Invigorating Medica’s Education Conference

Collaboration with Europe’s largest specialist medical society brings rewards

Interview: Brigitte Dinkloh

With around 140,000 visitors annually, Medica is doubtlessly the showcase for medical manufacturers. However, although the world’s largest medical fair, the venue is not yet very well known for continuing medical education. This is set to change. With the re-orientation of the Medica Education Conference (MEC) in collaboration with the German Society for Internal Medicine (DGIM), the organiser is hoping for a bigger response and an increased number of visitors.

We asked Congress President Professor Hendrik Lehnert, Director of the Medical Clinic 1 at the University Hospital Schleswig-Holstein, Campus Lübeck, about his expectations and the programme design.

Explaining how the collaboration with Medica evolved and the importance of the congress for the DGIM, Professor Lehnert said that Messe Düsseldorf sought a new partner for the Medica Education Conference. Professor Lehnert explained what visitors can expect from the 2014 edition of the Medica Education Conference.

On November 12 and 13 the Medica Education Conference offers ten events on modern ultrasound for participants to bring their expertise up to date. 10-15% of the programme will be practical seminars and hands-on courses to include, for example, ultrasound seminars, nutrition, endoscopy and diabetes.

Although an hour a day has been set aside for industry symposia, so far there has not been much participation. ‘However, this is not decisive for the success of the congress,’ the professor noted, adding that there will be industry symposia on laboratory medicine. ‘Many are probably waiting to see what the first MEC under our management will be like and then decide to participate next year. Our annual congress includes around 40 industry symposia and I’m sure this kind of participation will develop for the MEC as well.’
As the global prevalence and severity of obesity increases day by day, the challenge for physicians to scan for deep structures and abnormal haemodynamic flow becomes greater when faced with limitations in ultrasound imaging. Mindray’s new DC-8 Exp, an advanced ultrasound imaging solution, is dedicated to minimising those limitations and maximising the effectiveness of scanning difficult patients.

‘Based on the company’s new generation mQuadro ultrasound platform, the DC-8 Exp brings together a new set of innovative solutions to enhance the experience of conducting an ultrasound exam and providing a confident diagnosis for patients across all ages and body types,’ the firm says. ‘The industry’s very first ultrasound system to implement a deep vascular detection solution, the DC-8 Exp incorporates a combination of outstanding processing capabilities, featuring Mindray’s proprietary transducer technology and user-defined interface that enables an expert diagnosis.’

Powerful imaging capability

‘mQuadro, Mindray’s high end ultrasound architecture, empowers the DC-8 Exp to facilitate a fast and reliable diagnosis, making it the optimum choice for examination of Technically Difficult Patients (TDP),’ the firm adds.

‘The new single-crystal technology combined with 3T technology provides a wider bandwidth that gives both better penetration and higher resolution resulting in the best possible scanning solution for TDP. Moreover, the new matrix-array transducer technology uses multiple rows of crystal to help achieve superb resolution of detail throughout the field of view.’

The next level of diagnostic confidence

With the DC-8 Exp, ultrasound practitioners now have the power to handle a comprehensive range of clinical exams easily, including abdominal, cardiovascular, OB/GYN, and small parts, and to obtain extraordinary image quality even on difficult patients. The DC-8 Exp benefits from inventive ART Flow technology for better display of hard-to-detect deep blood flow, and advanced Echo Boost technology for intelligent image optimisation across multiple applications. ‘The new architecture-based technology UWN+ Contrast Imaging and Natural Touch Elastography provide enhanced information for more effective diagnosis,’ the firm notes.

Details: www.mindray.com

A wide variety of sophisticated analysis tools including TT QA/LVO/Stress Echo also enhance accuracy and confidence of CD assessment.

A new effortless experience

“A series of high-level automation tools significantly improve productivity. The intelligent auto-optimisation Smart Doppler tool enables rapid adjustment of colour, PW placement, and angle steering, while auto-measurement tools help the ultrasound specialist to work smarter with less operational fatigue,’ Mindray adds, and explains: ‘The fully customisable iWorks greatly reduces keystrokes and improves exam efficiency, all of which combine to allow more focus on the patient diagnosis. Details: www.mindray.com

Fingertips roll your NEXT

Infection, the tightest space and fast scanning are the three biggest things clinicians must tackle today in a point of care (POC) environment. The manufacturer United Imaging Systems reports that NEXT series ultrasound system removes these complexities and barriers. NEXT features a sealed, easy-to-clean, tempered glass control panel facilitating disinfecting. The ergonomic design, with height adjustable control panel and a large 19-inch monitor on an articulating arm, makes NEXT easy to position even in the most challenging clinical environment,’ the firm explains.

The system also has a small footprint and long battery life for mobility and access at the POC. The most advanced ease of use modes and protocols also ease as well as speed up medicals’ workload.

In the POC environment, the medical system is easy to install and add. The compact, light and elegant design allows the NEXT to be used in even the most critical environments. The system is simple and robust, with a large monitor and a compact keyboard. The NEXT has a touch-screen user interface that is intuitive and easy to use.

Details: www.unitedimaging.com
S-Vision imaging engine provides base for superior image quality and an innovative operating concept

The Samsung RS80A – the perfect ultrasound system for mammography diagnostics

Visiorad is an association of radiology, radiotherapy and nuclear medicine practices which serve the northwestern part of Hamburg and the adjacent suburban areas. Dr Timo Gomille, partner of Visiorad, and his team focus on breast diagnostics. A mainstay of their daily work is the RS80A – the Samsung ultrasound system which impresses with superior image quality and an innovative operating concept.

‘The patient is at the centre of all our efforts,’ says Dr Gomille, ‘but whenever we detect a suspicious finding the patient is immediately worried, whether the concern is justified or not. The better the image quality the more confident is our diagnosis and the easier it is for us to allay any fears the patient may have.’

S-Vision architecture provides detailed and crystal clear images

For breast ultrasound Gomille prefers the Samsung RS80A. ‘We use the system for b-mode imaging and the advanced functionalities for mammographic purposes,’ Gomille explains, pointing at one of the major advantages of the RS80A: ‘superior image quality.’ The technology behind this image quality is the so-called S-Vision architecture: the S-Vision beamformer manages to present both the b-mode and the colour image in high resolution. Moreover, artefacts are eliminated which results in clearer images. The S-Vision imaging engine provides exceptional depth, detail and resolution for all tissues.

Point in case: the retromamillary region. It is difficult to image due to the awkward beam angle which makes it close to impossible to look at deeper tissues. ‘The difference between the RS80A and the previous generation of systems – and even some current-generation systems: the RS80A almost completely compensates attenuation, which is a problem in conventional imaging of the retromamillary region,’ explains Gomille. ‘When we compared different systems by different manufacturers we also noticed that the RS80A is very good with regard to showing target lesion details.’ This advantage, the team of Dr Timo Gomille hopes, will facilitate the decision whether a biopsy is indicated or not.

An intuitive operating concept for improved workflow

The intuitive operating concept is another feature of the RS80A that impressed Dr Gomille, as it makes working with the system very comfortable. ‘Particularly the routine examinations that are a considerable part of our daily workload can generate a certain pressure,’ the physician points out. Approximately 35,000 patients present every year at the different locations of the network including those who participate in the German mammography screening program and those who undergo treatment. ‘Our teams work at different workstations and with different physicians. Nevertheless we want every physician to be able to work at any workstation. Therefore we need simple operation and standardized presets so everybody can reproduce his or her usual image parameters.’

The RS80A can easily be adapted to the individual needs and preferences of the user. The control panel moves in six ways and is equipped with a motorised lift. The foldable monitor and the tilting 13.3’ touchscreen make working with the system safe and comfortable. Gomille’s conclusion: ‘Our team tested different systems and we looked for the combination of image quality and operating concept. The Samsung RS80A delivered.’

Innovative advanced functionalities for confident diagnoses

The RS80A features optional innovative functionalities such as ElastoScan™. Beyond 2D images of the breast tissue, elastography provides colour-coded information on tissue elasticity. ‘A crucial advantage of ElastoScan is the fact that it shows the real size of a tumour,’ says Wim van de Vooren, Clinical Marketing Manager at Samsung. ‘In radiography and conventional ultrasound the size of a lesion is frequently underestimated. Elastoscan however shows the direction in which the tumour grows, a very important piece of information when it comes to tumour resection.’

For Wim van de Vooren the RS80A is a flagship system in the Samsung ultrasound portfolio: ‘We are extremely proud of the RS80A as it allows us to provide exceptional performance not only for breast ultrasound practices but also for the hospital and the research segment.’

www.samsung.de/hme
POC ultrasound takes to the skies

Given their quality, small size, portability and robustness, SonoSite point-of-care ultrasound systems play vital roles in hectic A&E and surgical departments, and also in monitoring patients in transit. Working in Berufsgenossenschaftliche Unfallklinik (BGU), Tübingen, anaesthetist Dr Rüdiger Eichholz believes in the importance of POC ultrasound and has set up a training programme for clinicians who accompany patients with International SOS.

For years, Dr Rüdiger Eichholz has found point-of-care (POC) ultrasound invaluable in anaesthesia, the ICU and trauma medicine for FAST scanning (Focused Assessment Sonography for Trauma), ultrasound-guided nerve blocks and vascular access, plus general cardiac, chest and abdominal scanning.

At BGU, a trauma, orthopaedic, plastic and craniofacial surgery centre, a large part of his work involves performing regional anaesthesia under ultrasound guidance. As a certified DEGUM trainer, he also spends considerable time travelling, demonstrating ultrasound's advantages and encouraging and training clinicians to routinely use the technique.

As a co-ordinating doctor for the German branch of International SOS, Dr Eichholz talked to patients, assessed their needs and helped to solve all kinds of medical problems. This included undertaking face-to-face consultations and often evacuations or repatriations. Although termed ‘emergencies’, the SOS flights do not go directly to or from an accident location.

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In the programme at International SOS, using my knowledge and teaching experience to explain the advantages of POC ultrasound to help flight doctors to make the most of its diagnostic capabilities. Based on the AEN (Armbruster-Eichholz Noethesen) training concept.

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EB @ MEDICA No 1 2014
Resuscitation is always a desperate attempt by an entire team to save a human life. If a reversible cause can be discovered, a patient’s chances of survival increase considerably. All medics therefore know the ‘4 Hs’ and ‘HITS’.

Imagine you had a diagnostic tool that could either confirm or exclude four of these very quickly. Wouldn’t this be fantastic?

Actually, it’s not so much a case of ‘wouldn’t it’ but ‘isn’t it’. With the help of emergency ultrasound, a cardiac tamponade can be diagnosed or excluded at a glance. Modern ultrasound technology also facilitates the mobile use of devices beyond the hospital. Suitable ultrasound scanners are driven, or flown respectively, to accident scenes in ambulances and helicopters.

Eberhard Reithmeier MD, a consultant in the Department of Anaesthetics and Intensive Care at the Regional Hospital in Feldkirch, Austria, has worked with emergency ultrasound for years.

This diagnostic discipline brings together radiologists, internists, surgeons and anaesthetists who carry out standardised examinations and “speak the same language”, despite their different backgrounds, he says. “In this, and for training, interdisciplinary cooperation is at the forefront.”

Ruling out cardiac tamponade

Emergency ultrasound is, for example, used when doctors are looking for the cause of hypotension in a patient. Is the heart not working sufficiently? Is the patient dehydrated? Is it a case of tension pneumothorax? ‘You don’t have to be a cardiologist to see that the left ventricle is beating empty, Dr Reithmeier points out. ‘If this is the case, we rescan the inferior vena cava and will see that this collapses breath-synchronously.’

In this situation, a lack of volume can quickly be differentiated from acute heart failure. A pneumothorax as well as acute right ventricular strain can also be diagnosed with precision.

One of the advantages is the availability of imaging diagnostics in locations with no CT scanner. “This has mainly become possible because of ever smaller and cheaper devices,” says Reithmeier. The scanners are now available from about €8,000 and, thanks to their dimensions, range from real ‘handhelds’ to laptop size, so are also suitable for preclinical use. ‘In a few years I think it will be the norm to have these devices in all ambulances,’ he believes. ‘Currently, it’s down to lobbying by individuals for this type of investment from the respective emergency medical service providers.’

It is up to each individual hospital how ultrasound and CT are used in the shock room. Ultrasound has an important advantage when it comes to the examination of haemodynamically unstable patients. The significantly faster E-Fast examination can

Continued on page 6
confirm the presence of free fluid in the abdomen. Many shock room algorithms then point the way directly into the operating theatre with the need to carry out a CT scan. However, the consultant does not believe that ultrasound is in competition with CT scanning for the majority of patients in the shock room who are haemodynamically stable. ‘The current S3 guideline on polytrauma treatment of patients with severe and multiple traumatic injuries illustrates the problem very well.’

In the intensive care unit (ICU) things look very different: ‘We’ve seen that emergency ultrasound in the ICU can considerably reduce the number of chest X-rays and also the number of CT scans required. Why should I expose a patient to unnecessary radiation when there is an equally good, or even better, and definitely faster procedure available without radiation?’

The fact that emergency ultrasound has an important place on the intensive care ward is now an accepted standard and has therefore become part of teaching. ‘A specialist in intensive care must be able to diagnose a pulmonary oedema on an ultrasound scan if he wants to be awarded the European Diploma in Intensive Care (EDIC). ‘This is now already part of the test,’ the anaesthetist and intensive care expert says.

Monitoring venous catheter insertion

The general rule is that interdisciplin ary cooperation achieves the best results for the patient. During his time in Ulm, the radiologist under took the ultrasound scanning in the shock room, but in Feldkirch it is in the hands of the surgeon or anaesthesiologist. ‘This is done simultaneously, while the other medics care for the patient based on the shock room ABC,’ he explains.

The insertion of central venous catheters is now almost exclusively carried out under ultrasound guidance. The first studies to confirm that the use of ultrasound for the insertion of venous catheters has advantages were published in the 1990s. ‘During the first years of my training the so-called landmark procedure was still being used. These days it’s almost always the ultrasound guided puncture that’s being taught,’ Dr Reithmeier reflects.

A place in anaesthesiology

He is pleased that ultrasound also has its place within anaesthesiology. ‘The entire field of local anaesthesia has been revolutionised by neuro-ultrasound. When nerves in the arms or legs are anaesthetised this is now almost always done with ultrasound guidance. It is quite something, even for experienced anaesthetists, when they see the needle approach the nerve ‘live’ for the first time, followed by the dispersal of the local anaesthetic around the nerve. Why wear a blindfold when you can see?’

Standardised training

As emergency ultrasound scans are performed by representatives of different medical disciplines training standards are needed to assure quality. ‘There have always been calls for this. ‘A joint concept for emergency ultrasound covering three different countries was implemented in 2008,’ Reithmeier reports. ‘Experts from different countries and different medical disciplines came together and agreed on a joint concept, which resulted in a number of emergency ultrasound courses now being offered by the DEGUM, DEGUM and SGUM (Ultrasound in medicine societies in Germany, Austria and Switzerland).

Although not mandatory, there is growing interest in them, because training provides more assurance when scanning and, in times of an increasing need for documentation, training provides a level of support that should not be underestimated. The next important step for the near future will be to integrate these course contents into existing, internal clinical training systems and into specialist medical training.’

In the USA, some patients have been allowed to die while in the CT scanner because the CT scan takes too long for blunt abdominal trauma diagnosis. For this reason, internist Dr Josias Mattli, at Davos Hospital, Switzerland, introduced contrast enhanced ultrasound (CEUS) for initial traumatology diagnoses, setting the course for diagnosis even before patients undergo CT scans.

Mattli knows of no other institution where contrast enhanced ultrasound is carried out as a primary examination to the same extent as at Davos Hospital.

‘Since 2003, I’ve collected documentation on 470 such cases where no abdominal CT scan was carried out at all, but exclusively CEUS,’ he explained. The trauma surgeons only wear a blindfold when you can see? ‘It’s a very fast diagnostic tool that can be used in the shock room while IVs are being started,’ he said. ‘This is a particular advantage for smaller hospitals, where often there isn’t a CT scanner available.’ For this reason, eight years ago Mattli also introduced CEUS as a complementary, focused Assessment with Sonography for Trauma (FAST) ultrasound at the Santa Maria Hospital in Mulhouse, Switzerland’s smallest hospital, and an hour away from the nearest CT scanner.

There may be no question of enhanced ultrasound becoming the primary traumatology scanning tool to diagnose blunt abdominal trauma.

Ultrasound is available everywhere, takes no longer than five minutes and involves no radiation exposure or side effects. ‘It’s a very fast diagnostic tool that can be used in the shock room while IVs are being started,’ he said. ‘This is a particular advantage for smaller hospitals, where often there isn’t a CT scanner available.’ For this reason, eight years ago Mattli also introduced CEUS as a complementary, focused Assessment with Sonography for Trauma (FAST) ultrasound at the Santa Maria Hospital in Mulhouse, Switzerland’s smallest hospital, and an hour away from the nearest CT scanner.

The right diagnosis in just five minutes

The most commonly injured organ is the spleen, followed by kidneys and then the liver.

Most splenic injuries involve tears to the thin capsule and ruptures with or without injuries to the blood vessels. If the conventional ultrasound image suggests an abdominal trauma, perhaps due to the presence of some free fluid, in the abdomen, the traumatologist can quickly escalate the examination to a CEUS scan.

However, if an unstable patient is admitted with symptoms hinting at blunt abdominal trauma, such as injuries to the liver, spleen, kidney or pelvic, CEUS takes an immediate role.

Following his medical degree gained, in 1982 at the University of Zurich, Switzerland, Josias Mattli wrote his medical thesis on ‘Ultrasound in the shock room instruction following surgically treated, complex fresh internal ileus lesions’ at the University of Zurich. He is also qualified in delegated psychotherapy from the FMP (Föderal Association of Neurologists, psychotherapists and ultrasound diagnostics from SGUM (Swiss Society for Ultrasound in Medicine).

As an internal medicine specialist, this year he launched his own ultrasound diagnostics practice.

www.esaote.de

The new Af

45 years of innovation poured into one device

Launched at this year’s Medica, the new Affiniti ultrasound system was developed to help tackle increasing patient volumes and cost pressures, Philips reports. ‘We have leveraged more than 45 years of ultrasound innovation to deliver a reliable system that combines the excellent image quality our customers expect for fast, confident diagnosis, with advanced tools to help them improve efficiency and workflow and allow for the very best standard of care,’ explains Vítor Rocha, CEO and Senior Vice President of Ultrasound for Philips Imaging Systems.

Built on the same architecture as the company’s progressive EPIQ ultrasound, for this new system Philips collaborated with hundreds of physi cians and imaging centres. Their feedback helped inform Affiniti’s ergonomic design, which led to an intuitive, easy-to-use system, the company reports. ‘Philips put the system through 4,500 hours of reliability testing with the demands of a busy medical practice and heavy workload in mind.’

Dr Martin Pericka, cardiologist at the OÚV Clinic, Aalst Cardiovascular Centre, Belgium, who described the centre’s patient volume as high, also spoke of cost pressures and through-
Advanced ultrasound

Josias Mattli said, ‘it’s not only very fast but, above all, a reliable diagnosis. ‘Blunt abdominal trauma often occurs as a result of winter sports accidents,’ said Dr Mattli, naturally seeing cases frequently in the Davos ski area. ‘If the accident involved a fall on the back this tends to affect the kidneys, if the victim falls on their front it’s the liver that tends to be injured, and a fall to the side often results in a splenic rupture.’

Blunt abdominal trauma also often occurs as a result of road traffic accidents. The examination procedure is particularly suitable for children because the radiation exposure associated with CT examinations can be avoided. However, very elderly patients and patients with renal insufficiency should also be examined with contrast enhanced ultrasound in the first instance.

Following diagnosis, a rupture does not always have to be surgically repaired. ‘If the patient is stable and bleeding has stopped the patient can then be monitored in the intensive care unit, with regular follow-up ultrasound scans carried out in short intervals,’ Mattli explained.

In the case of splenic tears, the capsule begins to heal after five days. No other procedure can visualise the reinstated blood flow of the regenerated capsule. In most cases, the patient can thus be treated conservatively and does not have to undergo surgery. Out of 66 cases involving splenic ruptures at Davos Hospital only six patients needed surgery.

Philips highlights Affiniti’s key assets:

- Crisp, clear images that enable fast, confident diagnosis and reduce the need for additional exams.
- Philips’ PureWave transducer technology delivers excellent image quality with little or no need for image adjustment for technically difficult patients.
- Anatomical Intelligent Ultrasound provides automatic anatomy recognition and quantification, making it easy to perform exams and quickly deliver new levels of clinical information.
- Automation tools, such as AutoScan, Auto Doppler and SmartExam, reduce the number of steps required to complete each exam, enhancing workflow.
- DICOM and PC format capabilities allow seamless information sharing.

Philips is at Medica
Hall 10 / Stands A22 & B22
Disaster medicine is not for perfectionists

Global threats from viral agents have entered our list of dangers

Interview: Sascha Keutel

The Ebola epidemic in West Africa, war in Syria, typhoon in the Philippines – over and over, German doctors are among those deployed to help. We interviewed Dr Johannes Schad, Medical Director of the Foundation of the German Institute for Disaster Medicine, about his direct experiences on the ground at the worst of times.

When did the description emergency change to disaster medicine?

‘In Germany, only a chief councillor or mayor can formally declare that an incident is a disaster – by no means can a senior emergency physician do this. Therefore, for financial reasons (costs are borne by the district or city) the term ‘major catastrophic event’ is also often used.

‘Essentially, when a medical disaster occurs you are dealing with a massive imbalance between the resources available and those actually required. This means that the optimal and excellent individual medical care normally expected for patients can no longer be guaranteed. The applicable medical treatment motto becomes ‘do the best for the most’. ‘Emergency medicine is the “natural sister” of disaster medicine.

‘The objective of disaster medicine is to “cease to exist”, that is to ensure a return to the norm whereby optimal, pre-clinical care but also an exemplary relationship between civil protection and security agencies. In Germany, because thankfully we tend to be not as affected, the realness of the government as well as the chaos from the disaster site to the nearest hospital.

‘Unfortunately, as emergency medicine, we tend to be geared towards the provision of individual emergency care to such an extent that we sometimes forget to “flick the switch” in the respective situation and to carry out a strategic and systematic initial analysis. Basically, we automatically do what we have learned, are capable of and know.’

What are the greatest challenges in disasters?

‘The biggest problem in emergency communications is the confusion arising from this and the lack of information. Coordination is another weak point during what we refer to as the “chaos phase”. This concerns technical aspects such as an overload of the mobile communications networks as well as the responsible control rooms. Essentially, it’s important that the command team carries out a confidential, honest and self-critical appraisal of a situation.

‘This is the only way to jointly tackle this type of challenge. Furthermore, (self)-admission of a lack of knowledge is also important.’

Which concrete tasks must be tackled in a disaster?

‘Disaster medicine includes aspects of decontamination, hospital alert planning, transport logistics, biological and chemical damage assessment and, lately, also aspects of global threats through viral agents.

‘In a concrete case the initial objective is to obtain information – particularly about the cause – and thus to devise a strategy to prevent secondary damage or cascading effects. Doctors and nurses also need to look after themselves, so that they don’t end up causing additional problems – such as accessing a disaster location in an inappropriate way. ‘Emergency doctors are also responsible for the organisation of central assembly points for treatment sites where triage can be carried out for the injured. The past has shown that there is no point in merely relocating the chaos from the disaster site to the nearest hospital.’

Could work become a daily routine at disaster sites – or are there any routines?

‘The only real opportunity for disaster medicine is in preventative work. Only through practised training can we help to identify and improve existing weaknesses. Israel, to name an exemplary international case, has an excellent system not only for regular, pre-clinical care but also an outstanding chain of command teams who can coordinate the chaos from the disaster site to the nearest hospital.’

The potential use of existing healthcare facilities must be assessed on site.

Among other disaster operations, surgeon and senior emergency physician Dr Johannes S Schad was operations director for the German Red Cross Field Hospital and worked in the Basic Healthcare Unit in Haiti in 2010. As an International Committee delegate of the Red Cross (ICRC) in Geneva he became an instructor at Shifa Hospital, overseeing the largest emergency admission of patients in the Gaza Strip.

In 2011 he taught emergency medicine for the ICRC, presenting three-week-long courses for doctors and nurses in Nadjaf, Iraq and Sulymaniyah in Iraqi Kurdistan.

Dr Schad is currently studying for a Master’s in Disaster Management and Risk Governance at the University of Bonn, a degree course run in partnership with the Federal Office of Civil Protection and Disaster Assistance (BBK).
The special services to deal with this subject is quite assessable.’

Why did you, personally, opt for a career in disaster medicine and what experience have you gained?

‘My decision to work in disaster medicine was based on a mix of idealism and a sense of adventure, combined with scientific curiosity and the realisation that modern disaster medicine in Germany still has a lot of potential for further development. There are only few people who are substantially involved with this subject, and this is obviously not a profitable business.

‘My deployments for the German Red Cross or the International Committee of the Red Cross, among others to Kenya, Gaza, Iraq, the Philippines and Jordan, were very different in each case. The work calls for a lot of flexibility on the part of the task forces, to quickly adapt to the respective, particular environments. There is no general recipe that fits all deployments.

‘The important thing is to provide help to the affected population in the respective country where help is most needed. This can only be determined through an assessment of the situation together with those affected.’

Which deployments are most memorable and how do you deal with the psychological pressure?

‘Without a doubt, the disaster in Haiti in 2010 and the difficulties involved in the provision of acute aid, followed by rebuilding everything, eclipsed a lot of what I had experienced before.

‘This very example illustrates the importance of a political, or stable social, organisational structure. To date, Haiti has still not been able to rid itself of the dilemma of poverty and the associated lack of perspectives. ‘You prepare yourself for that pressure and know that the work has to be carried out under suboptimal conditions, otherwise it would be catastrophic. ‘Being quite a “tough cookie” is definitely not a disadvantage. However, sometimes working in a team, we achieve a level of motivation that’s hard to find in a more regular working environment. This is also not the right working environment for perfectionists because we often just have to find pragmatic solutions. Our local co-workers are frequently our best support because they know exactly what is important.’

Can we in Europe think ourselves safe from large catastrophes?

‘After the Cold War ended, the thinking was that civil protection could be scaled down because of a lack of external threats. Unfortunately, this soon proved a wrong decision. The age of technology brings with it modern vulnerabilities. In particular, we are up against the dependency on electricity, transport routes and cyber-technology. We are hardly armed to deal with this, contrary to all other public statements.

‘In Germany, the implementation and utilisation of the risk-analysis by the Federal Office of Civil Protection and Disaster Assistance (BBK) is called for, which allows for the identification of potential weaknesses on our own doorstep. With insights gained from this, we can try to protect critical infrastructures in such a way that a reasonably safe practice can be ensured.

‘However, there is often a clash between corporate interests and environmental concerns, or traffic management issues. Achieving a balance of interests will continue to be an interesting challenge.’
Endogenous bacteria

Is chlorhexidine still the best decolonisation method?

Report: Brigitte Dinkloh

For many decades decolonisation – be it selective intestinal, oral or skin decolonisation – has been the accepted procedure to prevent infections by endogenous bacteria. At the 12th Congress on Infectious Diseases and Tropical Medicine, Professor Petra Gastmeier, Director of the Institute for Hygiene and Environment and of the National Reference Centre for the Surveillance of Nosocomial Infections at Charité Berlin, presented new research on oral and skin decolonisation. The title of her talk indicates the results of her study: ‘Reduction of endogenous bacteria: an innovative approach to prevention?’

Oral decolonisation

The problem is as old as artificial respiration: With intubated patients bacteria preferably colonise the cuffs from where they migrate to the lower airways and cause pneumonia. ‘Chlorhexidine is the best researched substance to prevent ventilator-associated pneumonia in intubated patients,’ Professor Gastmeier explained at the symposium in Cologne. In the study by Sonia Labeau chlorhexidine received top marks: the scientist could show that the oral antibiotic significantly reduces ventilator-associated pneumonia. However, in his recent review, Boston-based Michael Klimpas draws a more complex picture. He concluded that, as far as pneumonia risk is concerned, only cardiac surgery patients benefit from chlorhexidine. For all other patient groups an increase in mortality has been recorded. ‘With regard to oral decolonisation the evidence of the benefits of chlorhexidine is not quite as obvious as with regard to selective intestinal decontamination.’

‘One possible explanation of the higher mortality rate is the aspiration of chlorhexidine, which may cause changes to the lung. In view of the fact that, day by day, thousands of patients on ICUs receive oral care with chlorhexidine, further research is urgently needed,’ the Charité professor emphasised, ‘particularly since alternative substances, such as povidone iodine have not yet proven to be particularly well suited.’ The endpoint of hospital-acquired infections. Already in 2001, Christoph von Eiff was able to show that 82.2 percent of staphylococcus aureus bloodstream infections are induced by nasal bacteria rather than by exogenous bacteria,’ Gastmeier pointed out.

Standard decolonisation procedures use mupirocin for the nose and chlorhexidine for the skin. The latter antiseptic is available either as a water solution or as pre-packed impregnated washcloths. Cohort studies looking at the efficacy of bathing with chlorhexidine showed a significant effect: the bloodstream infection rate decreased by 36 percent with cloths yielding slightly better results than chlorhexidine solutions.

Daily bathing with chlorhexidine

Randomised controlled studies on bathing confirm the positive effects. Clermo et al. report that, in their trial encompassing 7,000 Intensive Care Unit (ICU) patients, the rate of bloodstream infections was 28 percent lower in the patient group who had been washed with chlorhexidine compared to the group who had not received this type of care. Moreover, according to this study, daily bathing with chlorhexidine-impregnated washcloths significantly reduces the risks of acquisition of multi-drug resistant organisms (MDROs).

A further study published in the US shows chlorhexidine-impregnated washcloths in paediatrics to reduce sepsis by 36 percent. Susan Hsuang conducted the largest and best-known pragmatic cluster-randomised trial. More than 70,000 patients in 43 ICUs were decolonised for five days with chlorhexidine cloths and mupirocin. Endpoints were the MRSA clinical isolate and bloodstream infections. The group undergoing universal decolonisation with chlorhexidine and mupirocin showed a prior screening showing the best results. Even if universal decolonisation will not reduce bloodstream infections, the reduction of MRSA and VRE-isolation days is a major success,’ Gastmeier explained. However, according to this study, daily bathing with chlorhexidine significantly reduces the risk of MDRO acquisition.

Skin decolonisation

Skin flora is very different from patient to patient and varies from patient to patient, from body region to body region. Accordingly, decolonisation measures can yield widely differing results. ‘No doubt, the skin and its flora play a role in the development of multi-resistant pathogens. Even if chlorhexidine works better with gram-positive bacteria than with gram-negative ones, gram-negative ICU patients should undergo skin decolonisation. Care staff usually accept chlorhexidine: it kills virtually everything, and it does not create an additional burden. The side effects of the antiseptic are negligible, the Robert Koch Institute, however, reports that in Germany MRSA resistance to mupirocin has increased by seven percent over the past years and even the number of chlorhexidine resistances has been growing.

In Germany, polihexanide and octenidine are available as alternatives. Although neither of these substances has been thoroughly tested in clinical studies, so far no resistances were reported for the cheaper of the two antiseptics, octenidine, and it seems to work better with gram-negative bacteria than chlorhexidine. ‘In short: while the evidence on chlorhexidine to prevent ventilator-associated pneumonia is questionable, the evidence on decolonisation to reduce bloodstream infections and the transmission of multi-resistant pathogens is convincing. Moreover it is more effective to treat all patients at risk rather than only those with S. aureus and VRE. Alternative substances have to be urgently tested in clinical studies,’ Prof. Gastmeier concluded, ‘for us to be able to slow down the development of resistances.’

Endogenous bacteria

Is chlorhexidine still the best decolonisation method?

Professor Petra Gastmeier MD studied medicine in Halle/Saale and Berlin and has worked as a specialist in Infection Prevention and Control and Environmental Medicine since 1981. Following her habilitation on Infection Prevention and Control at the Free University of Berlin in 1999, a year later she was awarded a C3 professorship for Infection Prevention and Control at the Hospital at Hannover Medical School. Since 2008 she has directed the Institute for Infection Prevention and Control and Environmental Medicine at Charité University Hospital in Berlin, which acts as a National Reference Centre for the Surveillance of Nosocomial Infections.

The group undergoing universal decolonisation with chlorhexidine and mupirocin showed a prior screening showing the best results. Even if universal decolonisation will not reduce bloodstream infections, the reduction of MRSA and VRE-isolation days is a major success,’ Gastmeier explained. However, according to this study, daily bathing with chlorhexidine significantly reduces the risk of MDRO acquisition.

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The issue of patient/staff ratios in England came to a head in recent years following the poor levels of care witnessed at Mid-Staffordshire hospital, and the subsequent Francis Inquiry and the Berwick report, which outlined ways in which the National Health Service (NHS) could improve care. Both reports raised the issue of staffing levels and the latest NICE guidance has been designed to help ensure safe and efficient nurse staffing levels on hospital wards.

NICE acknowledges that, as patients’ needs differ from day to day, there is no single staff number that can be safely and adequately applied across the wide range of wards in the NHS. However, the guidance committee concluded that when each registered nurse is caring for more than eight patients this is a signal to check that patients are not at risk of harm, and the guidance sets out ‘red flag events’ that warn when nurses in charge of shifts must act immediately to ensure they have enough staff to meet the patients’ needs on that ward. Red flag events include patients not being provided with basic care such as pain relief or help to visit the bathroom.

Senior management and nursing managers must closely monitor ‘red flag events’, analyse safe nursing indicator data and take action if that becomes necessary.

Professor Gillian Leng, Deputy Chief Executive and Director of Health and Social Care at NICE, said: ‘Safe staffing is more complex than setting a single ratio. The emphasis should not just be on the available number of staff, it should be on delivering safe patient care and making sure that hospital management and nursing staff are absolutely clear on best practice to do this.’

NICE says that, while there may be some upfront costs involved in putting these recommendations into practice, depending on the existing staff levels, this is likely to be offset by the savings that can be achieved through safer care. It suggests more than a billion pounds sterling can be saved by preventing pressure ulcers, while reducing the number of infections patients get after surgery could save up to £700m a year alone.

Professor Leng added: ‘The current national cost for nursing staff in acute wards is estimated at around £4 billion. Implementing the NICE guideline is unlikely to have significant financial impact in many trusts, as they may simply need to adapt their processes to work out where nursing staff should be at any given time. Nor will any financial impact be felt in a one-year period. Many trusts are already rolling out planned staffing changes, which will spread the cost across a number of financial years. The expected increased training numbers for nursing staff will also see a gradual increase between now and 2017.’

Dr Peter Carter, CEO of The Royal College of Nursing (RCNI) commented: ‘It’s good to see this is now being recognised across the NHS,’ he added. ‘The needs of patients should be the only thing determining staffing levels – not finances.’
Medical video integration

IPS1000A, a video management system from FSN Medical Technologies, aims to help operating theatre (OT) staff to spend less time on the complexities of video use.

This system provides popular OT integration capability such as source selection, advanced windowing features, easy switching, and PIP/PBP mode, the manufacturer reports. It can standardise format and split video signals based upon the user’s needs and the user’s application, and also upgrade a lower resolution image to full HD 1920 x 1080 quality, ensuring brilliant images from older legacy source devices. To simplify operation, the unit is controlled using FSN’s touch screen tablet and simple user interface.

Handling core needs for integrated surgical video processing, the system:

- accepts many signal sources, live and reference, legacy and current.
- Converts, upgrades, and also maintains signal integrity.
- Switches signals as needed to monitors and recording devices.
- Allows for colour control and PIP layout adjustment.

Additionally, the company points out, it provides high performance at a competitive price; shorter ROI; less extra hardware and cabling; signals are kept within the OT. There is also a mobile tablet and intuitive touch screen control, and accompanying surgical display monitors and DVRs.

IPS1000A also has a small footprint yet manages a variety of imaging equipment.

Low energy, cold light, long life

A surgical led lamp illuminates countless conditions

The Starled3 NX is suitable for many applications in the operating theatre and diagnoses, for example, gynaecology, dermatology and general medicine.

‘The lamp grants a homogeneous and shadow-less light thanks to its special LED optics created by ACEM Medical Company, which directs light beams at best according to the needs,’ the Italian manufacturer reports. ‘The visual area is perfectly illuminated assuring both excellent visual comfort and working conditions.’ Its next generation LEDs produce an unparalleled quality of light with a colour temperature (CCT) of 4.500 °K and a colour rendering of 80, ensuring bright images from older legacy source devices. To simplify operation, the unit is controlled using FSN’s touch screen tablet and simple user interface.

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The new generation Tourniquets

DTR is at Medica

Hall 16 / Stand F42

Over in Hall 16, in the Wales Pavilion, an extensive instrument range from DTR, the single-use surgical instrument manufacturer, is on show. Included are precision electrosurgical instruments. ‘Micro Needle Electrodes (both tungsten and stainless steel variants) offer first time sharpness with fine, precise tissue dissection,’ the firm reports. The range also includes diathermy forceps – (an extended bipolar range to include McPherson and Monopolar) and Loops and Balls.

‘Further highlights include the Combilook, an innovative colposcopy device developed alongside a selection of leading colposcopists, that enhances existing procedures specifically in cervical manipulation, where stabilisation helps to secure the clinician’s vision during the entire procedure.’ Since launching at Medica 2013, the DTR’s renewably sourced Rotating Cervical Biopsy Punch has been well received by clinicians worldwide, the firm adds. ‘A recent independent Life Cycle Analysis (LCA) study supports evidence that the instrument is 2.8 times less harmful to the environment than a standard Tischler. The handle is made from DuPont’s Sorona plastic with 20-37% renewable material, utilising a renewable sourced propanediol (PDO) made from technical starch – a truly green innovation!’

Supporting the motto “Visibility, quality and safety in your supply chain”, the firm has integrated machine readable GS1-standard barcode labels across its instrument range, ‘… for improved product traceability with an increasing number of healthcare providers worldwide adopting an eProcurement strategy. DTR points out.'

Details: www.dtrmedical.de

Single use surgical instruments

ACEM is at Medica

Hall 10 / Stand E31
Designed for pre-natal screening

The world’s first 4D Curved Matrix Array probe

GE Healthcare is at Medica
Hall 10 / Stand A42

GE’s latest and most advanced Voluson system to date offers clinicians completely new ultrasound views thanks to three pioneering innovations, the company reports. These open up new screening prospects, which include the world’s first 4D Curved Matrix Array probe, which has been especially designed for pre-natal screening. The system also enables a simultaneous display of two perpendicular sectional planes in real time. Consequently, the detection of complex malformations of the foetal heart is far easier and more accurate, GE Healthcare reports. "Thanks to the Curved Array technology, a superlative level of spatial resolution is achieved at all depths."

With HDIVi Silhouette mode, the foetus and the inner structures and organ complex are displayed with vitreous clarity, the company adds. "During the first trimester especially, these new insights are extremely helpful when it comes to assessing brain and organ development."

"The Radiance system architecture, with four times the speed of parallel processing, means that the level of detail and discernibility of close neighbouring structures is even greater than what has been achievable with the Voluson equipment available to date. This is due to a significant reduction in background noise coupled with a further enhanced spatial resolution, producing impressive 2D, 3D and 4D images."

"This exceptionally realistic imaging, which has reached new heights with the Voluson E10, has increased the accuracy and therefore the significance of pre-natal screening even further," the manufacturer adds.

Voluson E10 from GE Healthcare delivers a new standard in OB/GYN imaging with more clarity, more speed and flexibility.

The first operating theatre light with HD-SDI camera embedded in the head

Brandon Medical is at Medica
Hall 13 / Stand C36

The new surgical lighting, Quasar elite, has received rave reviews since its launch earlier this year, the manufacturer Brandon Medical reports. "Orders have been coming in thick and fast for the OR light and end users have commented how the array of features have vastly improved their operating theatre experience."

"The company has completed installations at Bradford Royal Infirmary and London’s Queen Elizabeth Hospital (QEH), an, with many further installations in the pipeline, it is hopeful that the Quasar elite will ... continue to shine and impress surgeons up and down the country."

Theatre staff at QEH are said to have commented how easy the light heads are to manoeuvre, a direct result of the bespoke spring arm system used in the Quasar elite. "To compliment the excellent lighting characteristics, Quasar elite packs a number of world-class features into its slim, low-weight chassis. It’s the first OR light to feature an HD-SDI camera fully embedded into the light head," Brandon Medical points out, adding that the camera is full HD, equipped with zoom controls and allows for outstanding picture quality on even the largest monitors. Further to providing a platform for telemedicine systems, mounting the camera inside the lamp head has more practical benefits in obviating the need for excessively large handles usually found when encasing the camera inside the light’s main handle.

Brandon Medical points out, adding that the camera is full HD, equipped with zoom controls and allows for outstanding picture quality on even the largest monitors. Further to providing a platform for telemedicine systems, mounting the camera inside the lamp head has more practical benefits in obviating the need for excessively large handles usually found when encasing the camera inside the light’s main handle.
Dr Michael S Kristensen, Head of Anaesthesia for ENT and maxillofacial surgery at Denmark’s Rigshospitalet, is pioneering the new and expanding role of ultrasoundography in clinical decision-making, intervention and management of the upper and lower airways in a way that is clinically relevant, up-to-date and practically useful for clinicians. He has shown how ultrasonography is becoming essential in management of the upper and lower airways, can identify tracheal structures and is offering a primary diagnostic approach in suspicion of intraoperative pneumothorax. A few years ago, ultrasonography was not applied at all for airway management. Now, it is used for a whole range of activities, he explained. These include screening and prediction of difficult airway management, diagnosing pathology that can affect airway management, identification of the cricothyroid membrane, measuring gastric content prior to airway management, airway related nerve blocks, and prediction of the appropriate diameter of endotracheal, endobronchial or tracheostomy tubes.

Other areas where ultrasound has shown airway management value is in differentiating between tracheal and oesophageal intubation; differentiating between tracheal and endobronchial intubation; confirmation of gastric tube placement; differentiating between different causes of dyspnea/hypoxia and pulmonary oedema; and prediction of successful weaning from ventilator treatment. In interventional procedures or emergency situations the major roles of ultrasound include the localisation of the trachea and the cricothyroid membrane before anaesthesia, so that the clinician will know exactly where to perform an emergency tracheotomy/tracheostomy in case it becomes necessary, and confirming or ruling out a suspicion of an intraoperative pneumothorax before placement of a pleural drain-tube. Ultrasound also confirms whether the endotracheal tube actually enters the trachea or accidentally enters the oesophagus, evaluates stomach contents and lung pathology to distinguish between which treatment modalities that are needed and identifies the localisation of the appropriate tracheal level for dilatational tracheostomy or surgical tracheostomy.

Ultrasonography is becoming essential in upper and lower airways management because several indications cannot be performed in a clinically acceptable way, he explained. ‘For the primary suspicion of a pneumothorax, ultrasound is by far the fastest method, and it has a much higher sensitivity than an anterior-posterior X-ray in the supine patient. A CTscan is slightly more precise but is often delayed and is almost impossible to obtain in the intraoperative setting,’ he pointed out. ‘For clinicians, the benefits are an immediate diagnosis and hands-on guidance in real time, whilst for patients it means faster and safer diagnosis and treatment in relation to airway management.’

‘For hospitals, ultrasound in airway management is faster and cheaper than X-ray and CT and can lead to better outcome of dilatational tracheostomy and better outcome and potentially lower mortality when the patient needs emergency surgical airway management.’

Ultrasonography is becoming essential in management of the upper and lower airways.
UK researchers focus on ventilator weaning techniques

Dr Bentley suggested there is some evidence that non-invasive ventilation – delivered through a mask rather than an endotracheal tube or tracheostomy – has benefits for groups with underlying respiratory conditions such as chronic obstructive pulmonary disease. Patients with acute respiratory failure often require invasive ventilation to unload the respiratory muscles and support gas exchange, though invasive ventilation used over a prolonged period of time might lead to complications including ventilator associated pneumonia and increased morbidity. Resulting from this experience, clinicians aim to minimise the duration of invasive ventilation.

The consensus document
A 2007 consensus document from the European Respiratory Journal on ‘weaning from mechanical ventilation’ divides patients into ‘simple, difficult or prolonged’ withdrawal from ventilation and recommends weaning should be considered as early as possible and that a spontaneous breathing trial be used as the major diagnostic test to determine whether patients can be successfully extubated. Within the United Kingdom there is a common recognition of the document, despite variations in approach, and NHS England has also recognised the need for specialist weaning units for those patients who are difficult to wean within an acute intensive care environment.

Weaning in UK practice
Dr Bentley pointed out: ‘By far the majority of patients in an intensive care unit are weaned relatively quickly, within the first few days, but they are the patients that take up a huge amount of resource.’ He said the key challenge for clinicians is in understanding the pathophysiology of the weaning process, recognising the underlying co-morbidities and starting the weaning process as early as possible, following resolution of the underlying presenting condition to intensive care. ‘Patients that are usually more difficult to wean are those with pre-existing co-morbidities such as cardiac conditions or respiratory disease and those who develop critical illness acquired weakness affecting peripheral nerves and muscles. That is why it is important to have a multi-disciplinary approach through the medical, nursing and allied health professionals within the ICU to address the weaning process.’

Dr Bentley acknowledged that intensive care practices have evolved, and improved over recent years, but research supported by the ICS is helping specialists to understand more fully how to manage and improve outcomes better for their patients in intensive care, for example those with severe sepsis and ARDS (acute respiratory distress syndrome).

Multi-disciplinary approach
The introduction of a ventilator care bundle aims to reduce ventilator-associated pneumonia, associated morbidity, mortality and length of time spent on a ventilator. It includes a number of interventions that when used together can improve outcomes for patients. These include elevation of the head of the bed, daily sedation breaks and assessment of readiness to wean/extubate, deep vein thrombosis and peptic ulcer prophylaxis and daily oral care. Regular screening for respiratory infection, early recognition of ventilator associated pneumonia, and daily assessment of sedation and readiness to wean can reduce the length of time spent on ventilation, he said.

Report: Mark Nicholls
Research being conducted in the United Kingdom is focusing on techniques to help improve the weaning process for patients coming off mechanical ventilation in hospital intensive care units.

Weaning is a fundamental part of intensive care practice for patients that required intubation but while hospitals across the UK have individual strategies for weaning, there are at present no defined national guidelines.

Dr Andrew Bentley, consultant in intensive care and respiratory medicine at University Hospital South Manchester National Health Service (NHS) Trust, said: ‘many of those local guidelines will be similar, but there are different strategies and approaches to reduce support from ventilation. ‘A factor behind there being no definitive national guideline within the UK is because we still need to understand the position of various aspects of interventions within the weaning process.’

However, research projects are examining ways to improve outcomes and reduce the time it takes for patients to come off ventilation, explained Dr Bentley, who is chair of the Intensive Care Society (ICS) Research Committee. The ICS is the representative organisation in the UK for intensive care professionals as well as patients.

One ICS supported study is BREATHE, which is a pragmatic, multi-centre randomised controlled trial led by Professor Gavin Perkins of Warwick University, Coventry, and designed to evaluate the clinical benefits and cost effectiveness of non-invasive weaning.

Invasive versus non-invasive ventilation
That follows a systematic review in 2009 which suggested use of non-invasive ventilation to wean critically ill adults off invasive ventilation was associated with decreased mortality and other clinical benefits, however, the net clinical and cost effectiveness compared to other weaning strategies remained uncertain.

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A new tool for biochemical analyses

On the near horizon: Telemedicine will bring home care to chronic liver disease sufferers

Although telemedicine could improve the quality of life of patients with chronic liver diseases, viable treatment at home care systems are still lacking. However, within the EU-project "D-LIVER" (www.d-liver.eu) scientists at the Fraunhofer Institute for Biomedical Engineering IBMT in Stuttgart, Germany, are working with European partners to develop an IT and cell-based system that will help chronic liver failure patients to receive medical support at home.

The project engineers are programming the IT platform and developing sensor technology to measure the condition of the liver cells in the cell-based system.

As IBMT computer scientist Stephan Kiefer points out: 'Telemedicine is something that would greatly improve the quality of medical care and patients’ quality of life.'

With the research team's work progressing, currently their patient management system is at the most advanced stage. For the first time, the scientists are combining classic components of telemedicine – such as remote monitoring for doctors – within a system that assists decision-making. Called the Care Flow Engine, Kiefer explains what lies within it. 'We've created IT systems that can take treatment plans drawn up by doctors and turn them into such user-friendly automated processes that chronic liver disease patients can take treatment plans drawn up by doctors and turn them into such user-friendly automated processes that chronic liver disease patients can do so by analysing the cells directly.

To this end, the scientists have developed an IT application called Personal Health Manager, which patients can access conveniently on tablet computers in the form of an app. It amalgamates all the data from devices that measure blood pressure, heart rate, weight, temperature and liver values along with the treatment plans from the Care Flow Engine. 'Its main purpose is to ensure optimum treatment for the typical complications that tend to accompany liver diseases,' says Kiefer.

This can be achieved by means of tests, questioning, exercises, or instructions. For example, patients are regularly asked to weigh themselves, measure their liver values and accomplish a cognitive test. This provides indications as to how much patients are suffering from conditions such as encephalopathy and ascites.

The system automatically evaluates the results, suggests adjustments to medication doses, and recommends courses of action that are then discussed between the doctor and patient. 'Although the technology is currently set up for liver diseases, it’s suitable, in principle, for the telemedical treatment of any chronic illness,' Kiefer points out. 'Adapting the existing system to make this a reality is our medium-term goal.'

Sensors measure cell vitality The sensor technology for monitoring liver cells was developed by physicist Dr Thomas Velten. 'Our sensors continuously measure the vitality of the cells in a bioreactor – and they do so by analysing the cells directly. This is an important new tool to complement conventional biochemical analyses.'

Thanks to built-in sensors, operators do not have to open the bioreactor for every measurement, thus eliminating the danger of the cells becoming contaminated.

- Impedance (the technical term for resistance to alternating electric current) spectroscopy plays an important role in the procedure. When cells deteriorate, their impedance spectrum changes.

- Sensors will be used with the interface between the prosthetics and the patients' limbs by adding or removing socks.

- Eventually, the researchers want to confirm those results using bigger bioreactors that are equivalent to a human liver in terms of volume.

Finally, Velten adds: 'The online measurement of cell vitality is an important part of our [funded by the] European Project to create an adaptive interface to monitor the fitting of the prosthetic.'

Scientists aim for a self-adjusting buffer

Prosthetics and exoskeletons can cause amputees pain

UT Arlington researchers have been awarded a $744,300 grant from the Department of Defense Peer-reviewed Orthopaedic Research Program to create an adaptive interface that fits between a prosthetic and a patient's limb so that the fit and comfort of the prosthetic are improved. Haiying Huang, an expert in sensor technology, explained that four types of sensors will be used with the interface to monitor the fitting of the prosthetic device. The sensors will measure vertical movement of the limb relative to the socket wall, the pressure on the limb, the changes in the circumference of the residual limb relative to the socket, the water content in the tissue. Eventually, we want to build the socket that can adjust automatically to the patient,' said Huang.

So far, scientists have been able to prove this effect in smaller laboratory reactors. At the end of this year, the researchers want to confirm those results using bigger bioreactors that are equivalent to a human liver in terms of volume.

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Aerospace engineer Haiying Huang
Biomedical specialist Muthu Wijesundara

Biomedical Engineering IBMT, in St.

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Biomedical Engineering IBMT, in St.
Breathtaking:
The enduring respiratory valve

Three generations of Rudolphs focus on patients’ breathing needs

Back in 1938, the precision machinist and innovator Hans Rudolph created what is possibly the first respiratory valve specifically for human/animal pulmonary studies. The valve separates inhaled air from exhaled air, showing how efficiently a person’s lungs convert oxygen to carbon dioxide. That valve is still the primary product of the company founded by the inventor in 1960.

Today, Hans Rudolph Inc. manufactures a wide variety of products, all for use in respiratory studies and therapy. These include the masks patients wear to measure airflow and equipment to calibrate machines used in respiratory research and testing. The company manufactures and sells masks used by sleep labs during sleep studies to diagnose obstructive sleep apnea (OSA) and, once a patient is diagnosed, Hans Rudolph sells the CPAP/BiLevel/NIV Masks for them to use at home to treat their OSA.

The company has been perfecting its products for over 50 years—among the latest being the fourth-generation model of the continuous positive airway pressure (CPAP) mask—primarily used to treat sleep apnea. ‘The product is far superior to any other CPAP or NIV mask on the market,’ said Wayne Grooters, medical product distributor and owner of Sovereign Medical LLC in North Carolina, USA.

The hospital disposable masks are made of soft materials and do not cause irritation and skin problems, Grooters added. The anatomical design fits it on the face, rather than sit on the head, meaning less leak and more comfort for ventilated patients. Finally, he noted, it’s the only mask that allows users to wear glasses.

‘We’re seeing a huge growth in using the silicone face mask in the pulmonary function lab for stress testing and that sort of thing,’ said Kevin Rudolph, the third-generation CEO. ‘Then we’re making all sorts of custom modifications to adapt these to all the other manufacturers’ products. So they buy them from us with a custom adapter and put it in the kits that go out with their instruments, and pulmonary/exercise testing systems, and then we get the after-market business.’

Rudolph said the firm is starting to grab a lot of business from original equipment manufacturers (OEMs) that make a variety of respiratory machines for hospitals and clinics. The OEMs would rather buy a mask from a specialist than make it themselves. ‘We try to specialise in areas that OEMs can benefit from and not impede on their real business, which is the instrumentation and pulmonary testing systems that we don’t really get into,’ Rudolph explained. ‘It transforms us from a competitor into a partner, and that’s good business for us.’

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New Perspectives.

Hans Rudolph Inc. is at Medica USA Pavilion Hall 16 / Stand D20-15

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New Quest Homecare Mask is lightweight, low cost and fits under the chin
Continuity, consistency and more clinical value

Raising speed and capacity transforms ultrasound machine into a platinum series

‘The new Aplio improves the existing functionalities of the high-end systems, dramatically enhances image quality, increases diagnostic confidence and further streamlines workflow,’ the manufacturer reports. ‘With the new hardware comes new capabilities as Toshiba introduces an advanced Doppler algorithm called Superb Microvascular Imaging (SMI) and expands its suite for elastography with the addition of ShearWave Elastography (SWE).’

Jörg Schiegle, Senior Manager Product Marketing at Toshiba Medical Systems points out: ‘The Aplio Platinum Series is an evolution within the Aplio family, consistent with the revolutionary architecture of the new system.’

Christopher Simm, Toshiba’s Senior Manager of the European Ultra-sound Group adds that the expanded power of the Aplio system, based on the growing fields of ultrasound applications, for example comprehensive liver diagnostics with the unique SWE Smart Map approach; advanced prostate diagnostics with the Smart Fusion for MRI-US fusion guided biopsy solutions; gynaecological diagnostics with the firm’s Fly Thi technology for ultrasound hysteroscopy, and muscu-lkeletal diagnostics with Toshiba’s SMI for assessing inflammation. Toshiba has also introduced four new probes, including the world’s first wideband single crystal transducer created with a new composition of piezoelectric material and tissue matching technology to provide an increased bandwidth, a better signal-to-noise ratio and an improved axial resolution and penetration.

The first experiences with Aplio Platinum won praise from a cohort of leading clinicians who applied the new capabilities to advanced investigations as well as clinical routine, the company reports. ‘Six leading physicians presented their findings on the impact of enhanced features of the new platform through a series of case studies for specific clinical applications, as well as during a roundtable discussion where they shared experiences.’

Prof. Thomas Fischer MD, who has worked with the system for many years at a year at the Radiological Institute at Charité Hospital, in Berlin, observed: ‘The dramatic increase in image quality, Doppler sensitivity and Fly Thi rendering accuracy and speed leads to the question of whether there are clinical advantages with all the new tools of this very advanced system.’

Not just a toy

According to Adrian Lim MD, Consultant Radiologist at Imperial College and Chief of Ultrasound at Charing Cross Hospital, both in London: ‘Every time a new technology or technology comes along one needs to ask if it is something useful or just a toy. The innovative features of the new Aplio bring significant changes. Greyscale imaging particularly stands out with very nice homogenous imaging and crisp margins.’ An author on 142 published papers, Leopoldo Pentz de Isla MD, explores advanced echo-cardiographic measures to establish reference values at the Cardiovascular Institute of the Hospital Clínic San Carlos in Madrid, Spain. ‘I need a system with a very high temporal resolution and I need a fast system,’ he pointed out. ‘I can’t use a system where I have to push many buttons and wait a long time. This is the first system that works very quickly to analyse a complete left ventricle using Wall Motion Tracking in a very accurate way.’

Overall speed brings clinical benefits

Accelerated overall processing has delivered a variety of clinical benefits, Toshiba points out. For example, the firm’s Fly Thi technology is much faster in rendering large data volumes. ’Smart Fusion now manages multiple data sets from CT and MRI, the firm adds. Differential Tissue Harmonics Imaging has stepped up to a new generation while 3D Multi-Planar Reconstruction has been refined. Thanks to boosted processing, Toshiba Precision Imaging and Precision+ have entered a new dimension with 3D volume capabilities.

Finally, Toshiba concludes: Delivering more information with accelerated processing in an intuitive, easy to understand display, Aplio Platinum builds diagnostic confidence and helps physicians avoid the need for supplementary exams. Ergonomic with a fully customisable console, this advanced system saves time and expense, enhancing departmental pro ductivity.”

Shearwave elastography

Pakistan’s Sindh province shapes up for liver transplants

Dr Ihsrat-ul-ibad, Governor of Pakistan, has provided 12 Shearwave Elastography machines from ‘special funds’ to various Sindh province hospitals, including in Karachi, Hyderabad, Benazirabad, Sukkur, Larkana, Khairpur Mirs and Shadadpur.

Dr Ibad commented that Pakistan is a developing country with many health challenges, because the urban population is rising more than proportionally and, due to this, the government hospitals could not provide such health facilities as are needed, and there are more health problems in rural areas.

Most people are dying speedily and disease is expanding with very few or no treatments. The provincial government has provided emergency treatment for this disease is limited to Islamabad. Along with the specialist training in the USA, Dow University is currently preparing a Liver Transplantation Department according to international standards.
The current iPhone form factor is the result of generations of embedded system reductions in size while increasing capability and lowering cost. Similarly, we believe it will take investment in next-generation custom semiconductor technology to produce miniaturised ultrasound devices with high clinical value.

Disposable wireless solutions that monitor vital signs and physiological information are emerging IoT applications that promise to unlighten patients and improve workflow for clinicians. Since hospitals and ambulatory care centres are signal-heavy, interference-sensitive healthcare environments, solutions must provide the same link reliability as the current wired cables used today.

Dispositif Medical Inc. (www.dispositifmedical.com) developed breakthrough proprietary radio technology, the REACH platform, which combines a standards-compliant radio with a programmable sensor signal processor on a tiny CMOS IC to provide ultra-high link reliability, low-cost disposable battery operation, and low-power energy efficiency in a small footprint at low overall system cost.

Samsung introduced a wearable health technology concept called Simband (www.samsung.com/us/globalinnovation/innovation_areas/). Simband is a reference design platform for development of advanced health and wellness sensor modules. It combines an open sensor platform with an open data platform.

Really portable and ready for anywhere

Italian firm demonstrates two advanced ultrasound machines

Two new ultrasound machines from Esaote are on show at Medica this year. ‘These versatile, valuable and efficient new products are the work of considerable research into the current and future demands of the market place,’ explains Carlos Alonso, CEO of Esaote.

Giovanni Altobelli, the Esaote Ultrasound Marketing Product Manager, reinforces that confidence in these ultrasound devices. ‘It offers a premium, yet affordable, solution to customers in terms of user comfort, performance and versatility,’ he says. ‘Easy workflow and automation of key options maximise patient throughput without compromising diagnostic confidence.’

MyLab Six and MyLab Gamma address key sectors of the imaging market – from application-specific to fully shared services, the Italian manufacturer adds: they meet the rigorous demands of the sonographer’s working environment, being high on vision, low on noise, and these are “green” ultrasound systems with remote service capabilities.

MyLab Six is a complete cart-based system for use across a range of applications from general imaging to women’s health and cardiovacular, the company adds, and incorporates advanced scanning features producing high-res images, advanced software, a range of probes, from dedicated-to-application to fully-shared service solutions.

MyLab Gamma is really portable as well as battery-operated and offers fast boot times and a rapid resume from standby mode, so the machine is ready to use within seconds. Wireless connectivity, a class leading feature for a system of this size and price - facilitates easy, one-click networking with local networks as required, the company confirms. ‘MyLab Gamma finally sets ultrasound free,’ believes Joop Geijsen, Ultrasound Project Manager at Esaote. ‘We now bring superb quality images and fast, accurate diagnosis right to the point-of-care in any situation - wherever and whenever.’

Improved patient diagnosis is a key benefit of remote healthcare. The capability for a remote physician or radiologist to view DICOM (digital imaging and communications in medicine) encapsulated images long distance via a PACS (picture archiving and communication system) has been around for about two decades. However, this setup was missing a critical piece: interactivity between the diagnosing physician and the patient being imaged. Esaote’s Simband devices developed innovative CQLink technology that enables this crucial interactivity. Exploiting current wireless technologies, we wirelessly decoupled the user interface from the ultrasound machine. CQLink deploys very light clients, such as the iPad mini, and uses a web interface to store images and patient data on the ultrasound server.

Consider this scenario: the radiographer physically scans the patient with a CQuest-based scanner and uses an iPad mini for scan-parameter control and to view the image. On the other side of the world, a physician can view the live scan, interactively chat with the technician for needed adjustments, or even take over control of the machine.

The UF-760AG

Portable and small yet meeting multiple needs

The Fukuda Denshi Group specialises in medical instruments, providing “… products and services that utilise the company’s accumulated wide-ranging resources in the medical field to offer total support from medical examination to medical treatment and first aid, and even home medical care,” the manufacturer reports.

A high performance portable colour ultrasound unit designed for a wide array of specialty markets, the UF-760AG via a PACS (picture archiving and communication system) offers advanced imaging technolo-gies to improve diagnostic confidence.

The wide array of clinical applications that the system is highly suited for include cardiology, obstetrics and gynaecology, peripheral vascular, abdominal, paediatric, small organ, emergency, vascular, trauma, breast, musculo-skeletal, obstetrics and gynaecology exams.