater. He also points out that there is now a DHW for rainwater that must be considered.

UK: Rosie’s

In May 2006 the Rosie Hospital, in Cambridge, UK, launched a competition challenging staff to suggest ways to save both energy or time. Many came up with energy saving ideas. This resulted in the creation of the Rosie Energy Awareness programme. Monitoring energy usage of various items of medical equipment within hospital, for example ultrasound machines, the energy statistics provided staff with a real reason to switch off lights and PCs and save money.

Clara Moore, Operations Manager in Medicine at the renowned Addenbrooke’s Hospital in Cambridge, reports on this highly effective programme, which has so far saved the hospital an estimated £19,000 predicted for this year. ‘Most importantly,’ she also points out, ‘the Rosie has saved 48 tonnes of carbon annually.’

The Rosie Hospital is part of Addenbrooke’s NHS Foundation Trust. The Rosie’s focus is on the health and care of women, providing out-patient clinics, with a range of services that include family planning, genetic clinics, reproductive medicine, delivery, foetal medicine antenatal clinics, colposcopy, gynaecology, urology, and much else. ‘In 2006, when working as the Service Delivery Manager in Women’s Services, I was inspired by the commitment that staffed hospital to come up with ways to save costs, energy, or time in their normal daily working practices. It ran for one month. The collated ideas showed that staff had really put their thinking caps on and the majority of the ideas generated promoted energy saving. For example:

Switch off lights in seminar rooms at the end of meetings

Always turn off lights after use in toilets

All staff should turn off computer screens, printers and lights when leaving the office at the end of the day, and not leave them on over weekends. The residual electricity savings, I launched a competition that would probably run into thousands of pounds per annum.

And what happened next? The Service Delivery Manager and the Operations Manager Kate Evans revealed a great deal of the staff had registered energy efficiency savings as ideas then perhaps the thinking caps would be switched on as an energy awareness campaign. Clearly assistance was required in understanding energy, the carbon footprint and where energy could possibly be saved. A project team was formed including the two mentioned managers and the newly appointed Trust Energy Manager, Ian Jackson. Working closely together, the team
felt that, to raise awareness, there needed to be a service-wide understanding of energy cost – not only financially but also the cost of the carbon footprint. Clearly, the staff would need a tangible reason to switch off a light or printer and understand the effect of doing that. We agreed that if they could match the energy consumption to the services provided within the building they would be better placed to raise energy awareness and make some cost savings. At that time the team was not aware of the amount we would or could save.

First steps
The energy manager monitored energy usage of various items of medical machines within the Rosie, including ultrasound, foetal sonicade and a urodynamic device. PCs and general lighting were also monitored. (See table).

We agreed that those energy statistics would be the best tool to promote energy saving ideas. In the same way that the Carbon Trust promotes energy saving ideas via what is normal day to day living, such as mapping switching off lights with cups of tea, the Trust Energy Manager set to work on mapping the statistics to similar strap lines. The key difference was that the hospital would promote a ‘service specific’ message. The result included the following messages:

Did you know?
A computer left on uses more energy than a urodynamics machine

Did you know?
Switching off 12 lights for an hour saves enough energy to power an ultrasound machine for the same amount of time

Did you know?
Two lights left switched on constantly would power a foetal sonicade machine for an entire year

Remember, every £1 the Trust saves on energy is a pound made available to treat somebody and less carbon put into the atmosphere

The team’s puzzle was how to promote these ideas and make them stick! We commissioned durable light switch size plastic holders with bright backgrounds for the messages and placed them with a different key message under every light switch in the hospital. It was felt that staff when switching off would read the message, become more aware and switch off. The energy programme manager also guided the team towards changing to energy efficient light bulbs throughout the building. Since the programme began

• 334 lights in the Rosie have been upgraded to more efficient ones saving an estimated £7,000 and 48 tonnes of carbon annually!
• Every light switch has a relevant strap line message displayed beneath it.

Switching off 12 lights for an hour saves enough energy to power an ultrasound machine for the same amount of time

Future schemes
• On-going light upgrades
• Installing radiator valves (TRV’s) estimated to save a further £8,000 per annum!
• Ventilation plant and heating upgrade saving £10,000 per annum!

The sustainability drive here is now big, and the great savings will go towards patient care, not to mention the carbon savings that will be great for us all.

<table>
<thead>
<tr>
<th>Machine</th>
<th>Annual energy running cost/£</th>
<th>Number of lights left on 24 hours per day</th>
<th>Number of lights left on 1 hour per day required to run this machine for 1 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasound machine</td>
<td>153.87</td>
<td>3.45</td>
<td>11.60</td>
</tr>
<tr>
<td>Hysteroscopy stack</td>
<td>75.02</td>
<td>1.68</td>
<td>6.28</td>
</tr>
<tr>
<td>Colposcope</td>
<td>18.95</td>
<td>0.43</td>
<td>1.59</td>
</tr>
<tr>
<td>Urodynamic</td>
<td>11.79</td>
<td>0.26</td>
<td>1.19</td>
</tr>
<tr>
<td>Foetal sonicade (OI)</td>
<td>23.63</td>
<td>0.53</td>
<td>2.37</td>
</tr>
</tbody>
</table>

Comparisons are based on lights with single lamps, the most common within the Rosie. Equipment costs are based on hours of clinical utilisation of the machine.

The project team ran a very successful Energy Awareness day for staff and visitors to demonstrate the work and results. The Trust is launching a Trust-wide energy saving campaign based on the Rosie’s results. Estimated annual saving: £480,000.
NURSING CARE

NURSING SECTION COMPILLED BY HEIDI HEINHOLD

Equipment safety and nursing care

The safety of medical products, which includes bedding, depends on three pillars: identification of mistakes, updating standards and training.

Identification of mistakes

In Germany, these mostly concern faulty operation and must be reported to the Federal Institute for Drugs and Medical Devices (BfArM) according to Medical Products Safety Guidelines. They must then be rectified.

Updating standards

In terms of medical products, this should become internationally compulsory, with test criteria and procedures harmonised, which would facilitate comparisons of results and therefore products.

Staff training

Realistically, manufacturers should involve future users of their products in the development. This will later avoid problems with the introduction of products on the market.

First the good news: In the years from April 1998 – 2008, only 40 incidents were reported to the Federal Institute for Drugs and Medical Devices, for assessment. The following picture emerged from those events:

10 reports related to fire (including unrolling, deflagration and explosion)
10 reports of malfunctioning
6 reports related to technical presentation
5 related to mechanical problems
5 related to complaints and falls
3 related to electrical fields
1 report indicated a labelling problem

In terms of causes the distinction lies between:

• product-related (14)
• non-product-related (25)

Example of a non-product-related cause:
One report related to the fall, and subsequent death of a patient, because a system was used in addition to the normal mattress. The manufacturer had stated in its instructions that the product should be used in place of a mattress.

In 26 of the 40 reported cases there were no effects or only a slight impact on patients and users, such as minor injuries (e.g. reddening of the skin, through bruising). In three of the 40 occurrences there were severe injuries, e.g. decubitus ulcers on the back of the head, an open wound, and in three further cases the injuries led to patient mortality (1 x fall out of bed, 2 x effects of burns, although the product did not cause the fire). The severe injury causes were:

• faulty use
• non-observance of instructions
• patient behaviour

In 17 cases, corrective measures to rectify the mistakes, based on the assessment by the German Federal Institute for Drugs and Medical Devices or the respective institutes in other countries, resulted in changes to the design and construction of products with regard to manufacturing-related defects, product information and handling.

As a precaution it is recommended that in the new or further development of products, construction and manufacturing-related factors that become apparent should be taken into account, such as unit dimensions, quality control and suitable product documentation (instructions), along with user and patient requirements. Properly trained staff along with observance of instructions and regular inspection of the products used should be a matter of course.

During the second meeting in 2008 of the ISO Groups in TC 173 SC 1, which took place in Japan, the four working parties came together to work on existing and new ISO standards regarding technology for wheelchairs and mattresses. The main focus was on EN 17176 for wheelchair and stair climbers and ISO 16840 for seating products. In addition, the second 2-day meeting of the mattress group focused on the testing of microclimatic and mechanical properties, accelerated aging of products, terms and definitions and the mechanical properties of mattresses.

The Shear Force Initiative (SFI), an international group of scientific specialists, presented results of studies of the possibilities of measuring, describing and explaining shear forces and their effects on tissue and its reaction.

Intensive discussions took place on North American and European philosophical differences regarding air-filled mattresses. In the USA, mattress description mainly involves measurement of the depth of indentation and envelopment, which enables characterisation of the properties of Low Air Loss and foam mattresses and other products for continuous pressure relief. This work is supported by ISI, a subgroup of the NPUAP in the US. In contrast, Europe’s golden standard is the Alternating Pressure Philosophy, which must describe the shape of the pressure over a period of time in these products.

Working party 11 focused on seating, including flammability of products and the idea of an indicator instrument to measure interface pressure.

A European subgroup on mattress meeting in Berlin (20-26 October) particularly focused on the description of alternating pressure.

In medical/healthcare products shops that are commissioned in Bavaria by the statutory health insurer AOK to provide anti decubitus systems for AOK patients, medical staff receive two-day training conducted by Mobilissimo. The curriculum covers basic medical knowledge regarding pressure ulcers as well as the handling of questionnaires and documentation and, above all, is professional selection of an appropriate anti-decubitus mattress for the individual patient.

The participants (primarily rehabilitation technicians and hospital and home-care nurses) gain a first-hand impression of various available anti-decubitus systems. More than 20 systems from various manufacturers in different countries have been compared. Each participant spends a night on either an alternating air pressure mattress or an air cushion.

Another important issue is economics: What exactly is ‘sufficient and appropriate’ care that does not ‘exceed the necessary’, and where does excessive and superfluous care begin? At the end of the two-day training, the participants receive a certificate that permits them to deliver anti-decubitus systems to AOK patients.

The training course resulted from an agreement between the regional orthopaedics technicians association with AOK. Currently AOK Hesse does not offer any courses because, due to tight registration restrictions, not enough merchants were eligible for participation. Consequently, in some areas participation modalities were changed, now in Bavaria, for example, a qualified nurse who works a medical supplies store is allowed to determine a decubitus stage and select an anti-decubitus system. However, Mobilissimo will continue to provide training courses commissioned by the association of the medical supplies sellers, which received very positive feedback.

Details: H. Brandt@mobilissimo.de

Minimising the risk of falling

By Hans Peter Hartl, member of the Nursing Directorate at the Department of Gerontopsychiatry, Mainkofen District Hospital, Germany

Many old people tend to be restless and try to get out of bed. In one of his cases, neuro-psychologist Oliver Sachs describes a man who regularly fell out of bed because he said, in his bed he would find a cut-off human leg that was not his own and which he wanted to throw out. While trying to do so, he continued, he must have fallen out of the bed himself, then found the leg fixed to his body. In a similar case, a cardiologist arrived at a convincing diagnosis: paralysis following an embolism induced by ventricular fibrillation. The man had simply lost all feeling in his left body half, which is particularly noticeable at night when reduced blood circulation makes the affected body parts seemingly colder and heavier. The man simply could not identify the leg as his own.

Prophylaxis for patients at risk

The 680-bed Mainkofen County Hospital, in Bavaria, specialises in psychiatry, psychosomatic, forensic psychiatry, neurology and neurological rehabilitation. Here the patients’ risk of falling is a major issue, which prompted a number of measures to prevent falls and concomitant injuries. The staff is well aware that there is no 100% prevention and that mechanical devices, such as fixation of the patient or bed rails, are ethically and legally questionable solutions.

Consequently, low beds were purchased – but still, the question remained how injuries can be prevented, or at least reduced to a minimum, if a patient falls out of the low bed. Placing a permanent pad such as MTI’s Soft Landing Strip next to the bed turned out ideal – meaning a safe and ethical – solution.

Advantages of the low-bed-and-pad combination:

• Flattened edges ensure daily nursing tasks are not impeded
• The Soft Landing Strip is designed to support shoes and even wheelchairs, so it can be permanently placed next to a bed
• Anti-slip material ensures patient/staff safety
• The pad cushions falls, even from normal-height beds and prevents injuries
• The easy-to-clean surface facilitates compliance to hygiene standards.

During the implementation stage, we decided to ensure ethical and safe care of patients by fitting the departments that have patients at risk of falling (e.g. gerontopsychiatry and neurology) with low beds and Soft Landing Strips.
The internationally agreed definition of decubitus is damage to the skin and/or underlying tissue due to pressure or pressure combined with shear force and/or friction, and it predominantly occurs over protuberances. However, successful prevention depends not only on professional care but also on high-quality positioning materials, as experiences have shown in Gütersloh Municipal Hospital, Germany.

Professional standards and guidelines contribute to the high quality of nursing services. Our standards are revised regularly and are based on national expert standards of the German Network for Quality Development in Nursing (DNQP).

Problem case decubitus

One type of therapy for decubitus ulcers is the positioning of patients on pressure-relieving systems, such as DeCube by MTS. This system was first used at our hospital in April 2003; it has since proved very successful. We use 30 products of this type in our hospital; not least due to their simple handling and high patient comfort, which patients substantiate, in that no other technical devices are needed that cause additional heat or noise. DeCube has been used for several hundred patients all over our hospital as an alternative to a previously favoured alternating pressure system. The length of use – depending on the clinical picture of the patient – ranges from a few days to several months.

The material

The DeCube-System consists of cube-shaped, patented pieces of polymer foam. Removable units are embedded in a base made from particularly wear-resistant material, guaranteeing a firm hold. The foam ensures extremely low pressure levels in areas that are particularly at risk, whilst maintaining microcirculation. This in turn leads to pain reduction and promotes wound healing.

The individual layers of this high-quality foam (patented Engineered Polymer procedure) guarantee efficient pressure reduction for many years. The additional, inbuilt fringe reinforcement facilitates safe and simple repositioning and mobilisation of a patient. Removable elements allow for a specific additional pressure reduction, particularly for high-risk and un-cooperative patients.

The integrated positioning option is a relief for patients and nurses. Appropriate positioning of the elements facilitates positioning of the heel without pressure, or a seating position with almost vertical back part, without the need for additional aids, e.g. cushions, for all positioning techniques, including decubitus position and inclined plane. In addition to changes of position and mobilisation, the product has proved of value both for prophylaxis and therapy of decubitus ulcers, up to and including stage IV according to Seiler.

Consequential costs, such as maintenance or repair, can be subtracted. Hygienic preparation is not complicated. Only disinfection through wiping is necessary.

During five years of practical experience, Johanna Meyer, Assistant Director of the Nursing Directorate at Gütersloh Municipal Hospital, Germany, has found that a pressure-relieving system made by MTS proved convenient for patients and nurses. The DeCube system’s construction enables selective pressure reduction; individual elements can be removed according to needs.
Dynamic mattresses, also called alternating air pressure mattresses or replacement mattress systems, have air cells that alternately inflate and deflate in a cycle to relieve pressure on the body. They are used to prevent and treat decubitus ulcers. Indications, such as skin moisture, pulmonary conditions, wounds and activation of the patient, possible contra-indications and limitations such as spasticity and permanent pain must be assessed on a case by case basis for individual patients. In short: the selection process for a dynamic mattress needs to take into account a patient’s overall situation.

Some patients voice subjective ‘contra-indications’ such as the noise of the electric components of a dynamic mattress system, mattress buoyancy or the tubes that connect the cells. Modern systems, however, are silent and the components are integrated (Fig. 1). There are also concerns that, in an emergency, e.g. during a cardiac event, the cells do not deflate quickly enough.

Development of systems with the nurses’ cooperation

Dynamic mattress technology was developed in cooperation with caregivers – a smart move, because they will work with the system and know the patients’ and staff requirements and needs.

Several details have stood the test: all control units are integrated in the mattress, air tubes and cables are hidden and can no longer be detached accidentally, which reduced false alarms and improved overall mattress performance.

An easy-to-read control unit offers settings such as nursing or therapy, which ensure maximum pressure even during nursing procedures. This function is limited to 15 minutes, which corresponds with the average duration of nursing and therapy measures, e.g. body hygiene. After those 15 minutes the system automatically returns to the original mode.

With immobile patients the heel is a particularly vulnerable part of the body. Fabry explained that gangrene (he never used the word decubitus) occurs when wounds or similar log damages, e.g. caused by fracture, required the foot to be held upright on the heel for an extended period. This exerted pressure on the heel, which may turn into infections, pain and excessive moisture.

Therefore, modern mattresses must offer a heel area that allows cells to be emptied completely without causing festation oedema.

The cooperation of intended users in the design and development of new products is thus always fruitful. It can significantly reduce the number of customer complaints and operator errors – which can occur despite the best training.

Delta 2, a dynamic system, is almost silent. It has no external components and tubes. The user interface of this micro-processor controlled system is easy to read and use. It also includes a safety function to detect errors.

Settings: Individual body weight adjustment from 20 to 150 kg; alternating air pressure, combined with soft positioning or solely soft positioning; time-controlled mattress filling during therapy measures, and finally, on request, special heel protection.

3-D textiles reduce pressure ulcer risk in the OR

Pressure ulcers are a risk for patients undergoing long surgical procedures. Gel pads, widely used to reduce this risk, are considered to have two major disadvantages: they compromise the patient’s thermo regulation by ‘sucking’ warmth from the body and they do not provide sufficient pressure reduction for prominent body parts.

Re-usable 3-D spacer fabrics with thermo-regulating properties are being developed to overcome this and reduce the risk of developing post-surgery pressure ulcers. Spacer fabrics combine textile sheets with distance fibres made of monofilar polyester (Fig. 1). These structures are characterised by high permeability, pressure resistance and other custom-made features.

TJTV Greiz, for example, specialises in the development and production of elastic 3-D textiles for use on or close to the skin. The structures (available in thicknesses up to 9 mm) feature soft and skin-friendly surfaces.

Research on the development of innovative functional 3-D textiles to prevent pressure ulcers during long surgical interventions indicated that spacer fibres reduce the pressure on prominent patient body parts by up to 25% (Fig. 2). Additionally, air between the two textile layers provides improved thermo regulation compared to gel pads. The re-usable textiles can be disinfected, washed and sterilised and dirt can be removed, with detergents rinsed off according to hygiene regimes.

SPECTARIS, the German Industry Association for Optical, Medical and Mechatronical Technologies, has pointed to significant increases in the cost of hospital beds since double-digit price increases for raw materials and fuel has put manufacturers under pressure. Along with energy costs, the manufacturers are particularly hit by price increases for steel, aluminium and wood – the major raw materials.

With the situation being exacerbated by an innovative backlogging, manufacturers have been forced to introduce rationalisation measures because the cost-saving potential has been fully exploited. ‘Companies will have to react to this development and pass on the cost increase to their clients,’ predicts Jan Walter, director for medical aids at SPECTARIS.

In Germany, for example, the association estimates that the turnover for hospital beds to reach about 100 million euros this year. Last year’s SPECTARIS represents about 350 companies in the capital goods and medical aids sectors, which focus on high tech products and are strongly export-oriented. In 2007, German medical technology manufacturers reported a combined turnover of approx. 17.4 billion euros; 1,246 companies employed approx. 55,000 people.
The joint AACC/AACB conference laboratory medicine – into the future

Protein cloning technology gains European patent

London and Cambridge-based biopharmaceutical research firm Domainex Ltd has received a European patent for its Combinatorial Domain Hunting (CDH) Technology, which enables the cloning and expression of recombinant proteins, or parts of proteins (domains), from challenging molecular targets. The proteins are then screened to select soluble, stable protein domains that are ideal reagents for use in drug discovery programmes by the pharmaceutical industry.

CDH technology is based on research conducted by Professor Paul Driscoll, Professor Laurence Pearl, Dr Chris Prodromou and Dr Renes Savva, at UCL, The Institute for Cancer Research and Birkbeck, University College London.

Domainex specialises in the development of novel drug targets reached via this technology and also provides structural biology and chemistry services to major pharmaceutical and biotechnology firms.

The company has already used its CDH protein expression platform to successfully tackle a series of difficult target proteins and has fulfilled commercial contracts with a number of major pharmaceutical companies, such as leading global firm, UCB.

Dr Eddy Little, CEO of Domainex, said: ‘The application of the CDH technology within our internal portfolio allows Domainex to access attractive therapeutic targets that are impossible to approach by other technologies. We also have a granted Australian patent for CDH and pending CDH patent applications in the USA and several other territories.’

Domainex’s portfolio will have an initial focus on targets for cancer treatments; the firm has begun such discussions with pharmaceutical companies regarding future out-licensing.

Details: www.domainex.ltd.uk

Expansion for range of cardiovascular genetic tests

UK – Lab21 is to expand its portfolio of genetic tests for inherited cardiac syndromes. Through its existing UK licence with PlixilHealth, a division of Clinical Data, Inc., Lab21 offers exclusive UK and Ireland access to the Familian portfolio of tests for Long QT and Brugada Syndromes and has now added two new assays for catecholaminergic polymorphic ventricular tachycardia and atrioventricular node re-entrant tachycardia (AVNRT) and hypertrophic cardiomyopathy (HCM) to its range of tests.

The addition of CPVT and HCM to the Familian stable substantially assists UK cardiologists in the accurate diagnosis of cardiac disease. By enabling cardiologists to quickly identify a patient’s risk, the moment is your appointment and lifestyle options can be implemented,’ explained Berwyn Clarke, Lab21 Chief Scientific and Development Officer at Lab21.

Non-invasive prostate cancer test may reduce biopsies

The French firm bioMérieux and ProteoSys, based in Mainz, Germany, have signed a license and development agreement for Annexin 3 to be used to develop a urine-based, confirmatory diagnostic test for prostate cancer.

After a research phase, the new test should be developed on the VIDAS platform. Annexin 3, also known as ANXA 3, was discovered by ProteoSys, which specialises in cell biology and proteomics. Studies have shown that ANXA 3 quantification in urine is a novel, non-invasive test with high specificity for prostate cancer. Today, when the levels of prostate specific antigen (PSA) are in the uninformative ‘grey zone’, a biopsy is used to provide definitive diagnosis. The ANXA 3 test would be used to provide better identification of patients with a high probability of prostate cancer, thereby reducing the number of unnecessary biopsies.

After the first research phase at bioMérieux, a diagnostic test for the VIDAS platform will be developed. While the confirmatory diagnostic application on VIDAS will be the initial focus, bioMérieux is also considering the development of treatment decision and prognostic applications for ANXA 3.

NEW Urinalysis strip test

Siemens new Clinitek Micro-albumin 9 Urinalysis Strip is now available in Europe. The strips, which can be used on the firm’s Clinitek Status analyser, or the Clinitek Advantaus analyser, provide nine tests to detect and monitor kidney disease.

The urine strips provide the Albumin to Creatinine (A: C) and Protein to Creatinine (P: C) ratio, adjusted for varying patient urine concentrations to minimise false negative/positive results. This allows for immediate indication of normal or abnormal results, Siemens explains. A C ratio results are used for early detection of kidney disease in patients with diabetes, early intervention may stop the reverse process of kidney disease. The P: C ratio is used to manage patients with kidney disease. The P: C ratio results provided by the Clinitek analysers meet the needs of clinical specialists managing patients diagnosed kidney disease who are likely to excrete high levels of protein.

On the second day, complementary topics will be aired on quality, e.g. ensuring quality across the network, quality use of pathology resources, as well as patient safety and the greening of laboratories.

* The programme is supported by Siemens Healthcare Diagnostics.

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Details: www.domainex.ltd.uk
UMBILICAL CORD BLOOD BANK OPENS

UK – The Anthony Nolan Trust Cord Blood Bank and combined research institute, opened in September at Nottingham Trent University, will store stem cells from the blood of newborn babies' umbilical cords as part of a multi-million pound project that aims to bank 50,000 cord bloods.

In the next few years, the charity aims to have 10 collection centres, with initial donations of umbilical cord blood by mothers delivering at London's King's College Hospital.

The country has had a National Health Cord Blood Bank for 12 years. This new centre builds on the Anthony Nolan Trust charity's highly successful Bone Marrow Register of 400,000 potential donors, by offering a new source of stem cells to match an increasingly diverse population.

The charity first expanded into cord blood five years ago, by sourcing donations from overseas, last year it imported 70 cords for UK transplant patients. Of the 50,000 donations planned for storage by 2013, 20,000 will be suitable for transplantation, and 30,000 for research.

The Anthony Nolan Trust (http://www.anthonynolan.org.uk/) is a UK registered charity, founded in 1974, by Shirley Nolan, whose son suffered a life threatening congenital disease for which, at that time, the only known cure was a bone marrow transplant. In the absence of a compatible donor, Shirley Nolan focused on recruiting adult volunteers prepared to donate their bone marrow. Since then The Anthony Nolan Trust has given the chance of life to more than 5,000 patients in need of a transplant and today their register numbers nearly 400,000 people. The Trust's research institute focuses on research to improve the use of stem cell transplants and the use of immune system modulation as a form of therapy.

Report: Mary Black

NEW at MEDICA
The AU480 clinical chemistry analyser

Olympus will present the latest member of its clinical chemistry family at Medica. 'With a throughput of up to 400 tests per hour, an ISE module and on board capacity of 63 different analytes, the Olympus AU480 is the ideal main analyser for small to medium size laboratories. It can also fit as a special chemistry or STIR analyser in large laboratories,' the firm reports.

The analyser includes new Graphic User Interface software, standardised with the AU680, and master calibration established by 2-dimensional barcode. New state of the art sample and reagent volumes are also achieved by the AU480. 'Sample volumes as low as 1 µl are ideal for paediatric testing,' Olympus adds. Also: New microscopy introductions

New microscopy solutions on show at Medica will include the Olympus CX41 microscope with FluorLED Multi, enabling easy to handle fluorescence microscopy with up to three interchangeable LED cassettes. These are controlled at the same time via a three channel electronic driver, allowing multicolour observations. 'LEDs are safer to use and produce light more efficiently than other fluorescence light sources, which combined with their long lifetime produces a cost effective, energy saving solution,’ the firm points out.

For telepathology applications, the new dotslide 2.0 virtual digital microscopy system offers enhanced functionality and image quality for scanning entire slides at high resolution and fidelity.’ Olympus adds. ‘This advanced technology makes them accessible and fully navigable from anywhere on the globe. The new Olympus dotslide 2.0 is therefore ideal for remote review, secondary consultations and multidisciplinary team discussions, as well as for training purposes.’

See them at MEDICA. Hall 10, Booth C20

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Xarelto gains EU approval

The European Commission has granted marketing approval to the Bayer Group for Xarelto (rivaroxaban), an anticoagulant taken as one tablet, once-daily, to prevent venous thrombo-embolic events (VTE) in adults undergoing elective (planned) hip or knee replacement surgery. As Xarelto has the potential to become a blockbuster, its launch is an important milestone for Bayer,’ said Werner Wensing, CEO of Bayer AG.

The EU marketing approval followed a review of data from the extensive RECORD clinical programme that included three Phase III trials of Xarelto among around 10,000 patients undergoing elective hip or knee replacement surgery (RECORD1, 2 and 3 trials). Bayer reports that results from these three studies demonstrated the superior efficacy of Xarelto, both in head-to-head comparisons with enoxaparin (RECORD1) and 3 as well as when comparing extended-duration (5 weeks) Xarelto with short-duration (2 weeks) enoxaparin (RECORD2). ‘In all three trials, Xarelto and enoxaparin had comparable safety profiles including low rates of major bleeding.’

Dr Bengt Eriksson, orthopaedic surgeon at the Sahlgrenska University Hospital/Ostra, Gothenburg, Sweden, and a leading investigator in the Xarelto clinical development programme said: ‘The development of Xarelto, an effective oral, once-daily anticoagulant, which does not need routine coagulation monitoring, is a huge step forward in blood clot prevention.’

Worldwide, almost 50,000 patients are expected to be enrolled into an extensive Xarelto development programme. The clinical trial programme will evaluate the product in the prevention and treatment of a broad range of acute and chronic blood-clotting disorders including VTE treatment, stroke prevention in patients with atrial fibrillation, VTE prevention in hospitalised, medically ill patients, and secondary prevention of acute coronary syndrome.
The German Society for Senology 28th Annual Conference

In a pre-conference discussion with this year's President, Professor Hans-Heinrich Kreipe, Director of the Heinrich Kreipe Institute for Pathology at Hanover Medical School, he outlined the significance of MRI in breast cancer detection, and highlighted other topics for the event. For certain breast cancers – especially the aggressive ones that cannot be detected with X-rays – MRI examination is definitely better. For these, which occur particularly in younger women, it makes sense to define a risk group for early diagnosis – particularly patients with radio-opaque breasts, he added. However, an MRI scan often shows up things that may turn out to be harmless – but intervention has already taken place.

After diagnosis, the vital question is What type of mamma carcinoma is it, passive or aggressive? This cannot accurately be distinguished by traditional measuring instruments, he pointed out. Given the trend towards individualised therapy, the extent to 'The most helpful method to identify suspected malignant results remains biopsy. We have very gentle hollow needle procedures for this, using the ultrasound-guided punch biopsy and vacuum biopsy under ultrasound, X-ray or MRI control. MRI scanning only makes sense for high-risk groups – women already offered an annual MRI scan as standard in one of 12 centres set up for this purpose here,' she added.

The problem with early detection via mammography is not necessary that malignant tumours are overlooked, but that highly aggressive vs grow very fast. Therefore, a mammography screening programme carried out every two years is not effective enough for those tumours and for younger women. For them, in Sweden, screening programmes are carried out every 1.5 years. A large German study has shown that annual mammography screening for 40–50-year-old would make even more sense. If necessary, shorter intervals between examinations should be possible on an individual basis, to ensure early diagnosis.'

As for digital tomosynthesis versus 2-D mammography, Prof Schreer pointed out that the former shows small sections of glandular tissue without overlay, so unlike a classic X-ray exam, the result is not masked by upper layers of tissue. The uses for digital tomosynthesis are the subject of current studies. 'It is important that patients are not exposed to additional radiation through this procedure, so tomosynthesis can only be used complementary to classic mammography. However, we don’t know whether this will work. Digital mammography could potentially be combined in one single piece of equipment with ultrasound, but that’s speculation.'

As for using molecular imaging to differentiate and individualise tumours, this may one day become a complementary procedure ‘…to discover more about benign or malignant tumour functions, beyond anatomic-morphological information,’ she added. However, this is currently only used in animal experiments, and no one can be sure.
The biological effects of radiation – When any ionising radiation exposes a radiation field, it does what it is supposed to do: it ionises molecules in any material or tissues that lie in its way, whereby some of its energy is absorbed. Depicting this differential absorption that occurs is the basis of the resulting diagnostic image. Consequently, the effects of such ionisations are immediate, even if their biological consequences may not become apparent years until later. Considering the effects on the radiologists of the first hour on or the survivors of the atomic bomb explosions, there can be no doubt that these effects occur. Changes in peptides are largely responsible for these ill effects and occur predominantly through indirect means when free radicals are generated by the ionisation of water, which is ubiquitous in biological tissues. While these tissues have suitable mechanisms in place to repair such damages, these take time and may become exhausted. To understand risk assessments it is important to be aware of the standard units in which radiation doses are expressed in relation to risks: for each J/kg exposed, the absorbed dose may be estimated in J/kg [Gy]. Since the effective dose is expressed in relation to the effective dose to the whole patient, both the equivalent and effective dose estimates may be multiplied by an appropriate weighting factor to estimate the differential absorbed doses. Depicting this differential absorbed dose needs to be multiplied by an appropriate weighting factor, resulting in an equivalent dose. This in turn is multiplied by a tissue-weighting factor, which takes account of the different sensitivities of various organs to the effects of ionising radia-
tion. The values for all irradiated organs are summed up and the effective dose to the whole patient. Both the equivalent and effective dose estimates remain unchanged when considering the relative risks of different radiological investigations or procedures that utilise ionising radiation. Indirect means when free radicals are generated by the ionisation of water, which is ubiquitous in biological tissues. While these tissues have suitable mechanisms in place to repair such damages, these take time and may become exhausted. To understand risk assessments it is important to be aware of the standard units in which radiation doses are expressed in relation to risks: for each J/kg exposed, the absorbed dose may be estimated in J/kg [Gy]. Since the effective dose is expressed in relation to the effective dose to the whole patient, both the equivalent and effective dose estimates may be multiplied by an appropriate weighting factor to estimate the differential absorbed doses. Depicting this differential absorbed dose needs to be multiplied by an appropriate weighting factor, resulting in an equivalent dose. This in turn is multiplied by a tissue-weighting factor, which takes account of the different sensitivities of various organs to the effects of ionising radiation. The values for all irradiated organs are summed up and the effective dose to the whole patient. Both the equivalent and effective dose estimates remain unchanged when considering the relative risks of different radiological investigations or procedures that utilise ionising radiation.

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THE GUIDIANS

Clinical radiologists must embrace their key role in the radiation protection debate

Most professionals will recognise issues that call for consideration in a wider context, a context that does not merely consider strictly professional issues, i.e. based upon facts and figures, but of the whole patient, the latter from hereditary effects: the former is absorbed. Depicting this differential absorbed dose may be estimated in J/kg [Gy]. Since the effective dose is expressed in relation to the effective dose to the whole patient, both the equivalent and effective dose estimates may be multiplied by an appropriate weighting factor to estimate the differential absorbed doses. Depicting this differential absorbed dose needs to be multiplied by an appropriate weighting factor, resulting in an equivalent dose. This in turn is multiplied by a tissue-weighting factor, which takes account of the different sensitivities of various organs to the effects of ionising radiation. The values for all irradiated organs are summed up and the effective dose to the whole patient. Both the equivalent and effective dose estimates remain unchanged when considering the relative risks of different radiological investigations or procedures that utilise ionising radiation.

in her or his children. It is noteworthy that, while one would think that such genetic effects should occur, there is actually no such evidence. And yet another piece of information is crucial to understand the whole issue: the somatic effects of ionising radiation are divided into deterministic ones, which occur once a certain threshold dose is exceeded and stochastic effects that are probabilities, i.e. the dose is directly proportional to the effect. Skin reddening through ionising radiation exposure, induction of cataracts, bone marrow suppression and sterility are examples for deterministic effects that in general all require doses that should not occur in a clinical radiology setting. However, given that the lens of the eye has no blood supply, there is no possibility of a repair of damages induced and these will thus be cumulative. In contrast, the induction of leukemias and solid tumours are considered statistical effects of ionising radiation. These effects may therefore occur at very low doses, while it is believed that they manifest clinically only after a latency time of some years or decades, i.e. over 40 years (solid tumours). And whatever the incidence of cancers induced by man-made radiation may be, given that CT was introduced in the 1970s, being then widely applied in the 1980s, we are now within this time range, necessitating the current debate.

Population dose and its develop-
ment – Indirect means when free radicals are generated by the ionisation of water, which is ubiquitous in biological tissues. While these tissues have suitable mechanisms in place to repair such damages, these take time and may become exhausted. To understand risk assessments it is important to be aware of the standard units in which radiation doses are expressed in relation to risks: for each J/kg exposed, the absorbed dose may be estimated in J/kg [Gy]. Since the effective dose is expressed in relation to the effective dose to the whole patient, both the equivalent and effective dose estimates may be multiplied by an appropriate weighting factor to estimate the differential absorbed doses. Depicting this differential absorbed dose needs to be multiplied by an appropriate weighting factor, resulting in an equivalent dose. This in turn is multiplied by a tissue-weighting factor, which takes account of the different sensitivities of various organs to the effects of ionising radiation. The values for all irradiated organs are summed up and the effective dose to the whole patient. Both the equivalent and effective dose estimates remain unchanged when considering the relative risks of different radiological investigations or procedures that utilise ionising radiation.

Such a risk has been stated by the US National Council on Radiological Protection to be close to a factor of three both in regards to the desirability to summarise the overall risk of any X-ray examination by using the Sievert as a single estimate, and a new similar-}

An image of the European Congress of Radiology.

ECR 2009
European Congress of Radiology
March 6-10, Vienna / Austria

ONLINE REGISTRATION
Oct 1, 2008 – Feb 23, 2009
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Radiotherapeutic reduction e.g. includes left instead of right-sided lumbar spine radiography, beam angulation in cranial CT to exclude the lens of the eye, and copper-filtering as well as the use of pulsed beams in fluoroscopy. Clearly, the measures indicated here do not constitute a comprehensive list but are examples for specific, i.e. targeted, modifications in the examination of individual patients.

Final remarks – Considering all the above, surprisingly few certainties appear to remain. The foundations of current risk estimates have been questioned by some, just as the use of the effective dose concept has been criticized. However, within the agreed range of uncertainty of ± a factor of three, we may conjure that there is a notable risk to public health with current practices in the use of CT. CT examinations are commonly performed in the elderly and seriously ill whose life expectancy is not that of a normal population. Nonetheless, CT use in the young and for screening purposes should be questioned. In addition, we must take care when justifying repeat examinations and when alternative imaging modalities are available. These certainties are at the interface of clinical medicine and clinical radiology: specifically, we can condemn them to the questions whether or not, and how, any examination utilising ionising radiation is performed. Radiological expertise and guidance are central to this decision-making process. Radiologists’ unique understanding of radiation physics, examination techniques and the equipment used therein is central to dose reduction in any shape or form.

This conclusion is as important as the understanding that we need to raise awareness of the fact that population exposure is reaching a level that may constitute a public health issue. It has been argued that further regulations may be required to ascertain standard in radiation protection. We believe that this approach would likely fail, because it could not be meaningfully enforced. In contrast, if clinical radiologists could embrace their central position and practice radiation protection as shining examples, attitudes and practices of referring doctors and staff working with ionising radiation may change. Detailed referral criteria and guidelines such as issued by the European Commission (Referral Guidelines for Imaging, www.europa.eu) are prudent additions to this argumentative repertoire when justifying and performing Roentgen-examinations. And, as pointedly quoted by Cohen recently, ‘in radiation protection, a gram of brain weighs more than a ton of leaf’ (paraphrased from Wachsmatt, 1965).


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European Hospital

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Please note!...
Although there should always be concern about radiation in a facility that uses X-ray, it is not as if there is a problem. Quality control is perhaps not as vocal as for CT or interventional radiology, according to Jacqueline Gallet, Manager of Clinical Studies at Carestream Health. X-ray equipment is still very minimal in terms of patient dose and digital equipment has improved on that by going from film screen into digital. We have better management in terms of image processing. We also have quality control tools that can help in controlling the dose in X-ray facilities. You need radiation to produce an image, the type of the detector and the means by which you acquire that data varies. Therefore, some equipment may need a bit more. It is also very subjective in terms of the radiologist looking at an image. One radiologist may say, I’m okay, but another may say I need to see more, in which case you sometimes have to irradiate the patient a bit more. Also, you may be looking at a hard copy or soft copy – all looking at soft copy images, the quality control that you’d have on your monitors is very important. Factors can change very rapidly. The radiologist may not necessarily notice this and keep insisting that there’s something wrong, or that you need more dose, but in fact it is really the equipment that has not been tracked properly, and it may not be performing the way it should be performing.

How can tracking be controlled?

A facility should have a quality control program. If it doesn’t, there should be a quality control technologist or imaging manager to do that. Track the equipment, and we can help with any on-going programme as it evolves in a facility. This is very important in also monitoring the correct dose to a patient. If you don’t have a quality control program within the facility, it is very easy for a radiographer to increase doses – perhaps very imperceptibly at first – in order to correct for system minor malfunctions or even for a monitor degrading. So it depends not so much on the system, but on the skill of a radiographer or radiologist?

CARESTREAM HEALTH: ‘Tracking equipment performance is vital to control radiation dose’

Yes, the radiologist determines the quality of the image that he wants to read, whether or not it has a high radiation dose. The radiologist must make the final diagnosis. So the radiologist will abide by what the radiologist wants in the facility. But again, it is very subjective. One radiologist will be very happy reading a slightly noisier image compared with someone else. This can be a problem.

In equipment comparisons among radiologists someone said that Carestream equipment needs high dosage, which is not true. ‘Correct. Competitors have used that exact phrase. It is not true. It depends on how a facility is tracking, and whether it is really concerned about the patient dose. The radiologist is the end viewer. So see train the radiographer. The radiologist approves or does not approve or provides comments as to the quality of the image that he or she wants to see. If you have a good radiographer who understands image processing, now we are talking about digital, and we have that aspect of the image processing that can be adjusted to provide the quality that the radiologist would like to see. The more robust your image processing is, the more you can provide a better image at a lower dose to the patient. More than just dose comes in to image quality. Is there a difference in how, for example, Europeans, American, Asian, African or Russian radiologists deal with the question of radiation dose?

I’ve been questioned about dose in other regions, but perhaps not to the extent received from Europe. You have particular groups, such as paediatricians, who are generally more concerned about the patient dose. In Europe, this is also a political situation; there are groups that want to avoid a lot of CT, for whatever reasons. Is that the case in the USA?

For CT certainly there is a push to lower the dose in paediatrics – a national push. MI is a different part of the spectrum. I’ve not seen anything so disconcerting as a dose in CT. I’ve not seen that much coming out of MI, which is a different type of electromagnetic radiation. It can do other things that are harmful. Are you trying to develop material to lead to less radiation in CT?

We are always on a path toward lowering the amount of radiation that we need in order to produce an image. That is part of all of those product lines that we develop. In terms of image processing, we are always developing image processing so that you can extract the most out of the acquired signal. This is one of the two biggest areas; the other is the actual detector technology. Certainly informing and teaching the user on how to use the equipment is also a big factor, and introducing quality control tools to monitor and track equipment properly. As a company, we are concerned about the patient dose. We want to provide the best image quality and the lowest possible dose to our users, and we are continuously improving our products along that mind frame.”

SIEMENS:

The word ‘dose’ describes the energy effect on X-ray transfers to the material. Therefore, the radiation dose is quantified by the energy (unit: kilogram). In this context, the dose is known as absorbed dose. The unit of absorbed dose is Gray – abbreviated as Gy. One Gray is equal to one joule per kilogram (1J/kg).

Different tissues absorb radiation to different degrees. The amount of radiations can’t be seen or felt; it has no smell and our senses can’t feel it – still it can cause great harm. Therefore, many fears are associated with radiation. Radiation is used for diagnostic and therapeutic purposes. As with many treatments the amount of dosage is what matters. Harm from radiation can be divided into two groups, which are both present if one receives a certain amount of radiation.

1. Deterministic effect means that every exposure to a certain amount of radiation causes the same reactions. Deterministic effects are strongly dose related. Skin rash, skin burns, hair loss, bone marrow degeneration, radiation sickness and death – can be caused by a certain well-known amount of radiation. Compare deterministic effect to placing a finger on a hot plate – at a certain time and temperature you will see a red skin, burns blisters and serious burns. Deterministic effects are more or less relevant for radiation therapy; here deterministic effects limit the amount of radiation that can be used to treat a patient. Cancer does not play a role in deterministic effects.

2. Stochastic effects are different. Stochastic effects of radiation are due to the likelihood of cancer. However, it is not the case that everyone who gets exposed to radiation develops cancer – just increasing the likelihood of cancer increases. The relation between dosage and amount of additional cancer was calculated by witnessing the survivors of atomic bombs. From the witness linear dependency we developed the theory that even so little bit of radiation increases the risk of cancer. It might be that this view is overcautious and that we should give a little less than a dose. To do this is quite dangerous.
is it really?

By Soenke Bartling

Medicine is less harmful. However, it is better to play it safe.

In diagnostic imaging stochastic effects are the limiting factor. Every procedure that involves X-rays increases the cancer risk of an examined patient – strictly speaking. The question here is how much the overall cancer risk is increased; this can vary a lot, because the exposure caused by modalities varies in order of magnitude. Furthermore, even CT scan examinations. A standard X-ray exposes a patient by modalities varies in order of magnitude. Exposure to natural and medical radiation – Human organs differ in their susceptibility to radiation; the skin, for instance, is rather insensitive, while the gonads – in women, ovaries and, in men, testicles – are most susceptible. This is accounted for by the tissue weighting factor. The product of equivalent dose and the tissue weighting factor – summed over all organs irradiated – is known as the effective dose. The effective dose is the usual measure of the radiation exposure of the patient and is also given in Sievert (Sv or mSv for one thousandth of one Sievert).

The impact of the dose/effect of ionising radiation on the DNA in body cells is subject to scientific controversy. It has been demonstrated that ionising radiation can alter the genome. However, experts disagree on which dose affects which degree of damage. Radiation exposure in CT scans – State-of-the-art CT scanners cause additional radiation exposure of 2–20 mSv, depending on the model and the region of the body studied. Studies confirmed damage to the body only for a dose of at least 0.5 Sv – that is about 500 times the CT radiation exposure. Epilation of the skin becomes a risk only with an absorbed dose of at least 3 Sv (about 1,000 CT studies). Therefore, deterministic radiation damage (damage that can be traced to a certain event) due to CT studies can be ruled out completely. The data on stochastic damage (probability of damage after irradiation) is found on long-term observation of the survivors of Hiroshima and Nagasaki. Since 1950, the so-called life span study, covering more than 120,000 patients, has confirmed a linear relationship between dose and additional risk of cancer. To a large extent, this risk depends on the age when irradiation happened. If irradiation took place during childhood the risk is increased. ICRP 1990 (International Commission on Radiological Protections) hypothesises an additional lifetime mortality risk of cancer of about 5% per Sv. In other words, a CT study with 10 mSv carries an additional mortality risk of 0.05%.

Compared with other known risks this is a rather low value. Cardiovascular disorders increase the mortality risk by 34%, heavy smoking by 40% and alcohol abuse by 72%. If the general risk of cancer is 25%, a CT study will increase this risk to just 25.05%. Without a doubt, for medical indications the patient benefit far outweighs the additional risk of radiation exposure.

Modern CT scanners are equipped with numerous tools that allow radiologists to keep patient radiation exposure as low as possible. Decreasing patient diameter by just 4 cm will halve the tube current. For quite some time, automatic dose modulation, such as CareDose4D by Siemens, has been taking this into account. It ensures real time automatic dose modulation by anatomically controlled automatic exposure control, thereby reducing the dose by up to 66%. Asymmetric collimator control preventing over-exposure of the area studied and ECG-gated dose modulation also help to reduce radiation exposure even further. Knowing how to handle the unit properly has a direct impact on patient dosage.

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Absorbed dose Energy dose transferred by the radiation energy to the tissue
Equivalent dose Weighting of the absorbed dose taking into account the biological effectiveness of the different types of radiation
Effective dose Weighted organ dose taking into account the radiosensitivity of the organs and tissues

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Aquilion ONE is the first CT scanner capable of imaging whole organ regions up to a width of 16 cm in one rotation and within a split second. Based on the raw volume data, rapid dynamic processes within an entire organ (e.g. heart, pancreas, kidney or brain) may be diagnosed with a time interval of 50 ms, i.e. with a rate of 20 volumes per second. With their smallest effective width of 0.5 mm the detector elements ensure best possible spatial resolution. Image reconstruction of 2 x 320 slices, coupled with special mathematical interpolation, provides a geometric resolution of 0.4 mm image voxels in all directions. Unlike in flying focus spot technology, the signal strengths are not halved and spread over both slice series. Consequently, this halved signal strength per slice does not have to be compensated by increasing the exposure.

Heart rate adapted temporal resolution between 50 ms and 175 ms allows scanning of the entire organ within one heart beat. For rather high heart rates the temporal resolution of 50 ms is almost half that of a

CT: Optimising

By Dr Jörg Blobel, Ph.D., Chief Clinical Science, CT Systems Division, Toshiba Medical Systems Corporation, and Jürgen Mews, of the CT Systems Division at Toshiba Medical Systems in Neuss, Germany

Dose ‘hysteria’ and the 320-slice CT scanner

For the last few months, Dr Patrik Rogalla, Senior Consultant at the Charité, Berlin, specialist in diagnostic radiology and Head of the Computed Tomography Department at Campus Mitte, University Medicine Berlin, has been using a 320-slice CT scanner, one of four currently manufactured. During a European Hospital interview, we asked whether the system has provided greater detection rates, and why it has also ignited further debate on radiation dose.

Radiation dose is a topic that is sometimes discussed rather hysterically, and often by many without sufficient basic knowledge on the subject. Reason number one: if people are short on interesting and innovative topics they will talk about radiation dose. This always goes down well and scores points, because radiation is generally perceived as something very negative in our society. Once you tackle this topic you are guaranteed to remain a talking point. The second reason: Of course we must cut down on dose and are obliged by the legislators to examine using the lowest possible dose. The reason why the 320-slice is re-igniting discussions is the potentially lower dose requirement of this new type of CT scanner, and this puts us into the focus of the discussions around dose.

There are not quite so trivial discussions around the question of how much dose is required for what kind of image quality. The dose can be measured – it is not that easy but technically it can be done in a fairly reliable way. However, image quality can only be conditionally objectively measured, because a large part of image quality is determined by subjective impression. The real measure should be: How much of a dose do I need for a sensible image quality that allows safe diagnosis? However, seeing how images tend to make very subjective impressions, this opens the floodgates to all kinds of speculation and marketing. CT scanners manufactured by all the main suppliers all require a certain degree of a radiation dose for comparable examinations. The differences between the different manufacturers are rather marginal. The parameter setting of the equipment, determined by the radiologist based on the individual requirements of a patient, and in particular the clinical question at hand, is much more important.

It is a little regrettable that the discussion about CT tends to be reduced to a discussion around dose, although the use-ratio of CT scanning across medical indications is calculated at around 200:1. This is not only damaging for this technology, but also for radiology itself. This discussion then questions many radiological procedures, such as conventional angiography and fluoroscopy. How can you convince a female patient to have embolisation of a fibroid carried out using fluoroscopy when there is this constant debate over the dangers of radiation during CT scanning? We are taking away our own basis for essential methods of examination and treatment in radiology. I think this is short-sighted. The discussion around dose is necessary, but should be carried out based on the highest levels of knowledge and seriousness. One of the great difficulties with this discussion is that in today’s scientific world...
**Euro. Hosp.** Vol 17 Issue 5/08

**Dosage**

A dual source CT scanner and the heart is better locked into position during motion. Compared with a Helical CT unit where the heart volume is captured by individual overlapping rotations the volume scan reduces the effective dose of the normal patient to 1.5-6 mSv - a reduction of 60-80%. Also the disadvantages of the step-and-shoot mode of multislice CT with a scanned field width of 20-40 mm, i.e. the common stepping artifacts at the overlap, are overcome. Data capture with Aquilion ONE requires just one heart beat. The data doubling along the volume overlap, are overcome. Data capture with Aquilion ONE requires just one heart beat. The modality is robust and offers increased potential to study arrhythmia patients. Calculated and non-calcified plaques, the latter frequently resulting in myocardial infarction, can be visualized down to a diameter of less than 1 mm.

This outstanding low-contrast resolution of the Aquilion ONE allows low radiation energy levels at 80 kV, e.g. for diagnostic organ perfusion scans. For the first time perfusion of the entire cerebral volume can be captured simultaneously. The 15-20 volume data sets generated during one minute of the study are acquired with a regular effective patient dose of just 4.6 mSv. Volumetric acquisition permits anatomically accurate fusion of the CT angiography and perfusion volumes (Fig1). The innovative range of CT studies opens up new perspectives for functional diagnostic workup, e.g. in joint movement, peristalsis, dynamic blood flow analysis and perfusion of numerous organs. In diagnostic pediatric scans the radiation field and the number of detector element rows is collimated to the size of the organ. This rapid examination avoids the need for breathhold in infants and small children otherwise required by the longer scanning times. If an emergency thoracic CT study is needed in an infant the effective dose at a tube voltage of 80 kV is minimal at 0.16 mSv. Large areas of the body in combination with cardiac CT can be captured by individual volume scans much more rapidly than with helical CT and are subsequently “stitched” to one patient volume. Complex studies of the heart, lungs and the head may be combined with supplementary CT angiography and – based on the study plan – are optimized by automatic system selection of the scan parameters to reduce radiation exposure. Before the start of the study the expected patient radiation exposure is displayed and can be controlled. Conventional helical CT mode with the selection of 16, 32 and 64 detector rows is also available and the volume scan mode is enhanced by numerous new dynamic function options. These innovations of the Aquilion ONE will alter the patient workflow between the diagnostic imaging modalities in radiology.

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**Sectra**
New concepts for dose reduction in the diagnosis of coronary heart disease with CT

In the fifth in his series for European Hospital, Professor Stefan Schönberg (left) of the Institute of Clinical Radiology and Nuclear Medicine (IKRN), University Hospital Mannheim, Medical Faculty of Mannheim, University of Heidelberg, invited colleagues from Mannheim and the Federal Office for Radiation Protection (BFS) in Neuherberg for a round-table discussion on:

**Figure 1:** Diagnostic algorithm for workup of patients with suspected CAD including coronary CTA, which is a central tool for patients with a medium risk value (Courtesy of Siemens Healthcare)

N on-invasive multidetector coronary CT angiography (CTA) has become an established imaging tool for the diagnosis of coronary artery disease. Several studies have shown that – particularly with new scanner generations (i.e. 64-slice and higher) – the presence of hemodynamically relevant coronary artery stenoses in previously untreated patients can be ruled out by CTA with a high negative predictive value of almost 100%. With the latest 8th generation CT systems, which use broader detector arrays with up to 128 rows or dual source technology, an isotropic spatial resolution of 0.5 mm and a minimal temporal resolution of 0.33 ms can be realised, which approaches the spatial resolution of catheter-based coronary angiography. In recent clinical CTA studies using a 64-slice scanner, the effective dose ranged between 10 and 20 mSv, in comparison to 5 to 6 mSv for a diagnostic catheter-based coronary angiography. Recent radio-epidemiological estimates have shown that standard cardiac scans are associated with a considerable risk for patients to develop a radiation-induced cancer. As expected, the so-called lifetime attributable risk (LAR) for cancer incidence depends markedly on the age at exposure and the gender of the patient: It is markedly higher for women and younger patients as compared to men and older patients (LAR for standard cardiac scans varied from 1 in 143 for a 30-year-old woman to 1 in 2,061 for an 80-year-old man).

To maintain low levels of image noise and thus high image quality in CTA, the current-time product and tube potential must be increased with increasing patient body size or decreasing slice thickness.

Several techniques have been developed to reduce the radiation exposure related to a CT examination of the coronary arteries. The radiation dose decreases considerably by applying a lower tube potential. Recent studies have shown that reducing the tube potential in CTA from 120 kV to 100 kV in patients of normal weight would not only in a marked reduction of the radiation dose but also improves the contrast between vessels filled with an iodinated contrast agent and their surroundings. One of the most promising techniques to reduce patient exposure in MSCT is that of automatic tube-current modulation, which allows substantial radiation dose reduction without sacrificing image quality. The principal idea of this approach is to adapt the tube current according to the changing anatomy of the patient, both, in the transverse as well as axial direction. Coronary arteries typically show the least motion in the diastole. Therefore, images required to diagnose patients with low heart rates should be reconstructed from diastolic data. By contrast, systolic data does not necessarily need to be reconstructed. This can be realised by the ‘ECG-controlled tube- current modulation’, which decreases or switches off X-ray tube current during systole.

Quantification of the calcium content in coronary arteries by electron beam CT and MDCT was traditionally used with prospective ECG triggering with sequential slice-by-slice acquisition, and is typically related with a radiation exposure of about 2 mSv. To achieve a high reproducibility of coronary CTA, it is essential to use short acquisition times and overlapping slice reconstruction (to avoid partial-volume effects). With previous MDCT scanner generations this could only be realised by retrospectively ECG triggered helical acquisition of the coronary artery tree. With the current MDCT technology, however, much shorter acquisition times can be realised, which makes prospective ECG triggering possible. By using the so-called ‘step and shoot (SAS)’ mode, the X-ray tube is turned on only during predefined phases of the cardiac cycle, while the table is moved in the remaining phases not utilised for data acquisition. This approach considerably reduced radiation exposure of patients. When the axial range covered by the detector rows in MDCT is increased, the dataset can be acquired within only few heartbeats (or only one with most recent technology), which can result in dose reduction.

Most of these technological approaches can be combined to optimise CT examinations of the coronary arteries from a radiation hygienic viewpoint. Initial studies revealed that the effective dose can be reduced to less than 5 mSv, which is comparable or lower than the dose related to diagnostic X-ray coronary angiography.

Nevertheless, restricting the indication to a well-defined patient population is still the best method for reducing radiation dose of patients. In patients with a high pre-test probability of coronary stenoses there is a high likelihood that interventional treatment will be necessary anyway and therefore it would be no clinical benefit of CTA. Considering the radiation dose, there is also no evidence for screening of low risk patients or asymptomatic individuals. The benefit of CTA is likely to be greatest and is reasonable for symptomatic patients who are at intermediate risk for coronary artery disease (CAD) after initial risk stratification, including patients with equivocal stress-test results. In consideration of recent scientific statements and study results, a clinical algorithm for the diagnosis of CAD with the use of CT was established at our institution (Figure 1). A symptomatic patient with suspected CAD has to undergo a risk stratification including physical exam, symptom diagnostics and medical history first. CTA is a central tool for patients with a medium risk value (10–90%).

With its high negative predictive value one can be confident to adhere to conservative therapy after negative CTA (no or low grade stenosis only). Even in these patients, findings such as extended noncalcified or calcified coronary plaques warrant intensified conservaitive therapy, so there is an additional benefit for the patients. Patients with positive findings (high grade stenosis) are referred to cardiac catheterisation with potential percutaneous coronary artery intervention. The pre-interventional CT also helps to plan the procedure and is a valuable means of image-guided therapy. Patients with chronic coronary artery occlusion confirmed at catheter angiography are referred to MBI for the assessment of viability, in order to evaluate if the patient benefits from a revascularisation procedure.

The algorithm is currently evaluated as part of a research project performed in collaboration with the Federal Office for Radiation Protection in Germany. To its end, a comprehensive benefit-risk evaluation of various non-invasive imaging tools available for the diagnosis of CAD (MDCT, MBI, PET/CT, coronary angiography) will be performed, taking into account risks from the imaging technique, the administration of contrast agents, and the invasiveness of the procedure.
HOLOGIC: Radiation dose and digital mammography

The use of mammography to maintain breast health comes with a caveat: exposure of the breast to radiation, which can increase the susceptibility risk of breast cancer. Thus, using the lowest possible radiation dose for mammograms is of utmost importance.

A standard mammography examination with four exposures, two to each breast, is approximately equivalent to a whole-body dose from background radiation over the course of a year. Radiation dose from a mammogram is a direct consequence of the amount of X-rays that are absorbed in the breast tissue. With a well-calibrated mammography unit, no other parts of the body are exposed to X-rays. Radiation dose is affected by the energy of the X-ray beam, the thickness and composition of the breast, amount of compression, and type of imaging equipment used.

The introduction of digital imaging systems for mammography provides a lower dose alternative option for mammographers and patients. One of the advantages of digital mammography imaging, such as digital breast tomosynthesis, iodinated contrast, and dual energy breast imaging.

Hologic Inc has replaced molybdenum X-ray tubes with tungsten X-ray tubes in its Selenia digital mammography system. In laboratory testing, using identical Selenia systems, with the exception of the type of tube used, with radiation dose of 1.0 mGy imaging a breast phantom, superior imaging was achieved with a better Detection Quantum Efficiency (DQE) curve. This produced better digital images (fig. 1.)

In addition, a silver filter enables large breasts to be imaged better. Silver filters, which replace molybdenum ones, produce superior imaging performance.

Hologic also has eliminated the need for dual track anode X-ray tubes. In the golden age of screen-film mammography, X-ray tubes with dual track configurations were used on some analogue mammography X-ray systems to enable dose optimisation for large breasts. But dual track configuration X-ray tubes are less reliable and more expensive than single-track configurations. A Selenia system with a single track tube can deliver the highest current exposure needed for the largest breasts at an acceptable exposure time reducing motion artifacts. This ensures against underpenetrated images, long exposure motion blur and poor quality.

Hologic also offers a radiation dose of 1.0 mGy imaging a breast phantom, superior imaging was achieved with a better Detection Quantum Efficiency (DQE) curve. This produced better digital images (fig. 1.)

The use of single track configuration X-ray tubes is less reliable and more expensive than single-track configurations. A Selenia system with a single track tube can deliver the highest current exposure needed for the largest breasts at an acceptable exposure time reducing motion artifacts.

Digital mammography offers superior performance for new technologies currently in advanced stages of development and clinical testing.

By Kerry Heacox of I.T. Communications

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ULTRASOUND CT MRI X-RAY SERVICES
Clinical applications of advancing high frequency ultrasound techniques

By Dr Adrian Lim and Professor David Cosgrove, Department of Imaging, Imperial College London, United Kingdom

High frequency ultrasound (US) techniques continue to improve with better resolution and exquisite B-Mode imaging, particularly with improved compounding techniques seen with the Aplipure product. However, particular focus has been on improving techniques for breast imaging and one distinctly novel idea is to highlight microcalcifications within tissues.

**Micropure** – This highlights those microcalcific foci as a ‘twinkling’ focus on a dark blue background (the latter can be altered to personal taste). This is the first time that an ultrasound device has been developed to help the operator confidently visualise microcalcifications, which previously would have been deemed too difficult with just conventional US. This could be particularly helpful with biopsy, where traditional methods would necessitate stereotactic sampling. The latter would require 10–20 core biopsies whereas, with the help of US guidance, this could be reduced, although its efficacy remains to be proven. Fig. 1 illustrates how the microcalcific foci in the 12 o’clock position of the right breast, seen mammographically, is more clearly seen with the Micropure application.

**Elastography** – The technique has been shown to distinguish benign from malignant breast lesions successfully. It is a method to quantify ‘manual palpation’ ultrasonically: the stiffer a lesion, the more likely it is malignant. Much of the published work has concentrated on providing colour maps of the area of stiffness of a lesion and surrounding tissues. Toshiba has added this capability to the Apollo, but provides an extra dimension by allowing time elasticity graphs to be plotted over a region of interest in the compression or relaxation cycles by quantifying elasticity it removes the subjectivity of colour maps and some recent pilot studies (as yet unpublished) have suggested that the ratio of the adjacent normal fatty breast tissue to the lesion can be an indicator of malignancy when the ratio is at least 10. However, there are exceptions to the rule, particularly if a malignant lesion is necrotic or in cysts, which can also show stiffness. Fig. 2 displays the elastograph map and graph of a breast carcinoma.

**Volume imaging** – Another area of US development has been the ability to generate 3-D volumetric images with high frequency probes. Particularly successful in obstetrics, this has yet to find its clinical application in general imaging. However, it has become apparent that the coronal plane reformatted images of breast cancers provides an appreciation of the retraction of a lesion and perhaps gives a better estimation of the true size and extent of the mass. Further trials are needed to assess whether this really does provide a better representation of tumour size. Fig. 3 shows the extent of a carcinoma with the ‘finger like’ projections closely resembling those seen on the MRI images. 3-D elastography techniques have also been suggested to be helpful in assessing breast masses.

**Contrast enhanced ultrasound** – Although US contrast agents have an established use in abdominal studies, particularly for characterising focal liver lesions, they have yet to find their niche with superficial lesions and high frequency scanning, particularly for breast lesions. Fig. 4 shows how the enhancement pattern and angiogenic vessels of a malignant tumour can be depicted with microbubble enhancement. It remains controversial as to how much this adds for distinguishing benign from malignant lesions, since breast biopsies are easily performed with few complications or significant morbidity. The role of contrast enhancement may therefore not be major; however, it may find a role in assessing response to treatment.

**Conclusion** – There is immense potential for the latest developments in breast ultrasonography, in particular Micropure and elastography time/stiffness curves, which provides quantification and does not rely solely on subjective visualisation. Together with the 4-D and small parts contrast capabilities, the new version 3 Apollo Xi provides the radiologist with a great armamentarium for evaluating complex breast lesions.

It is not envisaged that Micropure would replace mammography in screening for microcalcifications, but the ability to biopsy microcalcifications under US guidance, and thus obviating the need for stereotactic biopsies, would be of notable value. The ability to depict the true extent of malignant breast tumours more accurately with elastography, 4-D imaging and the use of microbubbles would not only help surgical management but also has potential in assessing response to chemotherapeutic treatment, thereby aiding the oncologist.

The potential of these techniques to detect problematic breast tumours such as lobular or multifocal breast carcinomas, as well as in screening, should be fully investigated. Ultimately, these latest developments require multicentre studies to evaluate their true value and potential.
Elastosonography and the detection of breast carcinomas

Professor Friedrich Degenhardt (right), Head of the Gynaecology Clinic at Franziskus Hospital, Bielefeld and the Cooperative Breast Centre Bielefeld-Herford, Germany, is using elastosonography to examine breast carcinomas. We asked him to outline present finding as to its value, future potential, and the current value of ultrasound in breast cancer detection.

“We are currently carrying out elastosonography examinations to achieve a differentiation between benign and malignant growths, to find out a cut-off which gives us the chance to find out more about the nature of a tumour, an assessment of malignancy i.e. the histological result of a breast tumour,” Professor Friedrich Degenhardt explained. “We have just finished a doctorate on more than 200 cases and were able to draw good conclusions. As this doctorate is not yet fully evaluated, I can’t give more details. However, it will be interesting to see whether we will actually achieve a closer prediction of tumours with this additional grey-scale imaging.”

“Using the new Hitachi Elastosonography System, first we are able to show differentiated images of these tumours. Then the small boxes are superimposed on the tumour tissue. We then superimpose the same boxes on tissue that does not appear to have any pathological characteristics based on the ultrasound image. The density value for what we believe to be normal breast tissue is then compared with the density value of the tissue which appears pathological. Based on this density ratio we are able to achieve better conclusions about the tumour tissue.”

Asked whether elastosonography become an established procedure in the future, Prof Degenhardt said this is primarily a health-political question. “It is definitely of great help in the differentiation between benign and malignant tumours. So, if we say that we only want to operate on those patients with a malignant result, then elastosonography is a good basis for such a decision. However, he added ‘Healthcare politics is currently leaning towards mammography screening. But there are an increasing number of examinations that show that ultrasound could be equally, or in some cases even more effective than mammography. There are now special procedures in ultrasound scanning technology that allow us to depict a tumour slice by slice, almost as with MRI technology.’ I imagine that we could more or less match MRI quality and possibly limit the use of MRI for very specific areas.”

“Although there are currently three procedures – mammography, MRI and ultrasound – healthcare politics currently only favours mammography, he pointed out. For the first time, the new S-3 guidelines recommend ultrasound for women, up to the age of 40, who have a lump in their breast. For women between 50 and 69, mammography is the recommended procedure. However, for women with a high breast tissue density mammography does not always deliver good results. This means that breasts in categories ACE1 and ACB4 (ACR = American College of Radiology) ultrasound has to be carried out additionally to confirm results.

“The S-3 guidelines contain directives about the detection of tumours, whether they are benign or malignant and how to treat them. As I said, younger women, around the age of 50, or women who take hormones, often have very dense glandular breast tissue. It has transpired in recent years that a proportion of carcinoma within this group has not been detected. This is why ultrasound should be used here. If necessary, elastosonography or grey-scale imaging can also be used, which depends on what type of equipment doctors are using. If the appropriate equipment is available elastosonography can be carried out. The procedure of grey-scale imaging is currently not very wide-spread, it is still a field of investigation.”

“The outlook is definitely very promising. I should add that ultrasound is currently still a little under-represented in breast diagnostics, and something has to change. Maybe this is because, with mammography, imaging can be carried out by radiographers, whilst, in Germany, ultrasound has to be carried out by doctors, which means we cannot offer ultrasound on a large scale because we do not currently have the required number of doctors trained in this area.”

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This fibroadenoma shows a typical benign appearance.

Elastosonography and the detection of breast carcinomas

Has presented in breast cancer

EVALUATION: MAMMOGRAPHY

EUROPEAN HOSPITAL Vol 17 Issue 5/08 21
Mammography: What really counts?

‘In the next decade 80% of detectors used in medical X-ray imaging will be photon counting’

The fact that the female breast is one of the most radiation sensitive organs in the human body is a major driver for all those searching for low radiation alternatives – one of these routes lies in photon counting.

At this year’s meeting of the Radiological Society of North America (RSNA) (see box), ‘Photon Counting: Is it the future of X-ray Imaging from mammography to CT?’ will be an important panel discussion initiated by Professor Mats Danielsson of the Royal Institute of Technology, Stockholm, and Robert Nishikawa, Associate Professor of Radiology at the University of Chicago Medical Centre and Director of the Carl I. Svensson Translational Laboratory for Breast Imaging Research. Is dose the only factor that determines image quality? The Swedish firm Sectra certainly does not think so. It claims that the Sectra MicroDose, currently in use in more than 10 countries, produces more brilliant images at half the radiation dose used by competing systems. We asked, is this possible?

Prof Mats Danielsson explained: ‘The limitation of current imaging systems is that they have too much noise – comparable to a hearing difficulty in a noisy environment. Basically you have two options: either reduce either the background noise or speak louder. To speak louder is equivalent to increasing a radiation dose; the only problem is that it puts women at increased risk for radiation-induced cancers. The other solution is to reduce the background noise, in a silent environment you can clearly hear a whisper, while even shouting may not help if surrounding noise is too high. In exactly the same way it is possible to achieve as good, if not better, image quality at half the radiation dose if just the noise is taken care of. With Sectra’s solution the main noise sources in terms of electronic noise and scattered radiation are reduced more or less to zero and this is the answer. It’s not black magic.

‘This is achieved by photon counting technology. With the advent of applications such as tomosynthesis and dual energy mammography, it will become even more important to control noise because the signal in tomosynthesis will be much smaller compared to the noise – if nothing is done to reduce it.

‘To count the X-ray photons down to the quantum level is the ultimate solution for medical imaging. Today, it is a significant advantage; it will be even more important in the future. Getting rid of the noise is the way to go.’

Apart from eliminating noise, it is also important to optimise the X-ray source in terms of target and filtering and this can be applied to all systems – photon counting or not. For example, the same way it is possible to achieve as good, or, in fact, better image quality at half the radiation dose if just the noise is taken care of. With Sectra’s solution the main noise sources in terms of electronic noise and scattered radiation are reduced more or less to zero and this is really the answer. It’s not black magic.

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A reduction in radiation dose may even be worth a slight increase in cost; in this case it is better to count the X-ray photons than just dollars and cents.

Photon counting

Since X-rays are digital and Sectra’s detector counts them one by one, a direct capture of individual X-rays occurs. This means no electronic noise in the image and no information loss in conversion steps, which is the case in other digital detectors. With Photon counting, there are no phantom images to interfere with the image, since the detector is fast enough to be ready when the next photon arrives. The image is acquired by a multi-slice scanning technology that eliminates the scattered radiation and significantly reduces the noise level in the image. The multi-slice scanning technology ensures that images are truly reliable, with no dead pixels that could obscure microcalcifications.

PHOTON COUNTING

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THE WHOLE DIVERSITY OF BREAST CANCER

‘Diagnostics is not diagnostics, not even when it relates to a specific indication such as breast cancer,’ says Professor Walter Heindel MD (right), who heads the Münster Mammography and Breast Centre Reference Centre at Münster University Hospital, focusing on the dissimilarities among patient groups and their peculiarities.

Leading breast centres in Germany work in a standardised and structured manner with interdisciplinary teams. Modern sono-logic imaging comprises different radiological procedures and image-guided examination/classification of the female breast.

The three important imaging procedures are: X-ray mammography, increasingly carried out as digital mammography; ultrasound of the breast and all its different, enhanced forms, and finally contrast media enhanced MRI mammography.

This basic spectrum, brought together at these centres, facilitates the following services: many hospitals now offer a special breast advisory surgery for women who want a second opinion. This is different from symptom-oriented diagnostics, the clinical or curing imaging of the female breast.

The third area that has developed is image-guided breast biopsy. The trend across Europe is to confirm an image-based diagnostic histologically, even if the image fairly clearly indicates a tumour. These days – and this is something that we heavily emphasise at our centre – results, whether image-based and histological or pathological, must be correlated and have interdisciplinary evaluation to work out the best possible surgical and treatment plan.

Another important topic is risk-adapted early detection, which particularly concerns women with an individually increased risk of breast cancer – about 25% of all cases. This includes genetically-based risks, for example based on the BRCA1 and BRCA2, which, for the affected female constitutes a significantly increased lifetime breast cancer risk of up to 80%. Certain breast centres offer special imaging protocols and pro-"
in mammary sonography

If, in the early days of mammary sonography, it was revealed to be helpful to render tactual findings in a visible manner (sonic palpation), then now is the time to palpate clinically occult findings in a new manner (Elastoscan®). The use of the ‘strain effect’, i.e. checking to what extent reflectors can be separated from one another under compression, provides important additional information on tissue conditions in a region of interest not to be further differentiated by the B-mode image.

The complementing of conventional B-mode sonography by elastography represents, by contrast to Doppler sonography and 3-D sonography, a much less time-consuming new approach that is available without any additional preparations.

For more enhanced requirements made of sonography in early detection of breast cancer it is increasingly important to also unerringly address such focal points as would scarcely have been remarked upon without mammographic detection with ultrasonics. In addition, these focal points are, in part, rudimentarily to be differentiated from the small intra-mammary haematomas frequently occurring in pre-operative interventions.

Similar indications for elastography arise during ‘second look’ sonography during the search for correlates of mammary MRT findings and in improved targeting for the execution of interventional measures (punch biopsy) on small or difficult to delineate focal findings.

Additionally, still under scientific evaluation are questions of detail definition of therapy monitorings, whether in the case of pre-operative chemotherapy, pre-operative predictions on size and the supplemental sonography of mammary excidates.

Gathered previous clinical experience shows that elastography does not, in fact, actually replace mammary sonography in histological clarification but, particularly in the case of small or more deeply situated findings, delivers unambiguous and clearly reproducible images. Hence, clearly targeted work becomes a possibility and a further, promising facet provides an enhancement to sonography, a facet the deployment possibilities of which have scarcely even been embarked upon.

* Elastoscan is a trademark of Medison
A new generation of Endovascular Brachytherapy gains full CE-certification

The itm Rhenium-PTA/PTCA® was first developed by ITM Isotopen Technologien GmbH & Co KG in 2007, created to focus on radiochemistry, radiation protection, pharmaceuticals in nuclear medicine and industrial nuclear infrastructure.

When the treatment is complete, the short half life of Rhenium-188 of only 17 hours ensures that residual radiation levels in used materials drop very quickly which significantly simplifies otherwise complicated waste management.

Unveiled:

Ultrasound imaging and vital signs monitoring products from China

Edan Instruments Inc., based in Shenzhen, China, is one of the leading medical equipment manufacturers involved in R&D, manufacturing and marketing. Products include:

The EDAN M3 (below): this vital signs monitoring module is used in out-patient department and doctors’ office for its accuracy, durability and cost-effectiveness by SpO2 and NIBP.
The Carestream DRX-1

important part of the design – we needed to start out with a fundamentally durable detector material – scintillator and detector material. These two things were important for the first attempt at making such a thing.

The development of such a neat concept began with core research labs’ investigation over seven years ago’, Todd reflected. ‘Commercialisation of the product goes back about three years. A long time, but this is very advanced technology. A way as we know no one else has a cassette size, wireless DR. It really is a technological breakthrough. If you look at the market, about 93% of X-ray rooms are currently cassette-based. We say, well of course, they were built around a standard and that standard was the film cassette which later became the computed radiography (CR) cassette, using the same standard. So if you could make a DR cassette at that standard, you would have a really nice solution because you could simply put it in and it would fit, and then the room would be converted to a DR room and a great deal of the workflow would improve because the movement of cassettes would be almost eliminated. Essentially, it takes away the obstacles to converting to DR.

The current wireless design, he pointed out, is for use in an X-ray room. ‘The console is associated with this X-ray room and can work anywhere in it. This 802.11n wireless technology with the WPA2-PSK security software ensures that information is communicated peer to peer, and only between the cassette and console. So, if you were to use this technology in a typical application, it works for many metres. In our clinical tests we have had no issues with it communicating from anywhere in the X-ray room.

There is yet another special feature of the DRX-1. Todd Minnigh explained that the lithium ion battery has a certain polymer layer and is ‘...a bit like a very large cell phone battery. The technology that keeps my cell phone working all week will keep my X-ray detector working all day. It can run for 70 to 90 exposures. We assume this will be in a typical busy setting, but even if not, the battery will stay charged for several days. Most examinations have 2–3 views. In an extremely busy X-ray room, 50 or 60 examinations may take place daily, meaning very close scheduling and only 2–3 battery changes through the day. It only takes about 30 seconds to swap to another battery. The first is then recharged in about three hours. The charger holds up to three batteries so you can use the detector constantly, all day long. It is almost impossible to shoot enough pictures to use up all of the batteries in the time it takes to recharge them. There are some wireless detectors, which are not cassette size and their batteries don’t come out. So you have to take the whole detector and put it in a charger stand to recharge; I don’t know how long their batteries take to charge.’

The detector, case and components are rugged, yet the detector weighs just 8.5 pounds – up to 30% lighter and some 50% smaller than other portable detectors. Carestream points out that it is suitable for general radiology, trauma, orthopaedics and almost all other X-ray examinations, adding that the system’s console assists with image capture, preparation of preview images, image processing and full-resolution display. Images can be transmitted as DICOM files to a PACS or storage device. All in all, a very neat package, so how has it been received? Todd Minnigh said that the Carestream DRX-1 has already been on show privately to customers at a few trade shows. ‘This is the solution I’ve been looking for. So it’s wonderful to have something that your competition doesn’t have, and that the market is hungry for. We are solving a real problem in healthcare, at least in the small area of X-ray, a core modality for us.’ The future market for this wireless, lightweight X-ray equipment is indeed large. ‘Globally there are over 200,000 X-ray rooms. If you count veterinary applications and others you can go over 300,000, but core hospital X-ray rooms alone are over 200,000, and 93% are cassette based,’ he pointed out. ‘Over the next 15 years as the baby boomers retire, most developed countries, as well as others, will have approximately twice as many patients, yet proportionally fewer workers. Then, it’s not just about who will pay for healthcare, but who will shoot the X-ray?’
Innovative technology for automated lymph node analysis

Definiens will introduce a new image analysis application at RSNA 2008.

Definiens technology can deliver more accurate results than manual image analysis in a fraction of the time. Thousands of images can be analysed with precision, easing the image analysis bottleneck. The technology is able to perform complex 3D volumetric analysis over time (4D analysis). Applications built on this technology will allow clinicians to monitor patient response or disease progression far more accurately than ever before.

By launching its first medical application, Definiens intends to help its customers take the necessary steps towards realising personalised treatment. Developing highly effective treatments requires an understanding of the entire healthcare landscape, from life sciences research and disease pathology to clinical diagnostics and treatment of individual patients. The company aims to provide intelligent image analysis solutions for cell, tissue-based assays and medical imaging, such as X-rays, CT and MRI scans.

Frank P. Klein, Vice-President of Medical Imaging at Definiens, added: ‘Our vision is information-driven healthcare that links patient information at the point of care with information gathered from imaging devices and medical knowledge databases. Such an approach enables the most efficient use of all available information in order to find the most effective treatment for the patient. Our innovative technology will be instrumental in realising this vision.’

Unlike most competing technologies that are mainly pixel-based, Definiens Cognition Network Technology® also considers context and examines objects in relationship to each other. The technology emulates human cognitive processes to extract intelligence from images. Klein explained, adding that Definiens LymphExpert®, the company’s new application for semi-automated lymph node analysis, builds on this technology. ‘It will support radiologists to identify, analyse and visualise lymph nodes over time. The application will allow the automatic measurement of lymph nodes according to RECIST and WHO guidelines in a consistent, fast and reproducible manner – building a 3-D volumetric picture of the node. Radiologists will be able to detect metastasising cancer early, avoid costly and unnecessary treatment and provide better outcomes for patients. Following the introduction of Definiens LymphExpert®™ at the RSNA in Chicago, the application will become commercially available in Europe early next year.’

Screenshot of Definiens LymphExpert™ (alpha version)
The Ziehm Vision Vario 3-D, we’ve saved time and cut down on radiation doses – with this device.

Researchers at the Technical University of Munich (Klinikum rechts der Isar). Recently, we asked him for the reasons behind this choice and his subsequent experience.

**Dr Burgkart:** We had shortlisted other providers. The Ziehm Vision Vario 3-D convinced us through its excellent image quality and the enormous flexibility of the system. Initially, we had a space problem – our operating theatres are comparatively small, but we obviously didn’t want to compromise on the technology, we wanted to be state-of-the-art. This system was the only one that fulfilled this requirement, which is actually not as banal as it sounds. Its flexibility becomes most apparent during use to capture the entire three-dimensional volume the C-Arm swings on an elliptic curve with a variable iso-centre. For example, this procedure allows us to generate 3-D images of the hip and shoulder, which play a decisive role in tumour surgery. Orthopaedic tumours are often found in almost inaccessible places that are hard to capture, making precise, safe biopsy very difficult.

Apart from biopsies the system is particularly suitable for spinal intervention, such as for stabilisation. The placement of pedicle screws has become a technically a lot easier due to 3-D images and the precise navigation system.

So, generally speaking, 3-D imaging guarantees more safety and accuracy during an intervention; the surgeon can assess whether he is using his tools correctly or whether a screw is in the right position during the actual surgery and, if need be, can adjust it. The number of cases where items such as screws are wrongly positioned should reduce greatly in the future. Previously, to make such an assessment we had to generate numerous C-Arm images and, if necessary, correct things during a second procedure. This not only took up a lot of time, but also the patient was additionally exposed to an increased radiation dose. So, since we’ve been using the Ziehm Vision Vario 3-D, we’ve saved time and cut down on radiation doses – with an even safer result than we had before.

To determine precisely the changes between bone and soft tissues for tumour surgery, outstanding contrast performance is needed. Is the system convincing in this area?

In the first cases in which we could test the flat-panel technology, the contrast performance was excellent in the soft tissues as well as bones. The same applied to depth of contrast. A further advantage of this technology is that there is no distortion. A straight K-wire is shown without the usual distortion, which obviously adds additional safety to the assessment. In my view FD technology has considerable advantages in terms of mobile imaging.

On the whole, this system has made our work a lot easier on a daily basis, not least because of the great ease of use despite the sophistication of the technology. The handling of the user console is similar to that of a CT – there was almost no need for any adjustment and we were able to start using the system without any significant problems.
The European multi-centre, multi-modality cardiac imaging project that could lead to a more intelligent and less costly use of today’s technology in cardiac care

**20 years of contrast enhanced MRI at Bayer Schering Pharma**

Since the mid 1990s MRI has enriched clinical practice

Vol 17 Issue 5/08

**WHAT WAS ACTUALLY VIEWED WITH SCIEPSION DEVELOPED INTO AN INTEGRAL AND INDISPENSABLE PART OF MODERN DIAGNOSTIC PROCEDURE?**

**WHAT IS MRI?**

**WATER – THE MOST COMMON MOLECULE IN THE HUMAN BODY – IS THE KEY TO MAGNETIC RESONANCE IMAGING (MRI): HYDROGEN ATOMS IN THE BODY ARE EXPOSED TO A MAGNETIC FIELD. THE HYDROGEN ATOMS then start emitting signals which are captured by a device that can be used to create images of the body’s internal structures.**

**WHAT IS THE BASIC PRINCIPLE OF MRI?**

MRI is based on the principle that protons (hydrogen nuclei) in the body will align with an external magnetic field, and when a radiofrequency pulse is applied, the protons will emit energy. However, when the radiofrequency pulse is turned off, the protons will return to their original state, emitting a signal that can be detected by the MRI scanner. The MRI scanner uses this signal to create an image of the body's internal structures.

**HOW ARE MRI IMAGES CREATED?**

MRI images are created by using a combination of magnetic fields and radiofrequency pulses. The magnetic fields are generated by powerful magnets, and the radiofrequency pulses are produced by a device called an RF coil. The RF coil sends signals into the body, which are then received by the MRI scanner. These signals are used to create an image of the body's internal structures.

**WHAT ARE THE ADVANTAGES OF MRI?**

MRI is a non-invasive imaging technique that does not require the use of radiation. It is particularly useful for imaging soft tissues such as the brain, muscles, and tendons, as well as for studying the flow of blood and other body fluids. MRI is also very effective for imaging the heart and blood vessels, and it can be used to detect and monitor a variety of diseases, including cancer, stroke, and heart disease.

**WHAT ARE THE LIMITATIONS OF MRI?**

Despite its many advantages, MRI is not without limitations. One of the main drawbacks is its cost, as it can be a very expensive imaging technique. MRI also requires the use of large magnets, which can be difficult to accommodate in some clinical settings. Finally, MRI can be uncomfortable for some patients, as the magnets can cause magnetic interference with other medical devices and implants.

**WHAT ARE THE FUTURE PROSPECTS OF MRI?**

The future of MRI is likely to be shaped by advances in technology and the development of new applications. For example, MRI is currently being used to study the effects of age and disease on the brain, and it may one day be used to diagnose and treat neurological disorders. MRI is also being used to study the effects of exercise on the heart, and it may one day be used to monitor the progression of heart disease.

**WHAT CONCLUSIONS CAN WE DRAW FROM THIS TECHNIQUE?**

MRI is a powerful imaging technique that can provide detailed information about the body's internal structures. It is particularly useful for studying soft tissues such as the brain, muscles, and tendons, and it can be used to detect and monitor a variety of diseases. However, MRI is not without limitations, and it may be difficult to accommodate in some clinical settings. Nonetheless, MRI is an important tool for medical professionals, and it is likely to continue to play an important role in the diagnosis and treatment of disease.
AutoLOGous cartilage transPLANTation

Advances in the treatment of cartilage injuries to the knee are very noteworthy. The decisive breakthrough must have been the development of the self-resorbing, bilayer collagen membrane (Chondro-Gide) by Geistlich in Switzerland. This allows the damaged area and the replacement material to be covered long enough for the new tissue to integrate and heal.

Small cartilage injuries often lead to concomitant injuries of the articular cartilage. However, in adults, a complete self-healing of cartilage damage is at present no tendency at all to self-heal. Left untreated, over the years they lead to an increasing loss of function to the joint (arthrosis), and there are always efforts to find new means to avoid this. During a discussion with European Hospital, Professor Matthias Steinwachs MD (above) at the Schulthess-Hospital in Zurich, a leader in the latest developments, outlined some of those techniques.

Operative treatment procedures

With arthroscopic drilling (Pridie procedure) and the procedure of microfracture drill holes are inserted into the bony base of the cartilage damage making it leak out and then clotting within the damaged area and settling as a fibrinous membrane. About 6-8 weeks rest for the joint, a fibrous replacement cartilage develops that, unfortunately, has limited biomechanical characteristics.

AutoLOGous matrix-induced chon- droneogenesis (ACI) is a procedure developed for the treatment of ak- wardly situated, large cartilage defects. The bone marrow leaking from the drill holes is retained within the damaged area by covering it with a period or a self-resorbing collagen membrane (Chondro-Gide). However, this also leads only to the develop- ment of rather ineffective fibrous car- tile.

AutoLOGous chondrocyte transplan- tation (ACT), a biological procedure developed for clinical use a few years ago, involves the removal and subse- quent analysis of a small cartilage sample from a non-weight-bearing part of the joint during arthroscopy. The cartilage cells are removed from the tissue under sterile conditions and germinated in a Petri dish. Eventually cells are cultivated to cover the defect. After 3-4 weeks germination the cells are inserted into the dam- aged area during an open operation and covered with the collagen mem- brane. Under these conditions the cells develop a much higher grade regenerated cartilage that has almost 90% of the biomechanical characteris- tics of healthy articular cartilage. It also means the joint can be used much earlier, significantly shortening rehabilitation.

Chondro-Gide bilayer collagen membrane

Swiss company Geistlich has made a significant contribution to advancing the treatment of cartilage injuries through the development of the new type of collagen membrane Chondro- Gide. This membrane covers the defect and the replacement material used to fill it and holds it in place. In Europe, the previously used product now hardly used because all too often the tissue becomes overgrown (hyper- trophy) and patients experienced com-
sistent pain requiring further opera- tions. The new collagen membrane decreased these undesired late effects.

Chondro-Gide consists of collagen of porcine origin. The membrane’s compact, smooth outer layer prevents permeation by foreign cells. The porous inner layer consists of colla- gen fibres that promote cell adhesion and stimulate cell growth. The config- uration of the fibres ensures high ten- sile strength. The membrane can be fixed with fibrin glue, sutures or pins, which prevents it from sliding or dis- placement resulting from mechanical strain. Spontaneous disintegration of the membrane through resorption takes about 3-6 months.

As Prof Steinwachs explained, in 99% of cases the methods have been used on the knee joint; it is also possible to use them to operate behind the kneecap. ACI has been used since 1988 although, unfortunately, it turned out that the fibrous cartilage that developed lasted only on average for three years. With AMIC plus Chondro-Gide it should be possi- ble to achieve much better results, he said. However, as this procedure has only been used for 3.5 years no con- clusive statistics are available yet.

One major problem with this proce- dure is cost. Surgical costs of ACI and AMIC are about the same and cov- ered by medical insurers. However, with AMIC there is an additional cost to cultivate the cells – around 7,000 Swiss Francs. So far, medical insurers do not cover this. Perhaps, given suffi- cient data from follow-up studies, this will change.


Orthopaedic surgery in France: cause for concern?

While consensus varies according to source as to the number of orthopaedic surgeons in France, all statistics point to a steady decline of the number of quali- fied specialists and particularly in the numbers entering the specialty. In 1999, orthopaedic surgeons repre- sented 5% of all surgeons in France; by 2002 this percentage was 10.9%. However, demand for orthopaedic surgery has not followed a similar downward path. Information from National Statistics (CNAM) shows a progression of 4.95% in surgical con- sultations and operations since 1998. In 2003, SOFCOT (National College and Union of Orthopaedics) conducted a survey of French adults. The results sug- gested that about 12% of adults seek some form of orthopaedic consultation annually – roughly 2.3 million people, if we include the paediatric population, according to another survey 1.6 million young people required orthopaedic treat- ment in the year preceding the survey and 163,000 of these underwent surgery.

Closer inspection shows that not all these operations were performed by specialists. Figures from CNOM (Council National de l’Ordre de Médecins) sug- gest that 27.5% of orthopaedic and emergent surgical interventions are carried out by surgeons with no real specialist qualification.

Modelling presents different epi- demiological methods has indicated a need to train 201 more orthopaedic sur- geons to satisfy legal requirements from 2003 onward.

The average age of qualified orthopaedic surgeons is 46.8 years; this is higher than the national average (44.6), and 78 of them retired between 1998 and 2007. Amongst paediatric specialists, 66 retired over a 10-year period and only about half the number of young surgeons qualified to replace them. If we consider it takes six years to train, spread over five years, this equates to a deficit of 40 orthopaedic surgeons per year. Extrapolation of these figures gives a deficit of 192 this year, 212 in 2009 and 219 in 2010. To overcome the problem 192 sur- geons should have qualified this year. Why is this not happening? One major reason is the increase in insurance pre- miums paid, even for the number of patients at risk of fracture, but who would not be candidates for preventive therapy using the Frax score. By incorporating the Frax calculator into our bone densito- meter systems, we dramatically cut the number of patients being treated for potential bone fractures, explained Kevin Wilson. The college of orthopaedic surgeons in the United States, the National Osteoporosis Foundation, in collabora- tion with other physician groups, has issued guidelines recommending that a patient’s 10-year fracture risk be calculated with Frax by physicians to determine whether pha- macological treatment is indicated for prevention of bone fractures.

Hologic points out that upgrades to Hologic’s bone densitometers...
Targeting market needs

The hybrid OT meets the needs of modern surgery

Recent developments in surgical techniques, e.g. trans-catherter valve replacement, now promise far better results by combining surgery and interventional procedures. The ideal environment for these treatments is the ‘hybrid operating theatre’ (OT), an integrated operating theatre with high-end imaging capabilities for interventions. As a vendor of the highly sophisticated angiography system Artis Zeego, Siemens Healthcare has established a new business unit to focus exclusively on the implementation of Hybrid OTs. The Artis Zeego angiography system is based on robot technology and systems from partner companies, depending on customer needs.

Mikke Lernew, of European Hospital, asked Professor Axel Haverich MD, President of the German Society for Thoracic and Cardiacvascular Surgery and Director at the Clinic for Heart, Thorax, Transplant and Vascular Surgery at the Medizinische Hochschule Hannover, in Germany (MHH), and Professor Georg Nollett, Director of the new Siemens unit in Erlangen, about this development and its potential.

The technological challenge in hybrid operating theatres lies in the development of a fully integrable imaging system in the theatre that also results in a practical environment for surgeons. Of course, imaging takes up a lot of space and impacts on hygiene requirements for the theatre, so the challenges lie particularly in planning, Prof Haverich pointed out.

‘To tackle planning needs, every individual application to meet surgical needs are being developed and tested at the new Siemens unit. ‘Next Siemens Healthcare with the Artis Zeego we have other manufacturers involved in our hybrid operating theatre business, for example, those that produce operating theatre equipment that we cannot offer,’ Prof Nollett explained. These, he added, are not competitors but partners, who contribute their experience to develop the best solution for customers. Prof Haverich, for example, has been working with a new hybrid solution for four months. ‘We are talking about an outstanding set-up, particularly for the patient, because he benefits from receiving a surgical result that has been constantly controlled during the intervention,’ he said. Thanks to integrated imaging, the patient is often spared a further intervention. For example, with aortic aneurysms we had to carry out surgery but were only able to check results afterwards. Today, this is a minimally invasive intervention and the stent is custom-fitted in the aorta, he explained, so that the result is optimal.’

Hybrid operating theatres will also play a significant part in aortic valve insertion, with valves fitted via a small chest incision. ‘We are due to start the procedure in Hanover in a few months – we think it is very promising,’ Prof Haverich prophesised.

On the subject of radiation exposure, he explained that examination times have been considerably reduced thanks to up-to-date technology and that radiation intensity would be no more than for angiography in a cath lab. ‘The point is, we can now combine the surgery with the necessary imaging procedure.

As for future product developments, Prof Nollett mentioned even more specific applications for cardiac surgery that will make procedures such as valve replacements even easier. Other future options include implant libraries, each to be custom-fitted in the aorta. Another objective for imaging is the conversion to 3-D imaging, which, said Prof Haverich ‘...is very important for surgery, as it would lead to more safety. After all, we operate in a three-dimensional space.’

The costs of a complete solution such as this can be offset against the number of operations saved, shorter aftercare and therefore shorter hospital stays and, above all, lower risks for patients. All of which makes hybrid solutions – currently much in demand in Europe, the USA and Asia – very attractive. On this, the professors agreed: ‘Imaging is moving into the operating theatre; it is definitely the trend for the future.’

In October, the office of the Federal President announced that Professor Haverich, with his Hanover research team, has been nominated for the ‘German Future Prize’ for the development and successful use of adaptable biological heart valves.

By Olga Ostrovskaya
EH correspondent in Russia

EurAsia Heart

The Swiss charity EurAsia Heart, founded in 2006 by cardiac surgeon Professor Paul Vogt MD, at Zurich University Hospital, emerged from numerous contacts being made with Asian heart surgeons at the beginning of 2000, and consequent invitations to perform surgery and lecture tours in China. At that time Prof Vogt realized there was little benefit for surgeons from other countries to visit Switzerland, to listen, see how Swiss surgeons worked, but not do anything themselves. As a result he formed the EurAsia Heart to enable European surgeons to operate in other countries.

The organization now has a medical network in Eastern Europe and Asia and a team of surgeons are committed to working for the foundation. Their aims are to provide poorer patients with appropriate treatments and to lower mortality from cardiovascular diseases worldwide. The charity has international partners in countries such as China, Vietnam, Malaysia, Thailand and Africa, who want to help with the surgery and support the organization.

In Russia, many patients cannot receive the good treatment they need. The mortality rate for cardiovascular diseases is 25,300-100,000. Anxious about education of young surgeons in Russia (many modern medical centres were built, but the country had very few great surgeons), in 2005, Professor Evgeny Shlyakhto MD, Director of the Almazov Heart Centre in Saint-Petersburg and Corresponding Member of Russian Academy of Medical Science, founded the Russian charity, the Almazov Foundation. The charity, the Almazov Foundation. The
Maquet: CardiHelp makes proven technology unusually usable

With CardiHelp and the oxygenator pump unit developed especially for cardiac surgery, Maquet has further augmented the integration of components, which began with the QUADROX-i1. Apart from the arterial filter, accessible as an option, a new feature of the unit (QUADROX-iR) is a fully integrated centrifugal pump. Further development of the proven and tested QUADROX system now allows a minimal filter volume thanks to the pump unit and its design. The oxygenator pump unit guarantees constant blood flow, low pressure drop and, in conjunction with a low surface contact, minimal damage to blood. This has further optimised the principle of exact propofol circulation support (MECC) for cardiac surgery.

Apart from the use in cardiac surgery, Maquet has developed a product for long-term use in intensive care. In addition to an oxygenator, specially designed for long-term use, the machine also includes a cardiac support system. The so-called VAD system, in the shape of a novel centrifugal pump, and the integrated oxygenator interface is referred to as the HLS module. This heart-lung support module also contains the sensors for venous, internal and arterial blood pressure and the arterial temperature.

The premium line of products, known as HLS Module Advanced, takes the concept even further. In addition to the pressure and temperature sensors, this is the first time that a system offers the determination of the essential parameters of venous saturation (SvO2), haematocrit (Hct) and haemoglobin level (Hb) as well as venous temperature (Tv) with the help of a high-tech sensor. Up to now it has only been possible to measure these parameters with an external blood analysis unit.

The product has a license to be used for transport and a license to be used in emergency medicine for a minimum of 14 days.

Professor Christof Schmid MD, Director of the Clinic and Polyclinic for Cardiothoracic and Vascular Surgery at the University Hospital Regensburg, Germany.

The mobile heart-lung machine also ensures sufficient oxygen supply and stabilises circulation during inter and intra-hospital transportation.

The connection of disposable products is also easy. The connection of the HLS module (heart-lung support module) is located directly on the back and can be connected to the machine within seconds via a simple plug & play principle. The CardiHelp system can be adapted to specific requirements in the operating theatre, intensive care ward and for transportation in three operating modes and with three disposable products.

In September 2008, Dr Albrecht Borschbeere (right) changed roles within the Maximal Medical School (MHS): the anesthetist became a manager responsible for the coordination and capacity utilisation of the school’s 41 operating theatres. ‘Re-organisation is not an embellishment’, he reflects ‘but a necessity brought about by changing times – a tangible implementation of changes then makes it possible to improve the work environment and synchronise a wide range of working processes, such as accounting, purchasing and personnel management. This particularly applies to the adjustment of necessary working conditions. However, a surgeon’s individual commitment is just as important, yet often underestimated. ‘We have to prepare for the fact that, in future, we will probably have a kind of overtime in general. An extra hour is often needed during core working hours. Over-qualification is a key element – in precisely that order, he explains.

Tips for a theatre manager

Albrecht Borschbeere recommends careful analysis of the causes of target and performance discrepancies. The re-organisation process should take place in small steps, concrete steps to make it truly feasible. Objectives should be achieved without stress, because stress is the main cause of mistakes. He warns against losing the grasp of the basics, i.e., the basic relationship between doctor, patient and care, by obsessing with secondary processes, such as accounting, purchasing and personnel management. Optimising patient care in the theatre, on a qualitative and financial level, is the main objective – in precisely that order, he concludes.

You can set an example for colleagues by taking the initiative and actually carrying out necessary changes. This particularly applies to the adjustment and synchronisation of work schedules. This tangible implementation of changes then makes it easier to tackle further necessary adjustments because the reorganisation process has begun.'
Cross-enterprise electronic healthcare records (eEPA) in Europe

The creation of standardised cross-enterprise healthcare records in Germany will be increasingly promoted in numerous national initiatives and projects spanning several manufacturers, e.g. by the eEPA initiative for the electronic case file headed by the Fraunhofer Institute FIT. However, how can these projects be assessed in an international comparison? What experiences and successes are available in neighbouring European countries? Looking across the border is worthwhile, especially regarding cost-benefit reasons and also as a step towards harmonisation across Europe in the healthcare sector.

Cross-enterprise records usually mean electronic case files focused on the patient and/or the treatment. Depending on their purpose, these files have a permanent or time-limited validity and are always subject to patient approval, which, of course, can be partially or completely withdrawn at any time. Users of these files are predominantly physicians involved in the treatment – unlike the medical files maintained by a patient.

In the future, case files will be able to include any type of medical information. Their purpose and challenge are not only the accumulation of information, but also the structured storage of information and the possibility of its use in different recipient systems – in other words, neutrality with regard to manufacturers. For this reason the future consistent support of international standards is a necessary condition. An example worth mentioning here is the IHE XDS standard (Integrating the Healthcare Enterprise Cross-Enterprise Document Sharing), which facilitates the registration and distribution of and access to, electronic healthcare records across several health sector enterprises. At the same time it provides an interoperable approach based on standards for the joint utilisation of documents between enterprises in the healthcare sector from the general practitioner (GP) via the clinic to the aftercare. The XDS standard has already been successful in a multitude of national initiatives, e.g. in Canada, France and Austria.

When comparing the different approaches and projects in European countries, the NPIIT (National Health Program for IT) at the UK’s NHS (National Health System) is certainly an exception due to its dimensions and implementation status. The target set by the government is the centralisation of information in healthcare record systems for 30,000 general practitioners and 300 hospitals and health centres. However, in countries such as Holland and Austria interesting projects have also begun and can already show first results in some cases. In Austria, since 2006 the project ELGA (electronic healthcare record) represents a very promising initiative, although not too publicly well known. However, the production costs, with an estimated €30 million during the design stage, are quite considerable. Nonetheless, nationwide implementations are planned for 2009. On the other hand, in the Netherlands efforts are still relatively new. The recently started NICTZ (National Institute for IT in de Coöperatie initiative, with the working title MMS (Multimedia Sharing), is still in the early planning stages and implementation phase.

Although national projects now exist in many European countries, given a European border without borders, how can those national initiatives be integrated into a common European context? An example is the use of internationally active IT providers who consistently use international standards in their solutions. iSOFT, for example, is currently working on a cross-enterprise electronic healthcare record system as part of the Lorenzo Integrated Care Initiative, combining the requirements from Germany (eEPA) and the Netherlands (MMS) into a single product. This will allow patients presenting for treatment in border areas, e.g. in the Aachen/Maastricht region, to make their electronically stored and patient, treatment-related data available to physicians in both states in future.

Efforts for harmonisation across Europe could also arise from Brussels. With the European eHealth Action Plan (2004), the development of which currently involves 12 EU member states and about 30 industry partners, its objective is the creation of an EU standard for interoperable healthcare record systems (EHRs) and a bundling of the requirements for systems, as well as a political adjustment of the necessary legislation in the countries (EU guidelines). The above-mentioned stringent utilisation of international standards also make integration of the nationally created record systems even more probable.

In September 2008, twelve EU member states signed a new initiative aiming to revolutionise the way Europeans, no matter where in the EU, can access their health records electronically. The European Patient Smart Open Services (ePLOS), known as the Large Scale Pilot, is a bold attempt to break down barriers that block the way to offering seamless healthcare to EU citizens who fall ill in a country other than their own.

These barriers exist because European states all developed their own ways of storing medical data with no attempt to make those systems ‘talk’ to each other. Consequently, European lives have frequently been at risk when medical authorities could not access their health records.

With a mandate to run for three years, health authorities in Austria, the Czech Republic, Denmark, France, Germany, Greece, Italy, the Netherlands, Slovakia, Spain, Sweden and the UK will attempt to prove that interoperability can work despite the different medical heritage of each participating state.

Three years may not seem a long period in which to make a step change in how healthcare can be delivered, but it is important to remember that the project aims to work with whatever infrastructure already exists. Initially, this will involve countries in deciding how medical data from healthcare can be shared with their partners and then producing best practice models to achieve this.

To attain their objectives by 2011, the 12 member states have an ambitious timetable. Structured roll-out will enable several pilots under the project to start with a full audit of member states’ current status. The participation of only any legal considerations the project may throw up; development of technical considerations to ensure secure use of personal data and ending with a near-real life beta test.

The project’s chances of success have been considerably boosted by the level of political buy-in received. Progress among the twelve EU member states should provide a good working model of how a national system will work after the model rolls out to 27 EU countries. Furthermore, the thirty to forty projects will also work closely with the CALLIOPE network (Call for Interoperable eHealth Services) to ensure benefits can be shared with non-participant countries. During the project, the network will be consulted on specific topics and contribute to raising awareness around the network and the overall issue of interoperability of eHealth services.

In July 2008 the EC’s recommendation in July to work towards cross-border interoperability of eHealth architectures is also a good indicator of how this pilot is mapping into the zeitgeist for universal access to electronic health records across the EU.

The goodwill among all stakeholders for the pilot’s success is also tremendous. Along with the EC’s backing (funding 50% of the project), and that of the 12 participating member states, European industry, which was previously hesitant to play a part in jeopardising research and investment in proprietary legacy systems, is now lending support. Among major vendors, the feeling is that, far from destroying value, a role in helping to harmonise Europe’s healthcare system offers an opportunity to gain worldwide leadership positions in electronic healthcare – a real step away from the past.

The Large Scale Pilot offers social and economic benefits to all stakeholders and will be keenly watched by the other EU member states, which could benefit from the pathfinder’s efforts. It will also be keenly debated at the World of Health IT conference (26th Nov – 4th Dec, Nuremberg), where several of the scheme’s architects will offer feedback on current progress and share views on how the project will evolve up to 2011. It is in all Europeans’ interests that this project, which only a few years ago would have been considered impossible, becomes a success: let us hope they seize this opportunity wisely.

Links: www.eplos.eu www.worldofhealthit.org
REAL TIME EPRS GO MOBILE

Medical professionals have immediate access to patients’ clinical records. They are able to check results and to ask for internal consultations.

Spain – An article in the leading US business publication Forbes magazine recently predicted: ‘mobile technology will be the future of medical care.’ The use of mobile phones to access electronic patients records (EPR) for patients in Torrevieja Hospital gives credence to this prediction. Developed jointly by Microsoft and Torrevieja Salud, the Florence Mobile makes this the first hospital to provide its physicians with real-time internet mobile access to EPRs.

‘Beyond the inherent advantages of the Florence Mobile as innovative IT, the new tool proves us with the capacity and infrastructure to develop such a technology. And this is so because we apply state-of-the-art features developed by Microsoft,’ said, Manager of Torrevieja Health Services.

The Florence Mobile

Using this new technology, Torrevieja’s healthcare professionals can access the EPRs anytime, anywhere via their own mobile phones, giving them the medical data of any hospitalised patient: name, number, status, clinical results, etc. Moreover, Florence Mobile goes further into an interactive technology, allowing a physician to manage consultations through his/her cell phone.

Access to medical records is implemented via a highly secure connection that guarantees data privacy. If the system registers no activity during a 10 minute period, it automatically logs off. For example, if one patient in an emergency room (ER) needs an internal consultation with a nose and throat specialist, that physician will be able to check the patient’s status and to give advice to the ER physician through an internet mobile connection.

Luis Barcia adds that Torrevieja Salud is holding a leading position in IT developments in healthcare. The company has invested over €4 million in the development and implementation of innovative IT systems that have turned Torrevieja’s into a real online hospital.

Specifically, Torrevieja Sahub has jointly developed with Microsoft (systems), Servicom (infrastructures) and Hewlett-Packard (hardware), the healthcare system Florence, which centralise all clinical and administrative information, controlling parameters such as medical appointments, waiting rations or patient’s flow.

Recently, the Spanish company set in motion an SMS alert system addressed to healthcare professionals, to alert them regarding any changes in a patient’s status or to inform them about the availability of medical results. ‘Doctors were therefore immediately and permanently informed of any news concerning their patients and they needed nothing else but to get to the nearest PC in order to visualise the new information. Now, and thanks to Florence Mobile, the physician will be able to visualise all the information received via SMS from his/her cell phone – no more need of a PC, and will be able to act accordingly immediately. X-rays results can be consulted or extra tests requested just through the doctors’ pda or cell phone.’

The Florence Mobile (right), which was presented at the Microsoft Iberia Meeting in Budapest. This new device fulfils Forbes’ predictions of ‘mobile technology’ being the ‘future of medical care’, says Luis Barcia.
Web 2.0 makes the electronic health file look old

Web 2.0 is a ‘buzz’ phrase used to describe users’ involvement with the internet. This form of electronic exchange of influence is still fairly rare. ‘This reluctance regarding new development is typical in medicine,’ remarked Professor Frank Uckert, Junior Professor at the Institute for Medical Informatics and Biometry at the University Hospital in Munich, Germany, who discusses this theme at the IT forum MEDIA MEDICA at MEDICA (11-14 November). ‘I’m convinced that this development is necessarily good. But we mustn’t ignore the internet as a medium. We have to prepare for what is going to happen,’ he added. ‘After all, at one time there was even skepticism about the introduction of the telephone into medicine – for many doctors the only thing that counted was direct contact between patient and doctor.’

This perhaps explains why Google-Health, which bases its health information source for the general public on the Internet search engine, is flippantly referred to by many German doctors as ‘StudiVZ for the Sick’.

(Explanation: StudiVZ is a highly popular, Berlin-based social networking platform mainly for college and university students in the German-speaking countries; however, certification of such services may be hasty. Microsoft, and partners, has commenced a similar project. Named HealthVault, this aims to set international standards, and if that happens it will probably be irrelevant what patients, doctors, medical insurers and those involved in data protection want from an electronic health file – it may be outdated before it could even be introduced.

Professor Uckert is among the initiators of the electronic health file at the project ‘Hospital Information System’. During the following three years, up to the end of 2013, the AP-HP group has the advantage of quick accessibility, similar traditions and expertise, compared to the French industry.

Agfa HealthCare at RSNA 2008

Agfa HealthCare has won a contract to install the Orbis Clinical Information System (CIS) in 37 hospitals in the Assistance Publique – Hôpitaux de Paris (AP-HP) group. The order is worth €9.5 million. ‘It is the biggest contract ever in Europe for a hospital information solution and paves the way for our position as a leading company in France,’ said Christian Reinnaudo, President of Agfa HealthCare.

The AP-HP is a public health organisation comprised of 37 hospitals with a total of 36,000 beds, serving a million in-patients annually in the Ile de France region. Agfa HealthCare has put together a multidisciplinary team to ensure the progressive implementation of this project. ‘The programme is divided into three phases,’ Christian Reinnaudo explained. ‘The first runs for 18 months, during which we will adapt our software platform to the hospitals’ needs, since the modular design of Orbis allows for specific customisation. Then, we will team up with the AP-HP team and have six months to deploy our IT solutions to the first three pilot facilities. During the following three years, up to the end of 2013, the AP-HP and its teams will deploy Orbis into all other hospitals.‘

‘To bring the project to a successful conclusion, the company will manage a consortium with Cap Gemini, HP and Oracle.

Agfa HealthCare’s leading Hospital Information System

As neighbours of Germany, France and its manufacturers have the advantage of quick accessibility, similar traditions and a European presence. This October, to further trade relations, the Department for Economy and Trade at the French Consulate in Dusseldorf, invited German hospital buyers to meet French companies. ‘We see ourselves as mediators between companies and purchasers.‘ Bertrand Le Tallec, Head of Economics and Trade Department, told Denise Penchez, Head of the Investment Goods Department, and Martin Winder, Head of the Communication and Services Department.

Agfa with its show of its state-of-the-art solutions in ‘Computed Radiography (CR) and Imaging Informatics, with a strong focus on its Impax Data Centre for Enterprise Image Storage and Management and advanced tools for Enterprise Clinical Visualisation and Integrated Workflow for Radiology.

37 French hospitals opt for Orbis

Heidi Hanselmann: ‘in the St Gallen canton we now have an administrative council for new hospitals. This council helps us to utilise joint resources in a better way’

French firms meet Germany

This two-day event, held in Notwil, Switzerland, in September, hosted over 1,600 participants and 80 exhibitors, and attracted about 100 media, than in years, up to the end of 2013. The issue is not to generate quantity but to steer the decision-making players in healthcare towards action and quality, because Switzerland, as a country lacking in commodities, is in particular need of this innovation.’

Heidi Hanselmann, Administrative President, District President and Principal of the healthcare department in the St. Gallen canton, also underlined the importance of the working group (federation/cantons), which will decide on Swiss standards as a next step. This canton has recognised the importance of eHealth and, in line with solutions developed by other cantons, as well as by European neighbours, will further actively optimise, as well as dispel fears and promote its qualitative advantages.

Report: Guido Gebhardt

8th Swiss eHealthcare Congress

Willy Oggeri: ‘Health is the last technology that an attitude towards life’

From left to right: Eric Barrey, Alain Jampi, (European Hospital)
The Hitachi HealthXchange Module and Mawell M7 solution

Mark Clark, Hitachi Data Systems Director for e-health solutions EMEA, explained: ‘By partnering with Mawell, we’ve combined the company’s sophisticated medical software with our advanced storage technology. The result is a data management solution tailored to the exact needs of healthcare providers across Europe. Medical staff can now enjoy a new level of simplicity and fast access to patient records and images. Virtualisation will soon be an integral part of healthcare IT systems, and by using Hitachi storage, hospitals and clinics can benefit from our unrivalled expertise in this area.’

The Mawell M7 medical imaging solution manages multimedia clinical content and electronic health records across multiple sources, Hitachi reports. ‘It is a data management solution that allows healthcare organisations to real-time access patient records from any location. The archive also features automated policy management that allows healthcare organisations to comply with government regulations on data retention, integrity and security.’

The Hitachi HealthXchange Module provides a scalable platform to archive digital medical images, electronic health records and associated data from the various healthcare systems such as PACS, Radiology Information System (RIS) and Healthcare Information Systems (HIS). Through the Hitachi interface, users can quickly search, locate and retrieve patient data from the Hitachi archive, as needed. The archive also features automated policy management that allows healthcare organisations to comply with government regulations to ensure content authenticity, retention and integrity. Hitachi HealthXchange Module is a fully integrated component of Hitachi’s Content Archive Platform (HCAP) and supports Hitachi Data Systems’ Services Oriented Storage Solutions (SOSS) approach to storage management.

Petri Morko, PR and marketing manager for Mawell, pointed out: ‘Electronic patient data is continuing to evolve and new storage-intensive formats, such as video and bio-signals, will ensure storage requirements grow exponentially. At the same time Hitachi’s leadership in storage and storage virtualisation perfectly complements our expertise in virtualised patient informatics.’

Event report: European Healthcare Buyers’ Meeting

Increasing populations and the additional storage requirements for a spiralling volume of their medical data cause acknowledged concerns among healthcare organisations. A straightforward CT scan, for example, produces 250 MB of data, while an in-depth colonoscopy study can generate files up to 2 GB. In addition to such hefty storage needs, other patient information also needs to be quickly accessible to hospital staff.

To address this issue, Hitachi Data Systems, provider of Services Oriented Storage Solutions (SOSS), teamed up with Mawell, the European healthcare software company, on a year-long project to bring highly scalable data management solutions to a wider European healthcare audience. The result is the Hitachi HealthXchange Module and Mawell M7 solution.

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The Mawell M7 medical imaging solution manages multimedia clinical content and electronic health records across multiple sources, Hitachi reports. ‘It creates a virtual network within the healthcare organisation, and can be extended to include other healthcare providers in different locations. Through virtualised patient informatics, it consolidates this data and presents a single view of patient information tailored to the needs of the healthcare professional.’

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Advanced laser technology

Mediclase manufactures and distributes sophisticated medical laser technology. The firm’s DermaXel CO2 laser emits continuous or pulsed infrared radiation that is highly absorbed in water. Since any soft tissue is composed mainly of water, tissue at the focal point of the laser beam is instantaneously vaporised, leaving behind a thin necrotic layer of tissue that assures haemostasis, and stimulates creation of collagen in skin resurfacing procedures, Mediclase explains. Laser surgery is widely applied in a variety of human surgical specialties such as otorhino-laryngology, gynaecology, neurosurgery, plastic surgery, dermatology and oral and maxillofacial surgery. Out of several available laser types, the CO2 laser is considered the worth-while of laser surgery due to its unique capabilities in performing precise, haemostatic incisions, excisions and ablations of tissue. CO2 laser surgery is implemented in a freehand mode, in microsurgery and in rigid endoscopy, enabling surgical precision to a fraction of a millimetre, the company adds. ‘CO2 surgical lasers for human surgery are installed in thousands of hospitals and clinics around the world. These systems have so far been too large and too expensive for small to mid-size clinics. The DermaXel CO2 surgical laser now offers medical professionals the advantages of CO2 laser surgery in a cost-effective and affordable system.’

The DermaXel laser is a workhorse of laser surgery due to its unique capabilities in performing precise, haemostatic incisions, excisions and ablations of tissue. CO2 laser surgery is implemented in a freehand mode, in microsurgery and in rigid endoscopy, enabling surgical precision to a fraction of a millimetre, the company adds. ‘CO2 surgical lasers for human surgery are installed in thousands of hospitals and clinics around the world. These systems have so far been too large and too expensive for small to mid-size clinics. The DermaXel CO2 surgical laser now offers medical professionals the advantages of CO2 laser surgery in a cost-effective and affordable system.’

Non-invasive diagnostic devices for sleep and endothelial function assessment

Bio-medical technology firm Itamar Medical Ltd develops and markets diagnostic medical equipment based on its proprietary Peripheral Arterial Tone (PAT) Technology. The Endo-PAT2000 is a non-invasive, reliable & reproducible diagnostic medical device that assesses endothelial function based on its proprietary Peripheral Arterial Tone (PAT) Technology. The Endo-PAT2000 is a non-invasive, reliable & reproducible diagnostic medical device that assesses endothelial function based on its proprietary Peripheral Arterial Tone (PAT) Technology. It is validated by over 100 publications and abstracts, providing a perfect combination of natural sleep with sophisticated data.

Endo-PAT: assessing cardiovascular risk

Dubbed ‘the ultimate risk among risk factors’ for over a decade, endothelial function has been recognised by physi- cians as the critical junction between risk factors and clinical disease. Today, many clinicians see atherosclerosis as the clinical manifestation of endothelial dysfunction. The Endo-PAT2000 is a non-invasive, easy-to-use, user-independent medical device that assesses endothelial function, the manufacturer explains. ‘The 15-minute, office-based test provides immediate, reliable and reproducible results. It has been validated by nearly 100 publications and abstracts, and is used in eminent clinical institutions, research centres and pharmaceutical studies. The Endo-PAT2000 is becom- ing widely recognised as the standard methodology for endothelial function assessment and is part of the universal efforts to arrest progression of the CVD pandemic.’
Ear device opens Eusthician tube

Middle ear inflammation often involves treatment with steroids and pseudo-epinephrine to reduce oedema, and antibiotics to combat primary bacterial infection or a secondary complication. If all this fails and inflammation recurs, perforation of the tympanic membrane is carried out and drainage tubes inserted to keep it open and allow fluid in the middle ear cavity to drain out. In this way pressure is equalised and hearing improves; additionally a topical medicinal treatment can be introduced to the area.

However, Eardoc – a new non-invasive device that naturally opens the Eustachian tube and heals the ear – may prevent such measures all together. According to the manufacturer, a study performed by the Medical University of Hungary showed that Eardoc generates and transmits vibration waves that travel through the bone to the middle ear, thus opening the Eustachian tube. The waves then drain trapped fluids and ease the pressure, subsequently relieving pain.

Device details: www.eardoc.info/

MEDICA 2008

The Israel Export and International Cooperation Institute (IEICI) is the major organiser of our country’s participation at Medica.

To find out more about business opportunities in Israel’s life science industry, please visit the IEICI at Hall 16, Booth E27. Further information: http://www.export.gov.il/Eng/

Refurbished systems

ElsMed Ltd takes pride in providing fully-refurbished diagnostics equipment, servicing/ training, application/clinical user training, parts and technical support, all reportedly at affordable prices. The firm’s services range from initial consultation and evaluation to complete turnkey projects, installation and ongoing maintenance of advanced diagnostic imaging systems.

Refurbished equipment – Currently, the firm specialises in the refurbishment of all Philips Mx8000 CT Systems (2, 4, 16, and 64-slice) and The Elscint McTwin (Flash) CT System, as well as GE’s Elscint Nuclear Medicine Gamma Camera, single and dual head: SPX4, SPX6, VG Millennium (Hawkeye).

‘The equipment performs and looks and works like new’, ElsMed points out. ‘The refurbishment process brings a system to its original specifications and functionality in a dedicated refurbishment centre.’

Turnkey projects – ElsMed reports that it has successfully installed over 150 systems worldwide, and it services over 70 of these directly. These countries include Israel, the USA, France, Italy, Holland, the UK, Germany, Norway, Greece, Cyprus, Portugal, Ukraine, Moldova, Russia, Ethiopia, Puerto Rico, Chile, India, Mexico, Colombia and Iraq.

Ongoing parts & technical support – Experienced field engineers and factory trained support specialists are available 24/7, the firm points out. So are remote diagnoses and unlimited phone support. Its inventory (at reduced prices) is also large, and delivery quick.

ElsMed adds that it operates and maintains a quality management system applying ISO 9001:2000 standards.
В больницах Чехии экономят воду

По недавно опубликованным данным, в больницах Чехии получили широкое развитие и внедрение современные подходы к эффективному управлению водными ресурсами.

Идеи из этих сообщений, разработчики стремятся реализовать в программе все меры, которые приведут к потенциальному перепаду расходов. Работа начинается с первых, более локальных изменений, касающихся незначительных, касающихся применения оборудования для обработки водопроводных кранов, умывальных, душевых, прачечной. Затем, постепенно, приступают к решению вопросов, касающихся улучшения функционирования в контексте экономии воды в специализированных подразделениях.

В целях уменьшения потребления воды больницами, в первую очередь, базовыми университетскими клиниками, предусмотрены следующие меры:
- установка на все водопроводные краны устройств для контроля потока воды, а также установка водосберегающих душевых устройств;
- замена всех санитарных приборов с большим потреблением воды в туалетах на современные, с водоосберегающими клапанами;
- установка систем вторичного использования воды в прачечных в последующих циклах стирки белья;
- организация экономии в процессе работы, так или иначе связанной с использованием воды для очистки. Это включает, например, обеспечение полной загрузки машин для мытья посуды, оборудования в режиме реального времени.

Однако, для успешного решения данных вопросов, в том числе и в контексте упрощения процедур исполнения соответствующих законодательных актов, потребуется дополнительное финансирование и инфраструктурная поддержка со стороны органов власти и общественности.

Европейский форум по вопросам здравоохранения в Гаaseline

В работе единственного европейского форума по вопросам здравоохранения в Гаaseline приняли участие более 600 представителей политики, науки, промышленности, медицины, управления, а также многокультурных неправительственных организаций.

Один из ключевых вопросов, обсуждаемых на форуме, - обеспечение перспективного развития здравоохранения на международном уровне. В поощрение этой тенденции Европейский научный и деловой центр «Авантис» публикует ежегодные награды для лучших проектов, предопределяющих наукоемкость и технологичность подходов, направленных на решение актуальных проблем здравоохранения.

В специализированных рабочих группах, а также в ходе параллельных заседаний были обсуждены целый комплекс актуальных проблем. Целью организаторов было, в соответствии с генеральным девизом форума, «Здоровье и система ценности – от теории к реальности», способствовать тому, чтобы его участники изыскали в рамках европейского стандарта и взаимодействия посредством партнерства, способствующего росту статуса медицинских учреждений.

С точки зрения участников, важно, чтобы таких инициатив было больше, и их результаты стали бы своеобразным образцом для других стран. Роль форумов в этом процессе как раз и заключается в обеспечении взаимодействия между организациями, способствующего позитивным изменениям в области здравоохранения.
Частная клиника «Майн-Таунус» — тело, душа и настроение в руках лучших врачей.

Частная клиника международного уровня «Майн-Таунус» расположена в одной из наиболее успешных в экономическом отношении областей Германии — регионе Рейн — Майн, центром которого является финансовая метрополия Франкфурт-на-Майте. Клиника предлагает своим пациентам самые последние достижения медицины в сочетании с комфортом и великолепную местность.

Частная клиника «Майн-Таунус» входит в группу медицинских учреждений, которая ежегодно обеспечивает медицинское обслуживание, как стационарное, так и амбулаторное, более чем 55,000 пациентов. Она расположена всего в 20 километрах от международного франкфуртского аэропорта — центра путешествий, где приземляются и взлетают в воздух самолеты, практически по всем авиалиниям мира. В то же время, клиника находится всего лишь в 15 километрах от центра Франкфурта-на-Майте.

Клиника предлагает медицинское обслуживание наивысшего уровня, так как её медицинский персонал располагает большим опытом и обширными междисциплинарными знаниями. Врачи работают в постоянном профессиональном контакте с коллегами из других отделений в рамках клиники, а также с коллегами из других клиник. Клиника специализируется на определённом круге медицинских проблем, компетентность и опытность врачей и всего медицинского персонала отвечают высочайшим профессиональным стандартам. Процесс лечения, также как и его результаты, постоянно отслеживаются и оцениваются в соответствии со всесторонними требованиями системы менеджмента качества.

Медицинская концепция клиники подкрепляется принципами холистики, т.е. многокомпонентностью в подходе к лечению пациентов. Организм и духовная составляющая человека рассматриваемся в их единстве, при лечении принимается во внимание этот аспект целостности, а не просто лечение каких-то нарушений, больных органов или систем.

Данной цели также подчинено и оформление интерьера больницы: здесь все направлено на то, чтобы в высшей степени благоприятствовать созданию позитивной, спокойной атмосферы. Это очень хорошо влияет на результаты лечения. Оказываются диагностические услуги, проводится лечение и реабилитация, обеспечивается комплексное лечение путем создания междисциплинарных коллективов врачей в таких ключевых сферах, как, например, лечение онкологических заболеваний.

Ответ «Сименс»: ранняя диагностика и профилактика

Наша инновация — сочетание новейшей лабораторной диагностики, технологий визуализации и IT-поддержки. Это позволяет проводить более раннюю профилактику и точное диагностировать заболевания, что повышает качество медицинского обслуживания.

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Рассчитанный на 13 лет проект изучения генома человека был завершен в 2003 году, он с очень большим интересом был воспринят во всем мире. Молекулярная медицина делает все более глубокие изыскания в мире клеток человека и преобразует наши концепции диагностики и лечения заболеваний. Одним из лидеров европейских центров — партнером со стороны Ирландии в этих инновационных исследованиях, является Институт молекулярной медицины, который осуществляет свою деятельность в рамках Университета «Тринити Корнхолл» в г. Дублин, http://www.tcd.ie/IMM . Институт молекулярной медицины расположен в городе больницы Св. Джеймса, на площади в 4.500 кв.м. Это научное учреждение оборудовано по последнему слову техники и занимается исследованиями молекулярных заболеваний на молекулярном уровне.

Основные сферы работы — это биология клетки, иммунология и генетическая система заболеваний. В изучении биологии клетки большую роль играет методика скриппинга и анализ высоко информационного содержания. Данный методика предусматривает использование микроскопа высокой степени разрешения, который позволяет автоматически отслеживать индивидуальные состояния из 96 лунок. Это дает возможность анализировать большое количество материала. Клетки в лунках остаются живыми, а при помощи новейшего программного обеспечения камеры микроскопа демонстрирует изображения передвижения клеток в режиме реального времени. Если вы, например, захотите увидеть, каким образом цитокин визуализацию или визуализацию с помощью компьютеризированных радиографических систем. Детектор совместим со столами для рентгеновского обследования и со столами для обследования пациента в вертикальном положении. Не требуется специального модифицирования уже имеющегося в распоряжении пользователя оборудования: таким образом, затраты на установку очень невелики. При использовании один детектор может быть использован вместо традиционных кассет плоти для всех видов обследований.

«Система DRX-1» позволяет получать высококачественные предварительные изображения менее чем за 5 секунд, это существенно увеличивает эффективность работы, даже при использовании компьютеризированной радиографии, разъясняет далее производитель.

Таким образом, достигается автоматическое изображение или визуализация с помощью компьютеризированных радиографических систем. Детектор совместим со столами для рентгеновского обследования и со столами для обследования пациента в вертикальном положении. Не требуется специального модифицирования уже имеющегося в распоряжении пользователя оборудования: таким образом, затраты на установку очень невелики. При использовании один детектор может быть использован вместо традиционных кассет плоти для всех видов обследований.

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Центрам предлагаются также все виды пластических операций по увеличению, уменьшению или подтяжке груди.

В целях сохранения подмышенных лимфатических узлов, которые пропитаны кровью, уделяются у пациентов, страдающих раком молочной железы. Центром предлагается метод удаления так называемого сторожевого лимфатического узла (SLN). Это позволяет предотвратить потерю миоректатора от первичной опухоли, который выявляется посредством нуклеарной медицины и удаляется. Удаление больших чисел клеток позволяет ученым установить комплекс эффектов, которые оказывают влияние на результат лечения. Это позволяет врачам улучшить свое понимание и выполнение операции. Результаты могут быть использованы в дальнейшем для определения степени риска развития опухолей.

Институт молекулярной медицины описывает, что если удаление опухоли уже произведено, то это делается с большей степенью внимания. Если же опухоль не была полностью удалена, то это также делается с большей степенью внимания.
Насколько в действительности опасна радиация?
Взгляд на ее опасные последствия

Радиация нельзя зафиксировать визуально, она не воспринимается ухом, не обнаруживается на ощупь, у нее нет запаха, и, тем не менее, она может нанести огромный вред. Это является причиной того, с использованием радиации в диагностике и лечении связано много страх.

Как и во многих других сферах медицины, которая имеет дозу получаемой радиации. В принципе, вредные последствия применения радиации в медицине – то, что помогает, может также причинить и вред. Определение специалиста – решить, какой метод диагностики оптимальен, при этом он должен основываться на информации и методических рекомендациях научного сообщества. За последние годы диагностика врачей и пациентов стала более осознанной, в технологии облучения, включая применение новых методов диагностики, ведутся огромные усилия, направленные на уменьшение необходимой дозы облучения. Получаемая диагностическая информация, таким образом, стала общирнее, и необходимые дозы облучения уменьшились.

ВОЗ вводит новую систему для измерения плотности костей производства фирмы "Холоджик"

«Нолоис» является первой фирмой, которая использует двухлучевую томографию для измерения плотности костей. Сочетание двух лучей позволяет более точно измерять плотность костей и определить риск переломов. ВОЗ рекомендует использование данной методики.

Шарите - Университетский медицинский комплекс
г.Берлин Крупнейшая университетская клиника Европы

Организация. Расходы. Сервис.
Для обеспечения качественного обслуживания пациентов в ШАРИТЕ разработана специальная программа, которая позволяет пациентам оценить затраты на лечение и уход, а также получить индивидуальное предложение. В Наш адрес: Чаритё International, г.Берлин, Клюстендорфстр. 100, ФРГ, 10119, Tel: +49 30 / 450 570 000, FAX: +49 30 / 450 570 977. Email: charite.international@charite.de

Возможности и преимущества диагностики и медицинского лечения в ШАРИТЕ:
1. Двухлучевая томография: позволяет более точно и точно оценить риск переломов и заболеваний костей.
2. Пациенты могут получать индивидуальные предложения и индивидуальное обслуживание.
3. Высококвалифицированные специалисты и современное оборудование.
4. Обеспечение безопасности и комфортности пациентам.
5. Качественное и быстрое обслуживание.

Источник информации:
Современная хирургия опухолей

Главный компонент междисциплинарной концепции терапии опухоли костной и мягкой ткани

В саркомном центре клиники «Charité» в рамках междисциплинарной терапевтической концепции и с применением современных технологий происходит лечение как ворсовых, так и детей с опухолевыми или опухолеподобными заболеваниями костей и мягких тканей, включая метастатические изменения вне зависимости от места их расположения.

При этом спектр хирургических методов распространяется от эксконцию биопсии до гистологического сохранения и мультиспецификации резекций. В частности, может включать методы резекции для определенных отделов:

- опухоли костей и мягких тканей конечностей,
- таза,
- плечевой пояса.

В особенности следует упомянуть:

- периметратабульные резекции,
- резекции крестца,
- кифопласт и вертребопласт.

Предоперационная стабилизация позволяет в дальности, рентгенографии, рентгеновских снимках и на всем протяжении от стационара до реабилитации.

При этом для лечения опухолей неразрывно связаны, разумеется, и методы облучения и гипертермии.

Врач в хирургическом операционном зале в роли хирурга и врача, ведущего лучевую терапию, имеет возможность исследовать важную роль играет онкология, в том числе радиационную. Учитывая это обстоятельство, лечение всех пациентов с подобными заболеваниями совместно обсуждается в рамках консилиума, где также в соответствии с современными онкологическими стандартами разрабатываются индивидуальный эффективный план лечения.

При этом для лечения опухолей применяется стандартная междисциплинарная терапия.

С точки зрения медицинской онкологии здесь доступны все системные методы терапии, но в конкретных случаях могут быть использованы следующие методы:

- метастатические изменения опухоли, а с другой стороны, также эффективное предотвращение гипертрофии костного мозга. С точки зрения радиационной терапии для лечения пациентов с опухолями на пред- и послеоперационном этапе может быть использовано все обычное современное оборудование.

Методы терапии опухолей неразрывно связаны, разумеется, и физиотерапия, призванная восстановить функции суставов и конечностей, а также мобильность.

Все это служит только для того, чтобы обеспечить пациенту наилучшие шансы для лечения опухолевого заболевания и, кроме того, восстановить или сохранить функциональную и полноценную работу конечностей.

Если у вас нет других вариантов лечения, которое бы позволило вам сохранить жизнь, и вы хотите, чтобы ваш врач сделал все возможное, чтобы вы смогли жить, мы готовы помочь вам.

Ваше здоровье - наша главная цель!

Если вы хотите узнать более подробную информацию о нашей клинике или о возможностях лечения, пожалуйста, свяжитесь с нами по телефону или на нашем сайте.

Частная клиника Майн-Таунус ГмбХ

Клиника находится недалеко от финансовой мегаполиса Франкфурт-на-Майне и аэропорта. Мы с удовольствием примем вас, у нас есть персонал, говорящий по-русски.

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Вся статья полностью читайте на интернет-странице www.european-hospital.com

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Сердечно-лёгочный аппарат размером с небольшой чемодан, весящий около 10 кг, может быть легко зафиксирован на любой системе транспортировки больных. Кроме того, аппарат может быть использован не только в операционной, в катетерной, в радиологии, в отделении оказания первой помощи и в других местах, где необходима экстренная помощь. При этом аппарат не требует специальных условий хранения, его можно легко перевезти в любом автомобиле. Так что его можно было взять на борт вертолёта или использовать в автомобилье.

Кроме того, аппарат имеет дополнительные возможности, такие как использование в качестве ведущего создателя новых медицинских технологий. С помощью стандартных модулей, которые можно использовать в операционной, в катетерной, в радиологии, в отделении оказания первой помощи и в других местах, где необходима экстренная помощь, можно создать комплексную систему, которая может быть легко интегрирована в систему транспортировки больных внутри клиники, в операционных вмешательствах, в отделении оказания первой помощи и в других местах, где необходима экстренная помощь.

Доктор Ганс Кристиан Ришке, директор клиники и поликлиники университетской клиники в Регенсбурге, говорит: “Благодаря мобильности аппарата появляются совершенно новые области его применения. Его можно легко транспортировать или применять для поддержки кардиологов в ходе операционных вмешательств с высоким риском”.

Этот сердечно-лёгочный аппарат обеспечивает пациенту во время его транспортировки внутри клиники, из клиники в клинику, необходимым количеством кислорода и стабилизирует его сердечно-сосудистую систему. При весе около 10 кг аппарат достаточно лёгкий, для того чтобы его мог переносить один человек и достаточно компактен (50 см длина, 26 см ширина и 30 см высота) чтобы его можно было взять на борт вертолёта или использовать в автомобилье. Также легко осуществляется подключение дополнительных технических компонентов. Предусмотренное для подключения HLS модуль (модуль помощи сердца и лёгкого) разъём находится на задней стороне аппарата и позволяет подключать эти модули к аппарату в течение срока службы. Кардиохелп может спользоваться с 3 режимами работы и с 3 дополнительными клиническими модулями, которые позволяют приспособить его для работы в операционной, в катетерной, в радиологии, в отделении оказания первой помощи и в других местах, где необходима экстренная помощь.

Фото Кардиохелп (Cardioplex)

Фото аппарата Кардиохелп (Cardioplex) был использован в качестве примера аппарата, который может быть использован не только в операционной, в катетерной, в радиологии, в отделении оказания первой помощи и в других местах, где необходима экстренная помощь.

Университетский медицинский центр «Гамбург-Эппендорф» (UKE) — один из крупнейших медицинских центров в Германии и в мире. Центр пользуется известностью благодаря высокому качеству медицинского обслуживания, а также тем, что своей исследовательской деятельностью прокладывает новые пути в медицине. Новейшие апробированные результаты медицинских исследований в области сердечно-сосудистой системы, в области онкологии и в области инфекционных болезней, а также прогресс в области трансплантации органов и тканей, привлекают к центру пациентов из различных стран.

Центrum UKE отвечает высоким требованиям, которые предъявляют ему задачи лечения пациентов из разных стран. Пациенты, а также их родные и друзья получают медицинскую помощь, которая включает в себя диагностику и терапию; помимо этого, предоставляется организационно-административное обслуживание, как для пациента, так и для его близких, например, услуги переводчиков и персональных тренеров-инструкторов из числа носителей родного для пациента языка.

Университетский медицинский центр «Гамбург-Эппендорф» считается в Германии лидирующим в области исследования, образования и медицинской подготовки; он, в то же время, является надежным источником альтернативных медицинских заключений. Центр UKE имеет специальный отдел для работы с иностранными пациентами, который координирует все органы и обеспечивает высокое качество медицинского обслуживания, а также тем, что своей исследовательской деятельностью прокладывает новые пути в медицине. Новейшие апробированные результаты медицинских исследований, которые предъявляют ему задачи лечения пациентов из разных стран, привлекают к центру пациентов из различных стран. Пациенты, а также их родные и друзья получают медицинскую помощь, которая включает в себя диагностику и терапию; помимо этого, предоставляется организационно-административное обслуживание, как для пациента, так и для его близких, например, услуги переводчиков и персональных тренеров-инструкторов из числа носителей родного для пациента языка.

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Контакт:
тел.: +49 40 42 803 1690
patients@uke.uni-hamburg.de; www.uke-io.de
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