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16-page supplement

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VOL 13 ISSUE 1/04 JAN/FEB 2004

Pharma news.....

Cardiac drug - An experimental drug, currently called ZP123, may prevent cardiac arrest, according to results for animal testing at the MetroHealth Medical Centre, Cleveland, Ohio. The drug is said to selectively open electrical communication channels between neighbouring cardiac cells, and reduce the risk of a cardiac arrhythmia by restoring cardiac synchronisation. Human trials are expected to commence this year.

Genital herpes - Following an eight-month clinical trial, GlaxoSmithKline reports that its oral anti-viral treatment Valtrex (valacyclovir HCl) can reduce the transmission of genital herpes infection to a heterosexual partner. 1,484 healthy, heterosexual, monogamous couples in 21 countries took part in the study. It was found that a once-daily dose of Valtrex 500-mg capsules reduced the risk of transmission of symptomatic genital herpes by 75%, compared with the placebo, and reduced the risk of overall acquisition of the virus (with or without symptoms) by 48% compared with the placebo. The firm also points out that Valtrex significantly reduced the number of recurrences in the infected partner compared with the placebo - which is consistent with previous studies.

More pharma and lab news p. 9-11

Gunning down IT and PACS prices

Contract bidders told to think again

Since the British Department of Health (DoH) published its strategy: Delivering 21st Century IT Support for the NHS - a National Strategic Programme for IT, the project has advanced with all guns firing - and not without cannons.

As part of the plan, by 2010, individual patients will hold their own individual National Health Service Electronic Patient Records (NHS-EPRs), each containing details of their key treatments and care carried out within the health service or during social care. In addition, the NHS Care Records Service will connect over 30,000 GPs and 270 acute, community and mental health NHS trusts in one, secure national system.

This NHS Care Records Service is grouped into two parts:

- A National Application Service Provider (NASP) would be responsible for health services common to all users, nationally.
- Local Service Providers (LSPs) would be responsible for services delivered at a more local level, covering five regions grouped as 'clusters'.

Together, the LSPS and NASP would support the NHS Care Records Service by ensuring the integration of existing local systems and implementing new systems (where necessary).

Clearly the possibility of gaining such huge contracts put businesses into competitive gear. But before all the contracts were granted, Richard Granger, the NHS IT Director General, decided to go to war on pricing.

When, after apparently gaining ground on costs and contracts were awarded covering the UK's Eastern and North West and Midlands Care Records Services, Granger stepped up his price war and its range, warning other bidders for this and PACS system needs, to reconsider tenders. London's Financial Times newspaper quoted him saying, in an interview: 'We have seen big cuts in the prices for electronic patient records, for servers and for other infrastructure. We now need to see the same for picture archiving systems (PACS). If we don't get that we will subject the suppliers to radical surgery.'

continued on page 2

Merger to boost EU trading

D. Logistics AG and Global Healthcare Exchange have merged their European operations: PLC GmbH (PLC) and Global Healthcare Exchange BVBA to create a new company: Global Healthcare Exchange Europe GmbH (GHX Europe). This independent exchange will serve over 450 hospitals and 70 suppliers in Switzerland, Austria, Belgium, Germany, and the UK, making it the biggest of its kind in Europe.

PLC and GHX BVBA began working together over a year ago, when they established electronic connectivity between their two exchanges. Newly appointed CEO of GHX Europe, Norbert Kruchen, said now '... customers will be able to conduct e-commerce with more trading partners through a single exchange portal, avoiding costs associated with establishing multiple connections.'

Current suppliers and hospitals will continue to conduct business through the separate exchanges, until, within months, GHX Europe has fully developed the plan to merge the two exchanges.

Strategic guidance for the new firm will be provided by an advisory board comprised of both hospital and supplier representatives. GHX Europe will remain a privately held company open to all supply chain participants, with clear guiding principles and a business model designed to improve supply chain efficiencies for all involved

- Equity owners of GHX include Johnson & Johnson; GE Medical

continued on page 2

The Robert Koch awards

From left: Giuseppe Vita, Chairman, Robert-Koch-Stiftung; Prof. Kishimoto, Prof. Aguzzi, Wolfgang Thierse, German Bundestags President

Berlin - The Robert Koch Foundation has awarded the 2003 Robert Koch Prize, endowed with 65,000 euros, to neuropathologist Professor Adriano Aguzzi from Zurich, Switzerland. The foundation's Gold Medal was presented to immunologist Professor Tadamitsu Kishimoto from Osaka, Japan.

Professor Aguzzi (42), Director of the Institute for Neuropathology at Zurich University Hospital, received the award in recognition of his ground-breaking discoveries in prion diseases or transmissible spongiform encephalopathies. This group of brain disorders, which cause extensive loss of nerve cells, includes Creutzfeldt-Jakob disease in humans and BSE in cattle.

Professor Aguzzi has conducted research into prion diseases since 1992. He demonstrated how infectious protein particles penetrate the central nervous system and has made a substantial contribution both to our understanding of how these diseases arise and to the development of prophylactic and therapeutic concepts. Professor Aguzzi recently succeeded in using an anti-prion protein to immunise against the disease.

Professor Kishimoto (64), President of the University of Osaka, received the Robert Koch Gold Medal in recognition of his outstanding scientific life's work in the field of cytokines. 30 years ago, when Professor Kishimoto started his work , the structure and function of these intracellular mediator substances were still unknown.

Professor Kishimoto discovered interleukin-6 (Il-6), an essential mediator of immune responses and also inflammatory reactions. Blocking the action of Il-6 with a specific antibody can be used as a method to treat chronic inflammatory diseases such as rheumatoid arthritis. Kishimoto was one of the most frequently cited scientists in biomedicine in the 1990s.

contents

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Medical practitioner/type
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3. HOW MANY BEDS DOES YOUR HOSPITAL PROVIDE

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☐ Nursing: new aids/techniques
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☐ Medical conferences/seminars

Other information requirements - please list

ESPECIALLY FOR DOCTORS:
Please complete the above questions and we would like you to answer the following additional questions by ticking yes or no or filling in the lines as appropriate.

What is your speciality?

In which department do you work?
Are you head of the department? ☐ Yes ☐ No
Are you in charge of your department's budget? ☐ Yes ☐ No

How much influence do you have on purchasing decisions?
I can only present an opinion ☐ Yes ☐ No
I tell the purchasing department what we need ☐ Yes ☐ No
I can purchase from manufacturers directly ☐ Yes ☐ No

Do you consider that your equipment is
out-dated ☐ Yes ☐ No
relatively modern ☐ Yes ☐ No
state-of-the-art ☐ Yes ☐ No

Do you use/buy second-hand equipment? ☐ Yes ☐ No
If so, what do you use of this kind?

Is your department linked to an internal computer network? ☐ Yes ☐ No
Is your department linked to an external computer network? ☐ Yes ☐ No
Is your department involved with telemedicine in the community? ☐ Yes ☐ No
Do you consider your department is under-staffed? ☐ Yes ☐ No
Are you given ample opportunities to up-date knowledge? ☐ Yes ☐ No
Do you attend congresses or similar meetings for your speciality? ☐ Yes ☐ No

This information will be used only in an analysis for European Hospital, Höherweg 287, 40231 Düsseldorf, Germany, and for the mailing out of future issues of the Beta publication European Hospital. Candidates will also be automatically entered for a draw to win the prize featured on this page.

Signature Date EH 1/04

EDUCATION

A global catalogue of courses

The 14th edition of the catalogue 'Medicine & health 2003/2004' provides comprehensive information covering some 2,500 'flagship' courses held globally, plus offers from over 700 renowned universities, non-governmental organisations or international organisations, e.g. the World Bank Group, and the World Health Organisation.

This forms a guideline for targeted education and career planning for physicians in all fields, pharmacologists, nurses, medical students and experts in healthcare interested in further training.

Available in English and German, and with 256 pages divided into 9 chapters, the book focuses on:

- Management and quality assurance
- Humanitarian assistance and complex emergencies > missions abroad
- Development co-operation > missions abroad
- Interdisciplinary medical education
- Courses for medical specialists
- Public health
- Research and evidence-based decision-making

Course content, plus requirements and conditions for participation, and course organisers' contact details are given. The publisher points out: 'Medicine & health is especially valuable as it also contains an address directory of more than 700 international organisations and universities. Moreover our editors worked out lists of important websites, periodicals and books. The course descriptions are meaningfully supplemented by scientific papers and articles by renowned authors.'

- Medicine & health 2003/2004 costs €37,70 (Austria and Germany) €39,70 (Europe) €49,00 (overseas).

Orders: Going International, Fasangasse 28/27, 1030 Vienna. Phone: +43/(0)1/798 2527 15. www.goinginternational.org

PURCHASING

Spectrum Care Ltd, a buying consortium for some 130 nursing homes in the UK, has 'preferred purchasing agreements' with a wide range of suppliers for various goods and services, to which the firm has added True Health, Inc - specialist in healthcare recruitment and 'pressure relieving systems'. The firm will be the 'preferred' provider in three categories: pressure area care products; patient moving and handling equipment, and nursing home beds. Nursing homes in Spectrum Care's network will be offered products in those categories at a discount and with preferred payment terms. A joint marketing initiative with Spectrum, including a co-branded catalogue and joint sales ventures, are planned.

Through its subsidiary, Westmeria Healthcare Limited, True Health supplies medical equipment and medical professionals for healthcare, e.g. providing locum radiographers and nurses to the National Health Service (NHS) and private nursing homes. The firm also supplies pressure-relieving equipment - manufactured and licensed by the firm in Germany, Belgium and Taiwan.

KIMES 2004
19-22 March, Seoul, Korea

Up to 750 companies from 30 nations are expected at the 20th Korea International Medical & Hospital Equipment Show (KIMES).
The exhibition area covers 25,101 square metres, and the organisers report that 12,000 items in 500 medical categories will be displayed. These include equipment for consultation & diagnosis, clinical examination, radiology, surgery, physiotherapy, ophthalmology; dentistry, A&E; oriental medicine; pharmaceuticals, disposables, etc. There will also be a section on hospital accommodation.
About 60,000 people are expected to visit the trade fair, and medical conference plus seminars.

Sponsors: Ministry of Commerce, Industry and Energy; Ministry of Health and Welfare; Korea Food & Drug Administration (KFDA); Korea Trade Investment Promotion Agency (KOTRA); Korea Health Industry Development Institute; The Korean Hospital Association; The Korean Medical Association, and The Korean Medical News
Further details: **www.kimes.info**

GUNNING DOWN IT AND PACS PRICES *continued from page 1*

He had also implied that, if PACS and LSP contract bidders' prices were not lowered, the government would build its own systems (although the NHS had attempted in the past to produce PACS systems in-house and apparently found this too expensive and time-consuming to be feasible).

Following much hammering, through recent months, contracts were announced to provide the public with individual NHS electronic patient care records (EPR) - that is, all contracts except one.

British Telecom (BT) was awarded a £620 million 10-year contract to create the infrastructure that will provide 50 million of England's National Health Service patients with their NHS EPRs.

BT then gained a £996 million 10-year contract covering London regions, and the firm Accenture won a £1099 m 10-year contract to serve the North East, and also later gained a contract for the Eastern Region. The contract covering the North West and West Midlands was awarded to the firm CSC.

Then Richard Granger suddenly postponed the award covering the South of England, ostensibly 'to give each of the contenders more time to focus on quality and price'. Further rattling the bars, he added that he might invite other bidders to tender if the price didn't turn out to be right.

Bidders for the last contract: The Fujitsu Alliance, PlexusCare and SchlumbergerSema. Finally, at the end of January, the last LSP contract, worth £896m and running till 2013, was won by Fujitsu.

Richard Granger is said to be satisfied that the NHS had driven down costs by using commodity-based pricing.
(Now an electronic booking service? See page 9)

MERGER TO BOOST EU TRADING *continued from page 1*

Systems; Baxter International, Inc.; Abbott Laboratories; Medtronic, Inc.; Amerisource Bergen Corporation; B. Braun Medical Inc.; Becton, Dickinson and Company; Boston Scientific Corporation; Cardinal Health, Inc.; C.R. Bard, Inc.; Fisher Scientific International Inc.; Guidant Corporation; McKesson Corporation; Siemens Medical Solutions; Tyco International, Ltd.; as well as buying organisations Premier, Inc. and HCA.

PLC GmbH offers a communications network for active electronic communications between over 60 suppliers, medical and pharmaceutical wholesalers as well as more than 320 European hospitals (including those using the SEDICO inventory management and pharmaceutical transaction systems). PLC Net supports the necessary reconciliation of the hospitals' item master, electronic purchase orders, the upload of purchase order acknowledgements, delivery notes and invoices as well as external requisitions (i.e. data generated via SEDICO-scanner). In October 2003, PLC Net transmitted over 19,500 purchasing transactions.

D.Logistics is a holding company whose subsidiaries offer logistics and logistics-related services largely provided on a customer and project-specific basis. The group has 3,550+ employees worldwide. 2002 turnover: EUR 343 million.

Further IT and company reports: pages 4-8

More space demanded for ComPaMED

134,700 visitors at MEDICA

Germany - The organisers of MEDICA - the world's largest medical trade fair, held annually at Messe Dusseldorf - have reported the highest number of visitors to the event in its 35-year history. In November 134,700 professionals passed through the gates, 2,200 more than in 2002. Over a third came from abroad, which gave the c. 3,900 exhibitors from 65 countries '... excellent opportunities to establish contacts with relevant decision makers from all over the world'.

A walk through the 17 fully-occupied exhibition halls confirmed the role of MEDICA as a barometer of the medical industry's innovativeness, said the organiser: 'Major progress was demonstrated, for example, by medical implants, where the trend is towards biological instead of metallic materials. In addition, replacement joints are being launched that can precisely reproduce a natural movement sequence - for example the knee's roll-glide movements. There is also an increasing dominance of the "Lego" principle. Implant components can be joined and combined in an individual manner.'

Important developments were also seen in consumables. For example, a new safety cannula, launched at MEDICA has a protective mechanism that is easily triggered manually, and this slides over the cannula to lock irreversibly after use.

Advances in laboratory technology and diagnostics were key subjects of discussion at the Congress - and particularly biomedical applications. 'In diagnostics, so-called bio-chips provide information as to whether, as a result of certain blood parameters, the risk of some illnesses (such as a heart attack) is higher. Even bio-chips that can prepare a complete hormone profile from blood are being developed, and new bio-chip readers enable quicker and less error-prone evaluation than conventional analysis devices,' the organisers pointed out.

In medical technology and electro medicine, the presentation quality achieved by imaging devices can increasingly replace painful and time-consuming invasive diagnostic procedures - as seen in the latest multiline CT scanners for cardio-diagnostics, that supply top quality images and precise therapy planning in minutes - and at considerably lower cost than in invasive examinations.

IT - Software to merge the individual 'software islands' of specialist clinical departments (radiology, cardiology, etc) into a complete hospital information system (HIS), mean departments can continuously update electronic patient files as treatment progresses. Workflow business software can also help with the new settlement system that demands lump-sum case amounts, by enabling treatments to be documented in a perfect manner and with economic effects monitored. Such systems were demonstrated during user forums: MEDICA meet.IT and MEDICA MEDIA, as well as in the Integrated Healthcare Enterprise Forum, where users also reported experiences in using new software and IT solutions in clinical practice.

Traditionally focusing on the transfer from theory to practice, the MEDICA Congress plus courses and seminars covered practical everyday medicine as well as trends in science and research. Progress in cardiology and molecular oncology, early detection of dementia, and minimally invasive surgical techniques were among the themes. 'We clearly hit the target with the programme offered,' said Gerd Fischer, General Secretary of MEDICA Deutsche Gesellschaft für medizinische Diagnostik (German Society for Medical Diagnostics).

The 26th German Hospital Conference was completely dominated by the health reforms and the introduction of the new settlement system for inpatient care units. Over 2,000 congress participants obtained information on the consequences for hospitals and clinics resulting from the reforms. Congress President Wolfgang Pföhler said: 'Against the background of current developments in healthcare, the Hospital Conference succeeded in convincing through a combination of health policy and practice-oriented subjects.'

ComPaMED, held in conjunction with MEDICA as an international trade exhibition for the medical production supply market, had 182 exhibitors presenting raw materials, primary products and components for the manufacture of medical products. This year, it was not possible to meet all exhibitor requests for increased space, which will not be the case in 2004, when ComPaMED will held in a new exhibition hall.

MEDICA and ComPaMED 2004 will run from 24-27 November. (ComPaMED runs to 26th)

Details: www.medica.de

An interview with **Dr Matthias Krebs**, Managing Director of Trumpf Medizin Systeme

TRUMPF EXPANDS GLOBALLY

Originally focusing on precise sheet metal processing, e.g. for operating theatre tables and ceiling mounts, in recent years the medical division of the privately owned group Trumpf Group - Trumpf Medizin Systeme - advanced into medical technology. 'Machine tooling is particularly dependent on economic trends, so we became active in medical technology to become less dependent on market fluctuations,' Dr Krebs explains.

In 1990 the firm took over H¸ttinger Elektronik GmbH + Co. KG in Freiburg, which had supplied Trumpf with generators for laser work, and also manufactured cardiac surgery equipment. By the mid-90s Trumpf had increased development of its medical technology business and, in 1998, bought Blancomed, which specialised in operating theatre tables and was already working on a groundbreaking new operating table. Trumpf developed this further.

'This area quickly grew under Trumpf, and became so strong that we considered a complete range of products for the operating theatre. In 2001 we bought Kreuzer GmbH + Co. oHG. We were very innovative and market conditions were favourable. Customers were looking for alternatives, and those we offer are as good as or, in some cases, better than other firms' products.'

Today, the firm produces operating tables and accessories, ceiling mounts, mobile function furniture, laser equipment and tumour therapy equipment,

Matthias Krebs interviewd by Daniela Zimmermann

etc. and offering development and production services for industrial partners, and reports sales representing a 30% share of the German market. 'This is quite extraordinary,' says Dr Krebs, adding that it also reflects the success of medical technology over that period of time. 'But we would not be as successful if we simply offered operating tables.'

Following the Kreuzer acquisition, and development of its product range, including operating theatre lights bought in from a

When Samuel Smith set up his clock and watch-making business in London, in 1851, he could not have imagined that he was laying the foundation for today's **Smiths Group**, the international engineering company that produces aerospace systems, detection systems, mechanical seals and even medical products. Still headquartered in London, but with production in the UK, USA, Europe, and Mexico, (KEN - OTHER PLACES????) Smiths shares are listed among the 100 leading UK companies and sold only via the London Stock Exchange.

Recently the group streamlined its medical devices subsidiaries to form one global organisation - Smiths Medical Systems - drawing together over a dozen subsidiaries. ***Lawrence Kinet,*** *Group Managing Director of Smiths Medical*, explained the strategy behind this amalgamation in an interview with ***Brenda Marsh****, Editor of European Hospital*

The new name at MEDICA

At the turn of the millennium, Lawrence Kinet (55) joined the Smiths Group Board as an executive director. In the same year, when appointed Group Managing Director of the group's Medical Systems division, he began to analyse its medical enterprise as a whole. With some 25 years in the medical devices industry behind him, he already had preconceptions about the operation: 'Before joining the company I saw a very good business, and very good products. Later, I found it had very good people - and I could see the advantages of those strengths. But, given their independent basis, the groups couldn't thread together. There were over a dozen different companies, and Portex, for example, was two separate companies using the same name, but they even had different logos!

'What was needed was an analysis of strengths - which included the manufacturing of plastic-based products. Disposables - a great field, where medicine is moving quicker. It was clear we would have to change - shifting towards the customers' standpoint. To reflect the globalisation of the medical devices market we needed a single global strategy for research and development, manufacturing and marketing. Without that I didn't think we could add value in the long term.'

In 2001 Smiths Group paid $35.6 million to acquire Bivona Medical Technologies, which specialises in silicone tubes for anaesthesia and critical care - complementing Smiths' extensive Portex range of single-use devices, sold worldwide. The Portex PVC tubes are lower cost, more rigid devices, typically used for short periods. For some applications, particularly in babies and infants, and for long-term use, a softer material such as silicone is preferred, so bringing in Bivona significantly extended Smiths' range of single-use disposable devices, added new product and material technologies, and strengthened the group's position in the paediatric devices market.

Annual sales reported for Bivona products were US$21 million, but only 20% of this turnover came from beyond the US. In the parallel year Smiths medical division reported sales of £453 million and profits of £93 million. Therefore, boosted by the strong global presence of Smiths, the acquisition pointed to greater international sales potential for Bivona,

In 2002 Smiths paid US$26 million for an anaesthesia (epidural) kits and trays business from a division of Abbott Laboratories, and production was transferred to Smiths Medical plants in the US and UK.

In the same year, Smiths agreed with Medisys PLC to exclusively distribute the firm's Futura safety syringe and other safety products in North America, Japan and the UK. Due to legal requirements to protect health workers from needlestick injuries, and greater awareness of the need for safety systems, this is another dependable investment area. 'We see the availability of a low cost retractable hypodermic system as essential to our strategic growth plan for needle protection products,' Lawrence Kinet explained. The Medisys agreement, he added, swelled the product range, placing Smiths among the global leaders for sharps safety products. (Complementary products produced by Smiths are a safety scalpel and needle-less connector system).

In 2002, Smiths Group off-loaded two specialist medical device businesses (focusing on urology and ostomy). (Price: £7.3 million).

In August 2002, the newly founded Smiths Medical Östereich GmbH began direct selling of all the firm's medical products in Austria, adding another country base to its offices in Europe.

Finally, in June 2003, the Smiths Group brought its many medical devices firms - e.g. Portex (two firms), Deltec, Graseby, Level One, Bivona, BCI, Wallace, Pneupac and pvb of Germany - under one international title and organisation - Smiths Medical - and exhibited their brands under that banner and on a single stand, for the first time during MEDICA 2003 (November), although all - all retaining their easily identifiable brand names to retain brand loyalty.

On display: products for airway management, pain management, temperature management, needle protection, hospital and ambulatory infusion systems, critical care monitoring, vascular access, surgical drainage, and in-vitro fertilisation. (Also see box).

Also visible was a streamlined, united organisation with greater distribution potential. 'Our old approach was essentially independent. Now there is one centralised, complete, specialist group, getting the quality and delivery right,' said Lawrence Kinet.

'We have sophisticated medical products, and presently aim to improve sales in the big five: US (presently c. 60% of sales), Japan (currently 15%), and the rest in the UK, Germany and France.

Production was also among changes made in the past few years. 'Labour and overheads are very important,' Lawrence Kinet said, pointing out that a Smiths plant in Tijuana, Mexico, which employed 3-400 people to produce plastic products, now has around 1,500 employees. More complex equipment, such as electronic and diabetes devices, are made elsewhere (e.g. there are four manufacturing plants in the USA, three in the UK). Research and Development(R&D) still takes place in several locations, but has also been 'brought together', he pointed out.

During the last reporting period Smiths Medical's turnover was about EUR 700 million, with a profit of 18% of turnover. And the group aims to double its worldwide turnover within the next five years. Does this mean more acquisitions?

'We will stay within procedures and therapies - for example diabetes and anaesthesia - in which we have done well, and we will go forward with a number of different acquisitions. There are 4-5 company names in my little black book right now,' Lawrence Kinet replied.

Following analysis as to whether they fit in with the Smiths products and plans, and after gaining the Board's agreement, how long might yet another acquisition take?

'It's easier when a group of investors decide it's time to sell, and we bid for the price. Then it can take about 90 days to bring it in,' he added cheerfully, though a little briskly, clearly needing to end the interview and further pursue his strategies for Smiths Medical Systems.

Among Smiths products at MEDICA

Xtrans An invasive device to measure blood pressure, which the firm reports leads the field: it has a link-interface between re-usable and disposable components.

Deltec Cozmo insulin pump This provides consistent, precise insulin delivery, allowing diabetics to personalise treatments and adjust dosages to suit lifestyle.

CompPAC For use during military or civilian emergencies, the firm reports that this is the only self-contained, portable ventilator that can operate in an environment contaminated due to nuclear, biological or chemical attack.

Tuttlingen firm, Trumpf began to offer complete systems. 'Other firms offer them,' he points out, 'but we are an owner-run company, so not dependent on quarterly reports, and we can plan long term. If new business sectors and trends become strategically important for us, we can adjust accordingly.'

In the next two years the firm plans to 'sensibly combine products' in its portfolio, aiming to expand in the systems field.

Trumpf also has a separate consultancy firm, to advise on and equip operating theatres, alongside the customers, he emphasises. 'We advise hospitals about optimising processes - key words: patient logistics and workflow.' Often, he points out, existing consultancies do not have the practical know-now of the Trumpf employees, e.g. nurses with years of experience in operating theatres. Hospitals see a potential for change, but do not know how to optimise processes, so we assist either by introducing new products or just in consultation.' Hospitals may request a precise analysis of their processes and workflow, and are happy to pay for that service, he points out. 'This is certainly a good area of activity - particularly in the US and Asia, where consultancy needs are higher. We want to become international, i.e. to found our own subsidiaries in economically viable markets, and to develop a network of international distributors.'

With representatives in the US and Asia, last year the firm established subsidiaries in Italy and France, which are, Dr Krebs points out, Europe's most important markets for theatre tables and lights. 'We intend to become a market leader like our parent company. But this will only be possible if we base ourselves in a stable market such as Germany, and tackle other markets from there. We are only just beginning, internationally.'

3M boosts German plant

3M - the multi-tech company world famous for Scotch Tape and Post-it Notes - has opened a new production unit for medical products, investing over 80 million euros, and creating 100 new jobs at its plant in Kamen, Germany

Medical supplies, ranging from cold-hot packs and wound dressings, to surgical products, diagnostic instruments, dental products and pharmaceuticals, presently account for over 20% of the firm's sales.

With a 'sister' plant in Brookings, USA, and smaller production units globally, the Kamen plant is part of the firm's strategy to establish Germany as its centre for European healthcare activities - mainly producing adhesive coating and non-woven materials for wound management, e.g. waterproof Tegaderm transparent dressings, hypo-allergenic Micropore non-woven tapes, and elastic dressings for muscle/joint injuries.

Dräger Medical

New product line success

Dr Wolfgang Reim

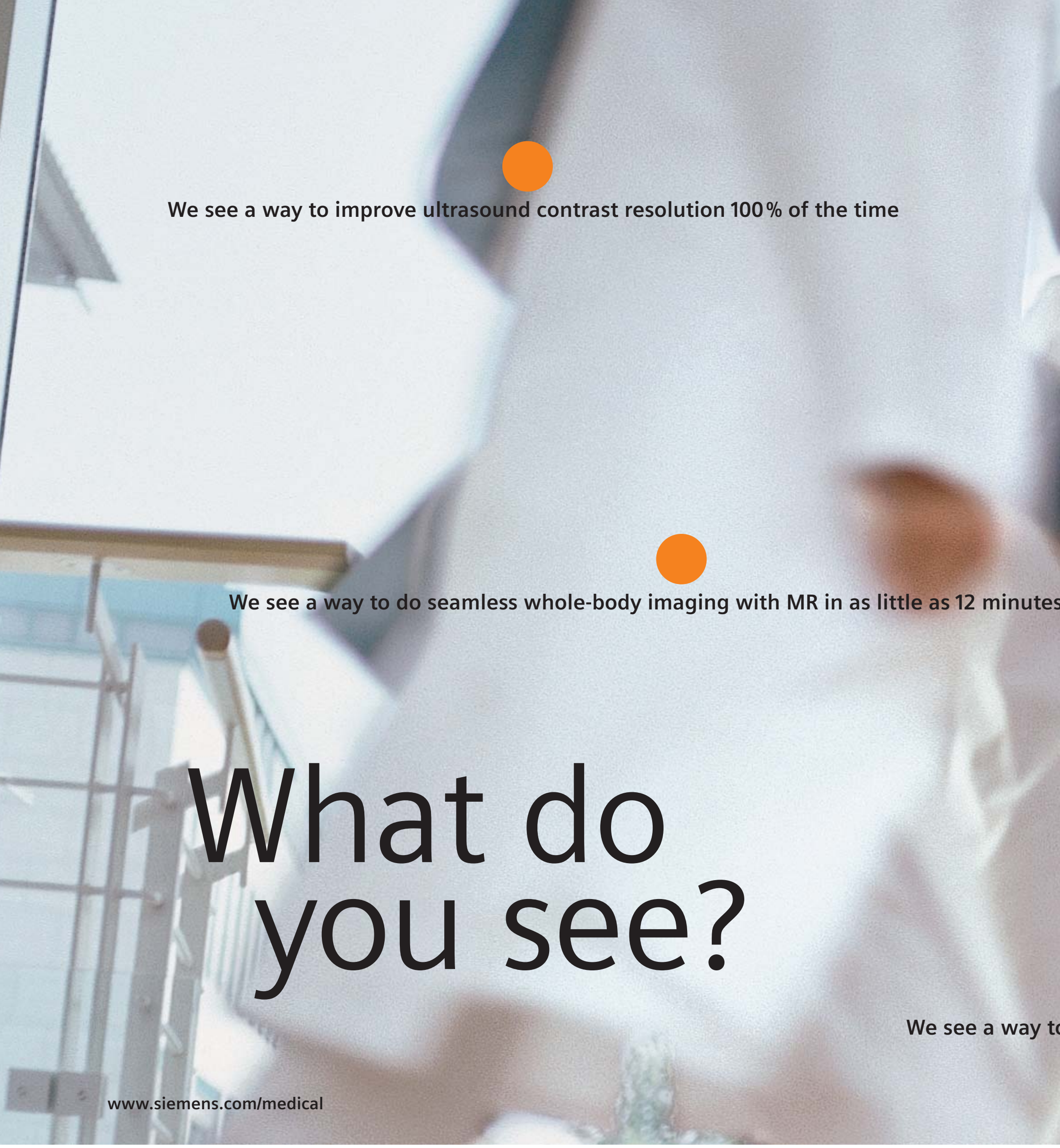
Following the launch of their joint venture, last July, Dräger Medical reports: 'Thanks to the quick integration of the new Business Unit Monitoring, the company has already achieved its first financial successes during the third quarter of 2003. To date, the new product line has contributed almost €50 million to the third-quarter turnover.'

At Medica 2003 Dräger Medical unveiled the next generation of the firm's Infinity Patient Monitoring System, which provides therapy, monitoring, and IT both in critical care and at the bedside, because, the firm points out: '... with the Infinity Explorer diverse types of information - whether it is data concerning anaesthetics or intensive care medicine - can be integrated'.

Along with general monitoring, Infinity Explorer provides data on ventilation and treatment, etc. plus lab and X-ray results, all of which are constantly accessible by clinical teams - via the Infinity Network,

'The quick realisation of the benefits the joint venture has generated for our customers was our first priority - and this was shown at Medica 2003, when we presented a new patient monitoring product family as well as different integrated solutions for the support of clinical processes,' said Dr Wolfgang Reim, President and CEO of Dräger Medical.

The biggest division of Drägerwerk AG, Dräger Medical - a Dräger and Siemens Company - is headquartered in Luebeck, Germany, and has R&D and production plants in Europe, the USA and China. The firm employs some 5,700 people worldwide to produce integrated systems throughout the patient care process in all CareAreas™, i.e. emergency, OT/anaesthesia, critical, perinatal and home care.



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TAKEOVER

Atos Origin gains SchlumbergerSema

London/Paris/Amsterdam - SchlumbergerSema - recently awarded a £64.5m 5-year contract to provide core services for the UK's National Health Service National Electronic Booking System - the first of its kind in the world - was last month bought by French firm Atos Origin.

SchlumbergerSema is a leading expert in EPRs, electronic prescriptions transmission, tracing services etc. In France the firm designed and implemented the health smart card system, SESAM Vitale. In Sweden it introduced mobile technologies for healthcare professionals to access patient records securely via portable computers.

Atos Origin, also a global IT services company, providing consultancy, systems integration and managed operations, reported annual revenues of EUR 5 billion+. The firm employes 50,000 in 50 countries, and clients include: ABN AMRO, BP, Ericsson, Fiat, France Telecom, ICI, Philips, Renault, Royal Bank of Scotland, Saudi Aramco, Shell, Telecom Italia, and Vodafone.

The new NHS Electronic Booking System - Using this, when referred to hospital by GPs, patients will be able to choose from an options menu the hospital they want to attend, plus the date and time.

The first stage of its nation-wide introduction will be this summer, and should be nationwide by the end of next year.

Electronic transmission of prescriptions is also planned in the UK.

Sun shines on Sun

A trial of Sun Microsystems' Linux-based Java Desktop system has been ordered for the UK's National Programme for IT. The National Health Service (NHS), Europe's largest healthcare operation, uses about 800,000 PCs, and this move threatens Microsoft's near-monopoly on that market. It is reported that Microsoft has been seeking renegotiations of its desktop contract with the NHS.

The Pentagon is said to have switched to Java Desktop, for cost and security reasons, plus the fact that the software can be used on existing PCs. StarOffice is also used by government departments in France, Germany, Israel and Brazil, and the Chinese have agreed a trial for about a million Java Desktops, which could increase to 200 million if successful.

Sun also partners British Telecom (BT), from which it recently received a 10-year contract relating to England's National Programme for IT.

Agfa Communications contracts flow in

The Netherlands - The Sint-Maartenskliniek Hospital, Nijmegen (one of Europe's leading hospitals in orthopaedics, rheumatology and rehabilitation) has signed a multi-million euro supply and servicing contract with Agfa for a complete ADCTM CR (Computed Radiography) solution, together with a hospital-wide RIS/PACS system.

The digital network will be the basis for growth towards a full-blown EPR (Electronic Patient Record) at the hospital. Dr M Obradov, Head of the Radiology Department, said the network will help in planning, preparation and surgical procedures.

Belgian and Luxemburg hospitals - Last year Agfa also signed agreements (worth c. six million euros) with seven hospitals to provide in-house digital care networks and link with the hospitals' surrounding care networks, involving ADC Computed Radiography (CR) and integration of the RIS/PACS with IMPAXTM.

In addition, University hospitals AZ Brugmann (Brussels) and AZ Damiaan (Ostend), introduced five-year plans to change to a digital environment. With Agfa, the Brugmann hospital (part of IRIS, the largest healthcare group in Brussels) will digitise radiology and clinical information in the outpatient clinic, emergency centre and central services department.

AZ Damiaan, a merger of two private hospitals two kilometres apart, transports patients by bus between the campuses for examinations. The introduction by Agfa of ADC CR solutions on both sites, connecting them with an Agfa RIS/PACS Broker (RIS Gateway), is the first step to complete use of IMPAX. Agfa Finance offered a flexible solution for the hospital to annually budget a fixed operational cost for seven years.

The Cliniques du Sud Luxembourg is generally considered a pilot case for Luxemburg hospitals, with whom extensive communication exists. Working closely with its IT department, Agfa managed to right-size CR and IMPAX solutions. The two campuses of this hospital share data over a fixed leased line, using the same archive and offering the surrounding care network to access the information with a web browser over Agfa's IMPAX WEB1000TM server.

Additionally, the new Hôpital Kirchberg, will install ADCTM CR solutions, including CR mammography, and Agfa's RIS/IMPAX solution, and the Centre Hospitalier du Nord wanted its IMPAX solution connected to the existing RIS and to expand its ADC CR infrastructure.

Australia - Last September, Agfa also agreed a $17 million PACS/RIS contract. Perth's primary teaching hospitals and, ultimately, the state's secondary and regional centres will access the system.

David Chambers, General Manager of Agfa HealthCare Sales Asia-Pacific said the project - called WA PACS - is designed for comprehensive health image management in Western Australia (WA) and will be the largest of its kind in the Oceania region.

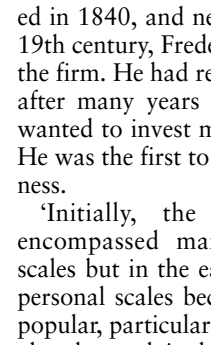
Unlike similar large-scale projects undertaken by Agfa HealthCare at major hospitals in Queensland and in Auckland, the WA tertiary hospitals will use one common PACS database and storage sub-system, rather than operating as separate site-linked entities. The consolidated informatics system will be designed to have complete 'redundancy', so that it will continue functioning even if the primary data centre fails. Connection to the data centres for all hospitals will be via a dedicated gigabit wide-area network.

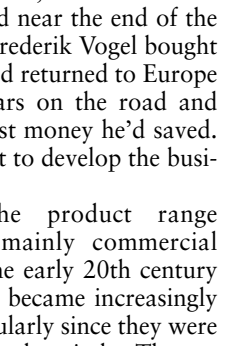
Germany - This year, Agfa is introducing its RIS/PACS system and stand-alone RIS modules to Germany. The QDoc RIS enables full context integration with the Agfa IMPAX as well as other PACS, HIS or EPR systems.

QDoc RIS modules, which help optimise workflow by streamlining patient registration, work lists, transcription and billing, can be used individually as a stand-alone solution. The system also incorporates speech processing.

Sönke Vogel is a rare breed of businessman. In a world of public companies and partnerships, he is owner and managing director of a firm that has been family owned for well over a century: seca **Vogel & Halke GmbH & Co**. In a European Hospital interview he described the firms developments and measures future prospects

seca: a weighty past - and future





Frederik Vogel, one of the prime fathers of seca Right: early seca models

'In 1821, a monk named Quintenz invented the decimal balance, which allowed large loads to be weighed on a minimal surface,' Sönke Vogel said, explaining the origins of this unique family firm. 'In the monk's Strasbourg workshop was a young journeyman locksmith from Hamburg, and he was convinced a lot of money could be made from this new device, so he returned to Hamburg and, in 1840, began to sell the decimal balance to warehouses and other businesses around the port. Hamburg being a large port, the locksmith also exported the balances very early on. That's seca's "cradle". So, seca was founded in 1840, and near the end of the 19th century, Frederik Vogel bought the firm. He had returned to Europe after many years on the road and wanted to invest money he'd saved. He was the first to develop the business.

'Initially, the product range encompassed mainly commercial scales but in the early 20th century personal scales became increasingly popular, particularly since they were already used in hospitals. The art nouveau chair scales of that period are not so different from the scales we use today.'

In the 1970s, your company reached a turning point?

'Yes. Many companies live and grow around a special know-how. For us this was building scales. In mechanics is an important art because you need to compare weight and power with as little friction as possible. At that time we built any product that related to this technology: scales for industry, commerce, liquids and powders and personal scales, and so on.

'In 1970, I realised that, to remain successful, we would have to focus on one area. To prevail in the marketplace you must be excellent at whatever you chose to do - better than the rest. But we couldn't be best in all areas. So we figured out which market segment we could be successful in, long term, and which corresponded best to our company in terms of size - where we could be the market leader. We decided on medical scales and consistently cut away all other branches - although we were market leader for the coin-operated scales found in train stations and restaurants. At that time many firms diversified - to expand. We did not want to be sidetracked. In hindsight we know we made the right decision. Since 1980, we developed from one faceless company among many to become a European market leader in medical scales, and we have continued on an international route since then.'

Who is the company's main competitor today?

'Worldwide we have two - one Asian, one American - who try to give us a hard time internationally. But both are organised differently; for them, medical scales are just one business division, which is an advantage for us: all our resources flow into the medical scales sector. Consequently we have a significant innovation rate. After all, 5-10% of our turnover goes into research and development (R&D).'

And the turnover?

'Because we are a (private) company who do not disclose annual figures - with good reasons. However, to give you an idea: From our Hamburg headquarters we operate all major functions - development, marketing, sales and distribution, admin and production, the latter being mainly pilot production. Production and administration account for a staff of about a hundred. Other production sites are located in the Czech Republic, Mexico, and China. For sales, in some countries we established distribution companies, in others we have permanent partners.

Multi-functional scales weigh standing, seated and wheelchair patients

Seca Nova 754

Has seca ever been targeted for a take-over?

'Oh yes, many times - and some quite tempting. But seca is a family business, which I have headed since 1970. It's close to my heart, not just a matter of history. I am also responsible for our employees. So, it's my serious wish to accompany seca many, many more years. Maybe the exceptional thing about seca is that today there are not many companies left that have survived for 160 years - and successfully at that.'

What about new products?

'We are working on many. Some are real innovations - of course, all to do with weights and measures. We are using the advantages of digital technology and the options this technology offers in terms of simple and versatile processing. I could talk forever about this but I trust you understand: I cannot go into details.'

Then will you discuss the complexities of international markets?

'Yes, we were quite surprised that on other continents and in other countries the needs and practices in terms of medical weighing are quite different. For example, today, in Europe, weighing is largely digital. In Germany, 60-90% of all scales are digital. In the USA it is the other way round - yes, hard to believe that in the land of technological progress, most scales are not electronic. There are more peculiarities: In the US, you read a sliding weight scale on the right side, not the left, as we do. And, in Asia, they only use round dial scales, on which weight is shown automatically. On a sliding weight scale the counterweight is adjusted manually on the beam. In Asia, nobody would ever buy that.

Do the Japanese wonder why anyone would need scales for up to 140 kg while the Americans need one for up to 250 kg?

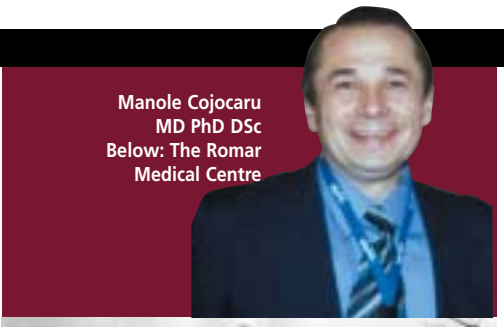
'Obviously Asians weigh on average much less than North Americans or Europeans. Having said that, we are also facing the phenomenon that obesity increases at the same rate as underweight. Therefore, seca offers products that cater to standard needs and to exceptions. There are personal scales that go to up to 500 kg.

'In the end, every company has to deal with such issues because it's about user needs and habits. On the one hand, we must ensure we are always one step head technologically, but must make products that are useful, user-friendly and sophisticated. That is more important than anything else. Look at design. What distinguishes us from other firms in this industry is that for generations we have attached great importance to design. Why? Very simple: we make the quality of our products visible by their design - and we have received many international design awards.

So do bathroom scales need a different design for Japan?

'I'm convinced that scales for home use have country-specific features. If you look at the different products you find in the different markets you can see clear differences in aesthetics and taste. However, we must consider different functional needs, not different tastes, because that's not economically feasible. Our design is classic, minimalist. It is here to stay and internationally accepted.'

Sönke Vogel in an interview with Daniela Zimmermann, Executive Director of European Hospital



Manole Cojocaru MD PhD DSc
Below: The Romar Medical Centre

Colentina Central Clinical Laboratory opts for public-private partnership

By **Manole Cojocaru** of the Romar Medical Centre, Bucharest, Romania

Health reform, urgently needed in Romania, will make hospitals more accessible in the future. Our country is also engaged in a transition from the public medical laboratory to a public/private laboratory - and hospitals play a crucial role in this transition.

In 2003, a collaborative pilot public-private partnership (PPP), which, as a business model, allows the private sector to finance the necessary infrastructure and improve service delivery to the public, was established. This involved Colentina Clinical Hospital, in Bucharest, and its public-private sector partners. This pilot project has demonstrated excellence and innovation in the establishment of public-private partnership, to benefit the public.

At the Central Clinical Laboratory Colentina, ROMAR Medical Centre, I believe, from our experience, that we have created a very valuable model for PPP for the future (a project of key strategic importance to the development of competitive laboratories). The project is based on co-financing, compatibility with development objectives and complementary investments - very positive steps forward, which should be recognised as such.

The interlinking of public and private contributions creates significant synergy for development of co-operation. In our national context, the injection of private finance will accelerate the delivery of the public capital programme.

First - and most important - it is clear that, within the contest of an insufficient budget, a hospital manager should consider the clinical laboratory to be a priority. The PPP delivers more cost-effective laboratory services and generates flexible revenue sources.

Carefully structured public-private partnership, as seen in the Colentina Clinical Hospital, represents one way to achieve our community objectives. PPP in our hospital is based on a deeply shared interest in the success of our co-operation.

The PPP is a co-operative project between the public (Colentina Clinical Hospital) and private sector (Romar Medical Centre), built on the initiative of each partner, which develops or improves facilities and/or services needed by the public through the appropriate allocation of resources, rewards and responsibilities. A partnership contract is essential, to protect Colentina Clinical Hospital. Additionally, built into the contract must be mechanisms and processes to manage the process of collaboration between our hospital and the Romar Medical Centre. Appropriate PPP with the Romar Medical Centre has enhanced the quality, efficiency or effectiveness of capital projects or operating programmes and services, including infrastructure and services benefiting the public.

The application was made by the Colentina Clinical Hospital, and Professor Sorin Simion MD, Director General, representative for each public partner, plus a private partner, signed the application.

The state retains responsibility for commissioning services, on behalf of the collective. We recognise the distinction between the public and public-private sector, at present the hybrid public-private laboratory (a public good), and our current practice is to consider the division of medical laboratories between a public and private sector as normal. The Public-Private Sector needs to carefully analyse what limits public-private sector investment and performance in terms of new technology, higher education and the skills development of highly qualified personnel.

The PPP in Colentina Central Clinical Laboratory is focused on output, not input. Due to this, there are excellent signs that the public-private laboratories will play a leading and highly responsible role.

A partnership for laboratory services means responsibilities and targets that both parties understand and from which they cannot retreat. There are very positive steps forward and these should be recognised as such. The potential benefits of PPP extend far beyond support functions, or the construction of the public infrastructure through the Private

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HOSPITAL CONNECTIVITY The impact on POCT

Point of care testing (POCT), near patient testing and connectivity are expected to reshape the European diagnostic equipment market over the next decade, according to a report published by the international consultancy firm Frost & Sullivan (http://healthcare.frost.com).

Greater connectivity at the POCT is expected to enable prompt and effective treatment, the report states: 'Improved clinical outcomes, especially for time-sensitive indications such as cardiac diagnostics, are likely to encourage the deployment of POCT or near patient tests. The development of POCT connectivity is also anticipated to reduce costs associated with a centralised laboratory. These, along routine hospital modernisation are set to boost uptake of POCT in Europe, showing a significant increase in use in 2005-2006.

'Three phases are likely to mark the evolution of POCT and connectivity - the connection of POC data to the laboratory information system (LIS), the integration of radiology data from the picture archiving and communication system (PACS) with diagnostics from the LIS, and the roll out of a fully integrated system with hospital-wide data availability using the hospital information system (HIS).'

The public sector holds the greatest potential in terms of usage volume, but budgets have impeded the uptake of POCT. 'The difficulty of quantifying financial benefits in terms of workflow changes is, moreover, retarding the implementation of these new technologies in public sector hospitals,' the report continues. 'Where a more holistic view of hospital operations is taken, POC and near patient testing have advantages for patient care, and in some instances, overall costs. Improved aspects of patient care will, in turn, encourage many non-laboratory healthcare professionals to accept or even champion POCT. For instance, early treatment of clinical conditions diagnosed by POCT devices is inevitably much less expensive than remedial care following patient deterioration.

New hospitals or facilities are expected to offer the greatest potential for uptake of POCT and near testing, and their experience should create a positive ripple effect, the report pints out.

However, one of the issues to overcome is the concern of centralised laboratory staff that POC and near patient tests will render them redundant, the report points out. Another is the impact that such technologies will have on healthcare professionals involved in POCT from a non-laboratory background. The responsibility of misdiagnosis will shift from a centralised service to these non-laboratory staff, thereby increasing their workload pressures.

Full details of costs, staffing changes, work practice changes and clinical outcomes must be publicised, the report concludes, which would require 'a great deal of confidence on the part of the vendor, as it may reveal commercially-sensitive aspects of their activity.'
Details: http://healthcare.frost.com. 'Hospital Connectivity - Impact on Point of Care Testing.' Code: B264

continued from page 9

Finance Initiative (PFI). Additional benefits are created and shared, and the parties are kept within a co-operative relationship. These include gain sharing, and reducing running costs. Expansion also has increasing significance, as Colentina Central Clinical Laboratory well knows, for it is a demonstration of effective public-private partnership (i.e. to create a national network!). Undoubtedly we need to do more in that area because it can help solve pressing financial, technical or managerial problems. Our Public-Private Partnership delivers more cost-effective services and generates more flexible revenue sources. Deepening that partnership, and investing far more heavily in it, will ensure our continuing success in the contemporary global economy. We believe we can achieve remarkable results in fields such as healthcare.

In fact, the greatest challenge for Romania in the future will be to match PPPs in our hospitals (we will aim to find new ways to financially support our development hospital). We look forward to working to make that happen. This is why Romania aims to draw up the Public-Private Partnership concept.

I have argued the necessity of establishing a PPP in support of renewed and sustainable economic and social development through more effective knowledge creation, application and transfer.

EH@ECR2004

MARCH 2004

EUROPEAN HOSPITAL'S SPECIAL ISSUE FOR THE EUROPEAN CONGRESS OF RADIOLOGY

Radiology is the future

and the time is right to invest in PACS

Professor Helen Carty

Communications is a hot issue at this year's congress. Radiologists quickly learned the value of hospital IT systems and recognised the impact PACS integration will have. But do administrators understand their enthusiasm, or will they continue to stare at feet bogged in budgets, and not look ahead to see PACS as a potential rescuer - at least from many radiology costs? To ensure a clear view of PACS is given, the ECR has drawn in expert speakers for the new Administrators Symposium.

'The time is right to invest in PACS, because progress in its development is now at a reasonable level,' said Professor Helen Carty, President ECR 2004, in our recent interview. 'We have to convince administrators that this technology is not a toy developed for radiologists, but a means to benefit patients - to speed up care by having images where and when you need them, with no hold-ups due to mislaid files, and so on. With this assurance, you can better plan some of the patients' appointments and care.

'However, it's no good if an IT department orders for radiologists without understanding their needs, nor for radiologists to order systems without knowing about IT possibilities. They need to work together.' To this end, for the first time ECR 2004 will draw together radiologists and hospital IT specialists and those involved in planning future purchasing for radiology departments.'

In terms of paying the price for IT equipment, the professor points out: 'It's a tragedy to pay more than we need to pay, or to pay less and find the system doesn't work. We have to pay the right amount, to obtain a) reliable and b) fast results. If you can't work in a fixed time, people simply will not use the technology supplied.'

In her passionate belief that '...radiology is the future', and IT is an intrinsic part of that, Professor Carty also pointed out another benefit of communications. 'The ECR is an extremely successful organisation in terms of innovation and progressive efforts to spread knowledge, not only to those who can attend, but those in developing nations who cannot.'

Following last year's congress, of which she was also President, the ECR website presented 'a cyber congress', ensuring many more radiologists around the world could benefit from the event than those lucky enough to attend. Professor Carty is also keen to continue to focus the energies of ECR members on the use of video conferencing: '...a huge international resource for teaching', she says, also pointing out the organisation's work to link with the World Health Organisation (WHO) initiative - to bring advances in radiology to far-away places such as Africa and Bangladesh. 'By using the net, in the broadest sense of the word, real time images and innovations in our field can be accessed. However, there are problems, the biggest being not access to computer equipment - but clean phone lines.'

Professor Carty is also particularly keen on the progress of molecular imaging, and this will be the first ECR congress to focus sharply on this. She talks of this field as 'going down to cellular level very accurately... imaging nerve fibres... seeing pathways, then contemplating a second phase, understanding tumours, which cannot be understood to the same extent by nuclear medicine.' Knowledge about a tumour's permeability and targeting new drugs to the centre, and imaging their effects - a combination of pharmacists and radiologists... companions in research! 'I understand it at a very superficial level,' she points out, but this is clearly exciting - and again, bodes well for the future.

PET CT is also expanding, and again developing the relationship between those in nuclear medicine, physics and radiology. Image fusion, to demonstrate a functional problem, will help surgeons to plan operations, she points out, and it promises to improve the saving of morbidity and alter invasive management. 'This has a potentially significant impact on morbidity. If you can show it, with a bit of luck you can get away with it!' the professor adds.

CT scanning of arteries is another field to excite, with the possibility of 3D images 'not just of the front or back, but also the sides of arteries'.

Non-invasive imaging is rapidly replacing invasive techniques. 'There will be interesting papers presented on cardiac imaging,' the professor points out, indicating that invasive work may become 'for treatment only'.

Her efforts for this congress have not only been drawn to the biggest issues and excitement about high-tech innovations, but are equally spread. Teaching is another issue. Of concern to Professor Carty is the general lack of paediatric radiologists, and that children are not sufficiently treated as such in radiology. 'There is too little paediatric radiology in general training,' she says. The general radiologist is not incompetent, but has less understanding of child patient chests, for example, than they do of the adult chest. 'They need to look at cases in that way, not as children's diseases. Otherwise it can lead to trouble.'

When outlining anything from major to minor for ECR 2004, Professor Carty added that all major manufacturers are producing scanners that are moving in the same general direction - and visitors to the stands or at presentations certainly will view their many promising and perhaps unexpected advances this year. And of no less importance, also keen to give ECR visitors what they want, when the professor heard of a huge demand for extra space for poster presentations - that's what they have.

Brenda Marsh, Editor
European Hospital

IHE Integrating the Healthcare Enterprise in Europe

Hans-Peter Bursig, Secretary General of COCIR (The European Coordination Committee of the Radiological and Electromedical Industry) outlines achievements and new goals for the future

IHE in Europe saw a successful start to the year 2004: 48 companies had registered 83 systems for the European connect-a-thon by the end of the registration period, Compared with the previous year, the increase is over 10%, which underlines the high acceptance that the IHE concept has found in Europe.

It is worth remembering that the European Society of Radiology (ESR) and COCIR initiated the IHE in Europe only in 2000. Since then, IHE in Europe has successfully demonstrated that the complete workflow within radiology departments can be integrated in a multi-vendor environment based on the use of existing standards.

Visitors to ECR 2004 in Vienna will be able to judge this success in a live demonstration of IHE Integration Profiles with commercially available IT products. Additional demonstrations are planned in Germany, Italy, France and the United Kingdom this year.

IHE in Europe is now based on national IHE initiatives in Italy, France, Germany, the United Kingdom and the Netherlands. Additional initiatives are currently being set up in the Nordic countries and Spain. The IHE concept has also spread from the initial field of radiology into IT infrastructure issues and applications in cardiology and clinical laboratories.

Five new IHE Integration Profiles are available to solve problems associated with IT infrastructure. A first integration profile for clinical laboratories was developed in 2003. Activities in the new field of cardiology started in December 2003, in a joint approach by the European Society of Cardiology (ESC) and the American College of Cardiology. Although initiated in radiology, the IHE concept has never been limited to this field. In particular, the new IT Infrastructure Integration Profiles increase the attractiveness and relevance of IHE to providers of hospital information systems (HIS).

Maintaining achievements in the various fields will be no easy future task. A growing number of companies need to be acquainted with the existing IHE Integration Profiles and the IHE Technical Framework - at the centre of the IHE interoperability concept. At the same time, the IHE Technical Framework will need to be maintained and developed further, to align with on-going technical developments.

The IHE initiatives in Europe, North America and Japan have therefore decided on an organisational structure for the further development of the IHE concept. All technical development work, like the development and maintenance of IHE Integration Profiles, will be carried out in field-specific IHE Technical Committees. Currently, technical committees exist for the fields of radiology, IT infrastructure, clinical laboratory and cardiology. All IHE Technical Committees will be open to international participation. Their task is to develop and maintain a single and coherent set of IHE Integration Profiles for their respective field. The goal is to come to global solutions that require only minor adjustments to local requirements. This will also help to reduce the cost of integrated healthcare IT applications.

At the same time, the "deployment" of IHE will be the responsibility of the regional IHE initiatives around the world. Deployment includes education, promotion and demonstration of IHE achievements. In addition to this, regional IHE activities will ensure that local requirements are known to and being considered by the IHE Technical Committees. Through this set up, all participants, even small and medium-sized companies, will have the possibility of participating in IHE development activities.

Based on this success, the global IHE community is currently discussing new goals for the future. IHE has successfully demonstrated that the integration of IT systems within clinical departments is possible. The result of such integration is de facto an Electronic Patient Record (EPR) at departmental level. However, the inclusion of the "Admission, Discharge, Transfer" (ADT) component of HIS in IHE Integration Profiles is making further integration and interoperability between clinical departments possible. Following this approach, an integrated EPR at hospital level could be achieved. A final step could then be to open this EPR for communication with external partners, e.g. outpatient and rehabilitation facilities as well as GP offices.

This pragmatic, step-by-step approach to the building of the EPR has a number of advantages to a single EPA standard. Existing healthcare IT solutions would provide a basis of previously acquired information. The integration process would follow clinical needs and workflows, which would support acceptance. Capital expenses could be spread over time. The complexity of the integration process would be reduced to manageable individual work items.

Developing the existing IHE Technical Framework further into this exciting new direction will be in the interest of all stakeholders in healthcare IT: decision makers, health professionals, solution providers and, most importantly, the patients.

(Details: www.ihe-europe.org)

Factors in improving productivity and cost reductions

Material costs

- X-ray film (smaller formats, 'film-less hospital')
- Contrast media (reduced requirement with modern CT- and MRI equipment)
- Archiving (room, infrastructure)
- Maintenance
- Repairs

Personnel costs

- Automated workflow (fewer user errors, reduced need to double-check, standardised examinations)
- Stable and improved capacities
- Comprehensive activity recording for reimbursement
- Fast availability of documents for doctors to facilitate diagnosis and treatment
- Avoidance of overtime

EUROPEAN HOSPITAL

Published by: EUROPEAN HOSPITAL Verlags GmbH, Höherweg 287, 40231 Düsseldorf
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Subscription rate
12 issues: 74 Euro, single copy: 6.16 Euro. *Send order and cheque to*: European Hospital Subscription Dept

Finishing media technique jöhri, Weilerswist, Germany
Printed by Frotscher Druck, Darmstadt, Germany

Publication frequency bi-monthly
European Hospital ISSN 0942-9085

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Investing in medical technology and IT innovations

What's the value?

By **Maximilian F. Reiser** MD

Given healthcare financial difficulties, worldwide, there is no single example of success that others can simply copy. Industry's adaptive process to global markets is paradigmatic. Modern management is based on clearly defined and standardised production processes, with strict controls ensuring transparency of costs and profits.

Many doctors may not be impressed with the fact that industrial production and marketing methods have entered the world of medicine - however, at the same time, we cannot evade them forever. It also cannot be denied that only those service providers who can deliver high quality medical and nursing care will survive in the competitive healthcare 'market'.

Hospital workflow and processes must be organised to achieve high effectiveness at reasonable cost, so that medical teams can concentrate on their jobs - patient care - and this will only be possible if management, doctors and nurses cooperate in a trusting environment where antagonism makes way for a corporate identity.

'Large-equipment medicine' is often accused of increasing healthcare costs. In Germany, the dangers of ionising rays are often discussed in a very irrational way. Allegedly, too many unnecessary examinations are carried out, which they say is due to bad working practices or even greedy doctors. This seems rather like a call for a kind of 'barefooted' medicine in the 21st century. An analysis carried out by Deloitte & Touche has shown that CT scans and MRI scans are among the five most important innovations in medicine of the last 30 years! Researchers who developed both procedures received the Nobel Prize.

Today, about 80% of medical diagnoses are based on imaging procedures, and those previously achieved only step by step, in a difficult process, can be easily achieved via a single examination method. This has drastically reduced the duration of hospital stays.

Due to costs standardisation in the new DRG-based system, fast diagnosis and transmission without data loss will become increasingly important. To achieve this, and to use limited resources effectively and purposefully, modalities for radiological diagnosis and intervention must be centrally set up and organisationally combined. This allows for optimum use of equipment and personnel, and avoidance of insufficient capacity and unacceptable waiting times.

The critical question concerns suitable cycles for purchasing new equipment. Write-off periods of 7-10 years for equipment that used to be standard can turn out to be counterproductive, also in terms of finance. Innovation cycles for medical and information technology equipment have shortened to 3-5 years, with each new generation of equipment showing vast improvements. These are not merely technical gimmicks or issues of design! Think of film-screen X-rays which used to be the only method of radiography. Some ten years ago digital luminescence radiography was introduced requiring less radiation and enabling PACS transmissions so that the repeat of examinations was substantially reduced. Smaller film formats also lowered costs. Now flat detector technology completely does away with cassette handling and work productivity of radiographers is greatly enhanced.

The spiral CT scan arrived in the 90s; the 4-slice multi-slice spiral CT scan came 1998; the 16-slice multi-slice spiral CT scans in 2002 and 32-64 slices became possible in 2003 - not only dramatically increasing speed in producing single scans, but more precision and diagnostic information. In addition: the use of scans for new examinations e.g. CT angiography and CT colonography.

MRI progress is as impressive. However, it cannot be explained with single, technical parameters. New concepts in coil-design, stronger gradient systems, faster pulse sequences and improved processors mean that whole body imaging can be done - and very quickly. Due to its complex morphological and functional information content, MRI technology could be called the diagnostic 'one stop shop'.

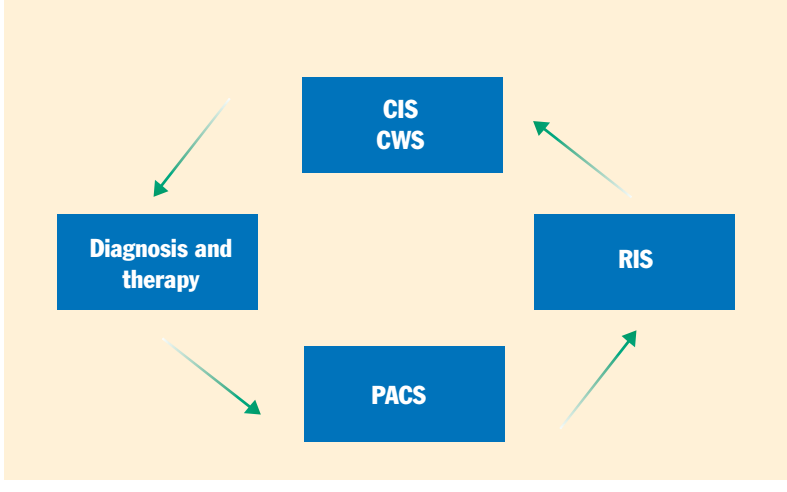
Radiology, administration and clinical information technology systems must be able to communicate with one another to ensure that radiological results can be efficiently used for patient management

Doctors in wards and out-patient clinics have access to radiological images and diagnosis data through mostly web-based image distribution systems. Appointments and patient transports are coordinated with other examination and treatment appointments in a sensible way.

The decision makers can only be convinced that investments in highly modern radiological examination equipment and in networking the hospital's IT infrastructure make sense if future economic advantages can be shown. Not only savings in material cost buts also reduced personnel costs must be achieved.

Apart from improvements with internal structures governing costs and services, competition with other service providers and patient satisfaction are other important deciding factors for hospitals. Radiology and administrative information technology systems have been a driving force behind the development and use of comprehensive IT solutions in hospitals, partly due to the high volume of data created by imaging and the need for 24/7 availability and access to data. Integration of radiological subsystems into administrative and clinical workstation systems is essential. Particularly due to the DRG-based documentation requirements, whereby doctors and medical controllers need easy and comprehensive access to all diagnosis and treatment data.

Being a doctor has become imperceptibly but increasingly less attractive - apart from other factors, due to an overkill of legal and bureaucratic requirements as well as escalating needs for documentation. In this context, effective support through purposeful IT investments might make hospitals outstanding and help them to attract highly qualified new medical staff.



CIS = clinical information system; CWS = clinical workstation; RIS = radiological information system; PACS = picture archiving and communication system.

The round table


Professor Jörg Debatin

Professor Jörg Debatin was Chairman of Diagnostic and Interventional Radiology at the University Hospital, Essen until October 2003. He is now Medical Director and Chief Executive Officer of the Hamburg-Eppendorf University Hospital. Asked whether this role change is - in terms of discussions regarding expansion, purchasing innovative equipment and radiology networks - a move to 'the other side of the table', Professor Debatin replied: 'Indeed, at a glance this does look like a change to the other side of the table, which reflects the old adversarial positions between hospital administration on one hand and physicians on the other. However, the survival of any medical institution in today's hostile healthcare environment - characterised by increasing demands and decreasing resources - will be jeopardised if such thinking is allowed to persist. Adversarial thinking that separates hospital administrators and physicians must be replaced by a deepened understanding of common goals with relevance for the entire institution. We must understand, after all, that we are all sitting around the same table.

In my case the table represents the entire University Hospital Hamburg-Eppendorf. Clearly, those who deliver healthcare to patients directly are at the heart of the institution's operation. The role of hospital administration is to facilitate, support and coordinate these healthcare delivery activities.

To prepare for this strategic process I have spent much of my first three months in Hamburg focusing on a portfolio analysis designed to identify strengths and weaknesses in the deliverance of healthcare and accomplishment in research. Based on this analysis, synergies can be strengthened and redundancies eliminated. This process of analysis and strategic decision-making can be successful only if communicated in a transparent and very direct manner to all participants sitting around the table. Assuring this type of communication represents a principal task in my new job.

As a radiologist who has spent much of his career speaking to other clinicians about diagnostic findings I feel well prepared to meet the challenge of transparent communication. Dialogue is the basis of trust between all participants at the University Hospital Hamburg-Eppendorf's table. Trust in turn is the central requirement for success in today's healthcare market.

What is the main problem in communication between medical staff and management?

'Based on their ethical vocation, physicians are a special breed of people indeed. On a daily basis, the physicians, as well as nurses and other healthcare providers, are confronted with humans in need of help. Ethics and morals dictate much of our work. As medicine is slowly transforming from a physician-dependent art to an evidence-based science, we have learnt to respect the importance of diagnostic protocols and therapy guidelines. Furthermore, we have been made aware of the severe economic constraints burdening of our societies at large. Misunderstandings between healthcare providers on the one hand and hospital administrators on the other, are frequently related to misunderstandings of their different terminology. To bridge this gap, we need individuals who speak both languages. In this respect I have found my training as a radiologist at least as helpful as my training, several years ago, in management and business administration at the University of St. Gallen The ability to translate a budget with an associated balance sheet into a language easily understood by physicians and other healthcare providers must be an integral part of any communication strategy designed to build trust.

Is the aim a compromise between clinicians and management?

'As said, healthcare providers and hospital administrators must realise they are sitting around the same table to represent their respective medical institutions. Thus, reaching an agreement on strategic goals and operative day-to-day management goals is not an option - it is imperative. Reaching agreement requires tremendous effort and willingness from all participants at that table. Hospital administrators must communicate openly and directly in a language understandable by healthcare providers. For their part, healthcare providers must be willing to absorb and accept the communicated messages.

Is an international outlook important in the growing competition between hospitals?

'We increasingly view the Hamburg-Eppendorf University Hospital as an economic enterprise. In fact, with a budget of 430 million Euros and over 5,000 employees, we are one of Hamburg's larger companies. Similarly to other firms, we are developing marketing strategies for new products and new markets. Thus, we will begin to offer integrated healthcare products comprised of elements of in-house treatments as well as rehabilitative medicine. We are venturing, for example, into traditional Chinese medicine as well as preventive healthcare programmes.

'As for exploring new markets, we are shaping our products to be attractive in countries abroad. Our geographic positioning in Germany's north, coupled with an excellent infrastructure, as well as the beauty inherent to the city of Hamburg, make our medical institution very attractive to under-served patients from Great Britain as well as the Netherlands. In addition, we are increasing our efforts to develop a market presence in the Middle East, where we recently entered into a partnership with Sulaiman Al-Habib Medical Centre in Rhyad and Dubai. We are confident that we can also position the Hamburg-Eppendorf University Hospital as a centre of excellence in healthcare delivery in those new international markets. ■

Teamwork is vital for successful PACS

By **Alan Budge**, General Marketing Manager, Ferrania Imaging Technologies

Alan Budge

Ferrania LifeImaging's LifeWeb project

Much has been written about the developments of PACS and RIS/PACS and their importance within the Integrated Care Record System. Now, with the recently announced UK National Programme for IT (NPfIT) radiology images and reports are also rightly seen as one of the key links between the primary, acute and tertiary care provided by NHS Hospitals/Clinics.

There are many successful PACS installations within Europe, and most are where the importance of the partnership between radiographers/radiologists (as service providers), IT (as the equipment link) and the clinicians as users of the service, has been instrumental right from the planning stage.

Hospital IT departments are usually repositories of sound information and expertise about data storage and networking; now the vast amounts of digital data and information produced daily by the imaging department represent one of the biggest challenges to a successful NHS Care Record Service (NCRS), for the IT fraternity.

This information and data not only needs to be able to travel quickly and accurately around the Hospital Trust network, to clinicians requesting it - wherever they may be - but may well need to travel outside the enterprise itself, so interoperability between sites is important. The successful installations will have recognised that the partnership approach must involve administrators and hospital managers, to ensure that procurement of systems is fully comprehensive and fully-costed.

A particular area often overlooked is the integration of existing equipment, which either has to be brought up to the relevant spec. or scrapped and replaced - leaving it in isolation from the network is not usually an option. This should not be an issue providing the initial audit process has been thorough and the tender process has been precise in its coverage (otherwise additional upgrade costs may well be incurred later).

Today, web-based systems are ideal for delivering images and reports, using common technologies to allow full use of the hospital Intranet and the PC/Network. Web-based viewing at radiologist, clinician and ward levels for review, now with wireless technology and PC tablets in use at the patient bedside, is cost effectively available.

With many enterprise-wide installations being purchased, a managed approach - whereby the supplier delivers a service that is paid for as and when it is used or on a quarterly standing charge, with measured service level agreements in place - is often the funding route chosen. It is crucial to ensure that technology refresh figures are budgeted. A seven, 10-year or more agreement will periodically require replacement systems and equipment so that the enterprise maintains a high level of efficiency and can take advantage of new technology.

It is essential to ensure that all equipment has the ability to interconnect and meets the most appropriate standards for interoperability.

The PACS/IT/Clinician/Admin Team must embrace the project together. Europe has many installations to learn from and advice of this nature is usually free, as opposed to the consultancy costs that can come afterwards from imaging companies.

Robert Shaw

PACS

The Newcastle on Tyne Hospitals NHS Trust (the Trust) is one of the largest major Teaching Acute and Tertiary referral centres in the UK.

With three main sites across the city and a number of smaller sites, the Trust serves a population of three million, employs over 11,000 staff members, and has over 700,000 outpatient contacts. The Trust's annual income is £500 million.

Robert Shaw, Head of the Trust's Information Management & Technology Department, describes the organisation's migration to a PACS environment

The Trust was due to renew its wet film and chemicals contract, and had several business drivers that required the migration to a PACS environment. The Trust went to procurement through European Journal for an integrated PACS/RIS solution. The project was to be financed through existing revenue contracts for films, chemical and maintenance, which meant procuring a facilities-managed service for PACS/RIS, and this was detailed in the Output Based Specification (OBS) as part of the procurement. The private company chosen had to bring new technologies in partnership with the Trust - which reviewed the OBS responses of the short-listed suppliers with the Purchasing And Supplies Authority (PASA), and selected Ferrania.

Ferrania had demonstrated a partnership approach to implementation, service delivery and, particularly, change in working practices across the Trust. The firm could bring a software integration specialist, Acuo, to manage intelligent messaging of information between the range of existing modalities.

From the beginning, we had wanted to challenge current ways of delivering PACS within healthcare. Ferrania showed us a different way of delivering a PACS solution within a managed service.

The project has also received support from the National PACS Team - which is keen to support 'early wins' as part of the programme. Its positive support enabled smooth progress through procurement. In return, the Trust has provides advice and information to help the National Team.

Technology to benefit patients, clinicians and administrative staff - This would be achieved by:

- Retaining all images on line for the life of the contract and moving from the more traditional deep archive architecture. This will allow rapid access to images across the Trust for clinicians, without needing to pre-fetch images. The architecture also will allow the image and report to be used by more than one clinician at the same time, across the Trust and wider community, which is particularly important for large multi-site Trusts such as Newcastle. It supports the development of longitudinal information across the care pathway.
- Using integrated PACS and RIS web solutions will allow simultaneous access to reports and images across the Trust and wider access into primary care. The use of web technology allows for greater flexibility in roll out with minimal client side software to manage. This architecture will also enable access to digital images into multidisciplinary team (MDT) meetings. (Radiology reports are a key diagnostic service, used to inform decision makers in the MDTs. The ability to access these on-line and, if appropriate, previous images for the patient will provide more information quickly for the decision-making process).

Wireless tablets have been trailed within the Trust for some applications, which was a successful pilot. As a result, the wireless network will be extended to allow access to images at bedsides in wards, and across A&E.

Wanted: high performance storage architecture

As part of the procurement, the Trust specified storage architecture capable of handling large volumes of images whilst

15-minute reports

By **Armin Scheuer**

Radiology reporting is becoming far quicker due to the use of speech recognition. By automating and centralising document creation, United Surgical Partners Europe (USPE) - the leading private medical group in Spain - now delivers radiology reports within a guaranteed time of 15 minutes maximum, after dictation.

'Faster document creation is a clear improvement opportunity for hospitals - both from an economic and a service point of view,' Santiago Raventos, IT manager at USPE, pointed out. 'Professional speech recognition systems support complete workflows to optimise document creation.'

USPE uses SpeechMagic - the speech recognition solution from Philips - which supports network solutions and offers flexible correction methods, such as self-correction, directly on screen, deferred correction by a secretary or outsourced correction. All are aspects critical in setting up a centralised document creation system.

Santiago Raventos

SpeechMagic has been integrated in the Hospital Information Systems (HIS) of three hospitals operated by USPE. Radiologists dictate reports on their PCs and create a sound file associated with the patient number generated by the HIS. This sound file is sent automatically, through the private LAN, to the data centre in Barcelona, where the speech recognition servers are installed. Here they are converted into written text and then sent for correction to Pyrenalia Net Centre - a provider of medical transcription services. Back in USPE's data centre, the corrected text is automatically stored in the corresponding patient's file. The doctors receive an email confirming the report is ready for validation and can be printed locally, in the hospital where it was dictated. All this procedure occurs within 15 minutes maximum.

'We used analogue dictation before, and the doctors did not use computers at all to create medical reports,' said Dr. Mariola Diez Orive, head of the Imaging Centre at Clínica La Esperanza (Vitoria). 'We now hand out radiology reports on the same day and referring doctors can start treatment shortly after examinations. We also handle more patients with the same number of employees, meaning that our whole organisation has increased its profitability,' she added.

Dr. Mariola Diez Orive

integration

maintaining performance, provide resilience and the capability of expansion towards an enterprise-wide storage environment. The trust selected an Intel based platform from HP, with their EVA Storage Area Network (SAN) system. The procurement was for two 24TB SANs, switching architecture, temporal storage, enterprise-wide backup and Network Attached Storage (NAS) to provide migration to enterprise storage under a single domain, Microsoft Active Directory.

A SAN was installed on each of the two main sites and configured into a mirrored pair, with local temporal storage facilities. The switch fabric was installed and linked into the Trust network.

Confidence in the network ensures use

To maintain clinician's confidence, the network has triangulation between sites and on each site. Storage Area Networks (SANs) will be mirrored over the network at two sites. Even if one of the SANS is taken out on a site, service can be delivered to the Trust. The network is also run to a quality standard with uptimes of over 98% - important because we are transferring the risk of uptime delivery for the PACS system to Ferrania.

The SANs will provide a centralised storage capability on each site to handle over 4.5 million radiology images annually. Speed of access to the SAN is an important consideration. When we mapped data flows across the Trust, we had to adopt certain switching architecture to deliver required access speeds. The SANs have a growth capability both within the managed service for PACS and to act as centralised storage for the other Trust applications.

This infrastructure will allow the Trust to progress towards a film-less environment, where clinicians have the confidence that images can be accessed 24/7. Once in a film-less environment, we can progress towards a radiology paperless environment for reports.

The challenge: Realising benefits - both financial and otherwise - is the key to the project's success. Within the department, direct savings are to be made against the current software contracts and the films and chemical contracts. The Trust is using the Office of Government & Commerce (OGC), Managing Successful Programmes benefit management strategy to release other benefits. Benefits profiles will be used to release benefits from other areas: e.g. water rates, when all 'wet' film processors are removed.

Other benefits: Clinicians benefit from quick access to images on wards, outpatients and theatres. Images and reports can also be accessed by more than one clinician in multiple locations - particularly important since the Trust has multiple sites.

Next? The Trust is expanding the storage and PASC system to migrate other image-using specialities across the Trust. Initially this will take Radiotherapy and complete the migration of Medical Physics. It will see the total number of images rise to over 6.5 million per year. The next phase will take in other specialities such as Ophthalmology, Dermatology, Genetics, Pathology sub specialties and medical photography. Ultimately this will deliver a single image management system for the Trust.

By creating a single domain and enterprise-wide storage, it is now possible under Active Directory to have single controlled access to multiple systems under a single log-on. Important consideration: the PACS/RIS system is integrated in to the Trusts Electronic Records System through its Integration engine.

The Integration engine handles clinical and demographic messaging amongst the clinical and administrative systems - an important flexibility that allows the Trust to implement NHS Care Records Service from the National Programme for Information Technology, whilst allowing for separate procurements to satisfy requirements beyond the National Programme.

The project team: Phil Wilson, Robert Shaw, Peter Batey, Dr Chippendale, Dr Mitchell, Louise Dryden, Phil Colls, Graham Hughes.

From the outset of the project team, work across radiology, IT and neuro sciences was recognised. The team was developed from the three areas, mixing IT, Managers, Radiologists and Radiographers. Each team member brings an area of expertise and knowledge to the project, to enable more effective and informed decisions.

Santiago Raventos now plans to equip all radiologists with SpeechMagic, to be followed by other departments.

A few months ago, Philips announced the first hospital-wide implementations of the system in Denmark and Germany. The success in radiology has lead to a push towards expansion. 'At the moment we are experiencing a real rush from the medical sector,' said Marcel Wassink, Managing Director, Philips Speech Recognition Systems. 'Many radiology departments have doubled productivity as a result of deploying speech recognition, and it is only logical that hospitals as a whole want to benefit from this development.

TELERADIOLOGY

Uwe Schmid, CEO of Amper Kliniken AG, describes the introduction of an innovative model to speed up radiological diagnoses, created in partnership with the Munich-Grosshadern University Hospital

Uwe Schmid, CEO

The German healthcare system is seriously ill. Despite a slew of laws and regulations to keep costs down, expenses soar, mainly due to demographic developments and medical progress. At the same time, the revenue of the statutory health insurance companies (which, in 2002, contributed 134.1 billion EUR to the healthcare system) stagnates. With minute economic growth and continuously high unemployment, there is little hope for a speedy recovery.

Above all it is the 2,000+ German acute-care clinics that suffer from health policy remedies administered to overcome the financial crisis. Not only do the new DRGs constitute an entirely new billing and reimbursement system, there is also the new obligation to treat as many patients as possible in out-patient facilities. Moreover, hospital budgets tied to health insurance revenues were practically frozen while payroll expenses continue to increase. This means that above all public hospitals are in dire straits: rising deficits that take them to the brink of ruin, insolvencies, shutdowns, and sales. The number of German hospitals will go down significantly in future years. According to Professor Karl Lauterbach, health economist and consultant to the German government, there will be 900 clinics, which means half those of today will provide necessary in-patient services.

In view of these threatening developments many hospital managers who previously insisted on independence are looking for cooperation possibilities and partners. The need to decrease costs to increase economic efficiency has generated purchasing associations or jointly-operated IT departments; from administrative cooperation up to mergers - everything is possible. However, medical cooperation between hospitals, to improve quality of healthcare and/or the costs of diagnosis and therapy, is still the exception. An integrated healthcare - strongly encouraged by the government - promotes cooperation between out-patient and in-patient and between in-patient and rehabilitation services.

Last October, the Munich-Grosshadern University Hospital (Klinikum der Universit‰t M¸nchen-Grosshadern) and the Amper Kliniken AG, Dachau, introduced an innovative cooperation model in radiology. The Amper Kliniken AG is a city-owned corporation that owns and operates three hospitals in the Munich area, manages three more and provides consultancy services.

To significantly improve and speed up radiological diagnostics within the current budget all radiological services of the Klinikum Dachau, which focuses on internal medicine, neurology and surgery, were transferred to the Institute of Clinical Radiology at Groflhadern. The radiology services in Dachau are no longer provided by physicians employed by the Dachau hospital but by physicians from Grosshadern. In terms of professional and disciplinary competencies, these 'outsourced' radiologists remain within the organisational structure of their parent hospital, Grosshadern. However, they are authorised to issue directions to the non-medical staff of the Dachau hospital. It is planned to rotate the outsourced physicians in to:

- give more of the staff of the Institute for Clinical Radiology the chance to gain first hand experience in the day-to-day operation of an acute-care hospital
- allow them to continue their academic careers
- provide the Klinikum Dachau with state-of-the-art radiology services.

Parallel to the transfer of radiology services, a telemedical link between Dachau and the central diagnostics department in Grosshadern was established. This link not only allows instant access to a highly qualified second opinion, but also saves medical on-call resources. Above all, due to this telemedical link, personnel requirements and thus costs have decreased significantly. Amper Kliniken AG transfers its budget for medical-radiological staff to the Klinikum Grosshadern, which in turn creates additional employment opportunities for physicians.

The advantages of this successful cooperation are manifold: Klinikum Dachau's radiology services were significantly improved without incurring additional costs and, due to close cooperation with the famous Institute for Clinical Radiology, the new model has been widely accepted. In turn, the institute can train more physicians, who can gain more practical experience. In view of the critical shortage of qualified doctors - particularly qualified radiologists - the latter is increasingly important.

Teleradiology is being tested 'live' and further developed, joint research is planned and medical-scientific progress will be promoted.

Integrated radiological services provided with the cooperation of a public hospital and an academic radiology institution promises a win-win situation. However, to make use of its full potential, a number of legal issues must be solved. Moreover, several government agencies and authorities have to be convinced of the idea and integrated into decision-making. That will take time - which is scarce. Quick action is needed. Last not least, resistance born from fear or self-interest needs to be overcome.

All administrative obstacles have been overcome and the cooperation is considered a full success by all parties involved. This may only be a relatively small pilot project, but it contributes to job security and to quality healthcare in difficult times.

Philippe Houssiau, General Manager of *Healthcare Agfa*,

Healthcare

EH: ***So, what is the difference between your firm and others?***
PH: Agfa's unique advantage is that we aren't in the modality business. All industries need an integrator that can function on a neutral basis - i.e. not being bound to one or another modality. This is why we are boosting up our professional IT services. In 2000, our business was still 48% analogue and 42 digital. Now we are at 52 % digital and 48 % analogue - a rapid conversion. We know everything about imaging and we know a lot about PACS and RIS applications. You cannot have a European PACS. We have a standard platform tailored to local needs. But our European RIS is working pretty well.
Once a departmental PACS is implemented, then the cardiologists and other specialists say 'Hey, we want that too'. Then you must decide whether to go for a PACS solution that has emerged from radiology or whether you move towards an enterprise solution. Agfa can go with PACS or EPR and we have a dedicated team working on cardiology and orthopaedics.
EH: ***What do you mean by an EPR environment?***
PH: You have the front-end and the back-end. Administration, planning and reporting must be integrated. Files and images relating to one patient must be brought together.
EH: ***Which nobody is yet capable of doing?***
PH: We are working closely with a number of luminary sites to start building that conversion. Then there's a question: Will the radiologist take the central role in controlling all that data?

As you said, I don't think EPR has been very clearly defined. The SAPs and IBMs of this world look at this from the back-office - administration with one electronic patient record. Clinicians see a completely different story - bringing all of a patient's history together, on one screen and in one file, to compare data in a consistent format. We want to carve awards in clinical application. We are also seeking alliances for back-office administration systems for integration. The next direction is the development of an electronic patient record. Within 12-18 months you will see the first integrated 'threads' - i.e. the generation of a unique patient number, which has to be linked to an enter-

Philippe Houssiau

Agfa has traditionally evolved from the classic film business - to which the whole organization was tailored for about a hundred years. However, with digitisation, the company began to develop many new kinds of product systems and applications. Fifteen years ago, these developments centred on computerised radiography - and progress inevitably comes in stages. We had to invest - take a lot of losses in development - until things picked up! I think it's fair to say, in terms of computer radiography (CR) that Agfa has stayed pretty much ahead of the market, as well as in the development of hard copy - a kind of dry printing technology - and I mean worldwide.

Our portfolio and volume is fairly equally spread, certainly divided between the Americas and Europe, with, of course, newly emerging markets such as China. Another very important market is India. A lot of consumers are rising to the sophistication of Western healthcare. We have also made an important step into the US market by acquiring Sterling, which was also a very strong base for development in the digital arena.

The organizational set-up followed those developments. Agfa was, and still is, famous in image processing. We have probably the best algorithms in the world for image enhancement and classical image processing. Basically, we know everything about light and how to treat it, and we successfully apply this to digitisation, developing our new algorithms and image enhancement that is of extreme value in productivity and quality for interpretation by radiologists. So, that was the first step into digitisation. Then, logically, came PACS and IMPACS.

The initial PACS was radiology-based, but now we are evolving towards enterprise PACS, although the original configuration of the PACS system was very much about hardware. Then we moved on to information technology, via acquisitions such as Mitra, a PACS development company, and Quadrat.

Profit lies in consumables more than the equipment we supply to customers. The film business is declining 10-12% annually. Hardcopy thermal printing is also under pressure from soft copy reading and other drivers. Then you look at IT and find that the business model you need is completely different. You need a completely new skills and product mix - a combination of hardware, software, consumables and services - and to learn how to provide services that encapsulate the product offering in so as to add value for customers.

From the moment you enter IT, you discuss connectivity and the integration of systems and very complex solutions. The only way it can be done is by ensuring your knowledge is brought to bear in a professional services organisation. Then, in the second phase, we evolve towards a solutions approach. But everyone is doing this, where does the differentiation lie?

Suppliers: easing the transition

Likely outcomes of the implementation of expanded picture archiving and communication system (PACS) include re-engineered workflow in radiology departments and organisational/cultural resistance to change. Therefore, effective change management during the transition phase is vital. Professional service vendors who can convince healthcare providers about a smooth transition during - and uninterrupted services after - PACS implementation are poised to reap a substantial market share, according to Siddharth Saha, Research Analyst for the international business consultancy Frost & Sullivan. As provider institutions await initial PACS deployment, change management is expected to emerge as an immediate challenge. 'Clinical transformation during the implementation of PACS solutions throws open several issues that need to be dealt with both by the provider institution and the PACS vendor,' Siddharth Saha warns. 'Issues range from technology, workflow processes and the switchover to people-related issues and change management.'

Vendors are also likely to confront various degrees of apprehensions regarding the actual quantum of benefits effected by PACS solutions and services. Indeed, a significant obstacle to PACS implementation has been the quantification of benefits derived from the system. While providers want return on investment (RoI), executives in charge of operations look for enhanced productivity, the report continues. 'Therefore, professional services components, including clinical consulting and workflow re-engineering, will need to justify the costs of using these new technologies and services. Vendors will need to offer tangible value propositions to clinicians to encourage the uptake of PACS and other IT systems.

'As the benefits of PACS and professional services are quantified through time-bound implementation and efficiencies achieved, organisational resistance is likely to diminish.'

The total PACS professional services market (consulting, project management, systems integration, plus training and support) is set for healthy expansion, he concludes, with the market expected to grow annually 19.7% on average, between 2003-2010.

Increased IT uptake by healthcare providers is expected to also add impetus to the PACS professional services market. Integration of new clinical information systems with existing systems is also likely to increase uptake of professional services, and the improved workflow, reliable throughput and improved budgets that follow should also increase market growth.

Revenue forecasts - Overall the

presents an overview of developments in a discussion with *European Hospital*

challenges for imaging

prise-wide planning system so that all planning is constantly drawn to that one electronic patient file - and that's where the trouble starts...

The impact on workflow will be tremendous, so management and the healthcare system must change dramatically to deal with all the changes to keep a healthcare system under control. Hospital management is galaxies different from enterprise management, and the old mode cannot continue. The only way to control services and costs is through electronic and information technology.

EH: ***Many clinicians won't believe in that.***

PH: There will be frictions! We saw it in radiology. But even reluctant radiologists progressed quickly - once trained and used to our PACS system, and they did not want to go back. Additionally, younger professionals coming in are computer-literate.

It also varies from country to country. In the Netherlands, for example, the use of PACS is about 60 %, with the majority of hospitals film-less. Due to changes in reimbursement policies, in which you move towards a pathology-driven reimbursement, a lot of convergence of departments into one, far stronger pathology-oriented point. That is the Nirvana of EPR, because it will force people to draw data sets together - not only for cost control or reimbursement, but also for quality. But people sometimes need a little push to change habits. In many cases we're yielding some very, very good results. Productivity improvements just from using PACS are important, providing you reengineer and build your workflow into it. Otherwise it won't help.

EH: ***They usually need help with this.***

PH: Yes. One of Agfa's strengths is the quality of our customer relationships. We operate in one hospital out of two in the world. So, we moved into a key-account management model, in which our sales people build relationships with those responsible for the process in the hospitals. Our product specialists, who are solution-oriented, are pre-sales consultants, who help to configure solutions, usually without a fee.

Our sales people undergo training, and usually come from an IT services consulting background. Also, at the top of our organisation are key individuals from IT firms, usually with a medical or professional services or IT background.

The market is developing and there are still so many things for all of us to learn. I don't believe any company that says, we are there in EPR, we are there with RIS, we can see the integrated healthcare enterprise - I don't believe that. This market is evolving...

to PACS

PACS professional services market is set to increase from $95.0 million in 2003 to $334.0 million in 2010, with project management accounting for the largest revenue share in 2010, due to major uptake in the UK, Germany, Italy and France, followed by systems integration, training and support and, consulting services segments.

IT professional services vendors will need to maintain close working relationships with hospitals and offer innovative financial schemes, the report suggests, and those selling PACS services will also need to maintain a diverse client portfolio. Additionally, they will need to build and retain strategic relationships with hardware suppliers, distributors and clients, to ensure easy servicing.

Details: http://healthcare.frost.com. Study title: European PACS Professional Services Market. Code: B274

Rostislav Kuklik, European Hospital's CR correspondent, discussed the present use of advanced scanners with **Jan Beran MD**, radiologist at Liberec's Municipal Hospital and head of the Czech Radiological Society's Section for Musculoskeletal Radiology

Dr Jan Beran

Radiology in the Czech Republic

The Czech Republic has maintained a good standard in radiology, despite several years of trouble in the healthcare sector.

Last year the Prague hospital Na Homolce installed a Siemens Biograph scanner, making the CR the 4th European country to install such a unique appliance. Biograph is a high-tech hybrid scanner combining two diagnostic principles - Positron Emission Tomography (PET) and Computed Tomography (CT) - a combination so far unbeatable in early stage cancer screening, and for Parkinson's and Alzheimer's. This device was used first in Essen University Hospital, Germany.

The CR also has multispiral CT scanners, e.g. Sensation 16, which was first presented in 2001 in Chicago. Up to now five of these have been installed in the CR, with hospitals in Prague, Plzen, and Ostrava all equipped with Sensation 16. These are rather revolutionary devices - Sensation 16 may scan 16 layers in a single period and runs two revolutions per second, allowing examination of 32 slices a second. Such an astounding speed enables physicians to inspect the peripheral circulation and the moving lungs or heart.

Understandably, medical facilities with such modern diagnostic tools won't have neglected modern communication technologies for data sharing. All major hospitals are more or less involved in a picture archiving and communication system (PACS) network, which will gradually make them the best equipped consultation centres and reference libraries for others. Basically, PACS represents a foreseeable course of action for university centres and clinics in major hospitals because these are crucial for information exchange, and modern technologies support. Not to mention that, apart from the initial investment into infrastructure of network in the beginning, image sharing, on-line consultations and telemedicine in general will help cut future costs, which is absolutely welcome. Lack of finance, cautionary strikes, and delayed payments still constitute the worst nightmare of the CR's Ministry of Health, so is this a way forward?

I asked Dr Jan Beran what importance he attached to radiology meetings.

'The ECR is undoubtedly very good opportunity for sharing of professional information,' he pointed out. From my personal point of view, I'd say that refresher courses are of great value, because they are longer seminars where specialists present modern trends - and particularly therapies. Those dealing with radiology in correlation with anatomical and pathological comments were very valuable. Also, seeing modern radiology equipment at ECR is valuable, to become acquainted with latest technical trends, some still not at our disposal in the CR. Vienna is also close to the Czech Republic, so many of our physicians can attend the event. This year I'll be a visitor, in 2003 I took part in a Scientific Session, presenting a paper on trauma of the cervical spine in patients suffering ankylosing spondylitis.'

Is the completely digitised hospital a goal in the CR?

'Digitisation is used more in developed countries, rather than in the Czech Republic. Developments are astounding in this field and also closely linked to the permanent rise of imaging data volume acquired using modern diagnostic procedures. The indisputable advantage of digitisation is a film-less operation, fast and easy data search, and savings on film materials. Several facilities in the Czech Republic already have PACS, and I believe numbers will continually rise. Today's main obstacles are enormous cost of systems. But the advantage of PACS is versatility - it can be implemented to each hospital step by step.

'The range of modern diagnostic methods available in the Czech Republic is truly broad, and modern diagnostic and therapeutic methods are implemented in our work very quickly. There are over 100 CT scanners and 29 MRIs in this country. Security of devices using ionising energy was solved by Atomic Law, in accordance with EU regulations last year. The EU Directive on indications for imaging methods was accepted by our Ministry of Health. I have no detailed information about numbers of CT and MRI scanners and the use of modern radiology methods in, for example, Poland, Hungary, and the Slovak Republic, but I believe it is similar to ours. Lack of certified radiologists may present problems. However, I can say this problem is the same in other European countries as well as the USA.

Do you foresee that using CT for 'virtual examinations' could become a standard procedure in the CR?

'Virtual "anything-scopies" performed by spiral and MD CT are non-invasive methods. Nowadays, special attention is given to virtual colonoscopy, to screen for tumour changes in the colon. Of course, its development depends not only on radiologists but also on gastroenterologists. The latter are expected to guard against this method - because it can decrease their clients list significantly. CT angiography (CTA) is a crucial achievement. Using CTA, we can non-invasively visualise not only the aorta but also kidney, limbs, and cardiac arteries. Moreover, all the data generated via CTA are of excellent quality, so this could easily replace conventional angiography. My prediction is that diagnostic angiography will be performed through CT, and intervention to arteries (PTA, stenting) will be performed angiographically.

Overview of Magnetic Resonance Imaging Appliances in the Czech Republic

There are approx 25 MRI machines in CR. Of these are 12 Siemens, 6 Philips, 4 GE Medical Systems, 2 Elscint, and 1 Shimadzu. Table below characterizes also in detail distribution of MRI machines in the Czech Republic - all of them are situated into large towns, and more than 1/3 can be found in Prague.

Town	Type	Maker	Tesla	Installation
Praha	Gyroscan AMT	Philips	1.5	1997
	Gyroscan	Philips	1.5	1995
	Multiscan Signa	GE	1.5	1995
	Multiscan Signa	GE	1.5	?
	Concerto	Siemens	0.2	2003
	Magnetom Vision	Siemens	1.5	1995
	Magnetom Expert	Siemens	1.0	1995
	Magnetom Symphony	Siemens	1.5	?
	Privilege	Elscint	2.0	1998
Brno	Magnetom Open Viva	Siemens	0.2	1999
	Magnetom Impact	Siemens	1.0	1994
	Magnetom Symphony	Siemens	1.5	1998
Ostrava	Magnetom Impact	Siemens	1.0	1993
	Gyroscan Intera	Philips	1.5	2003
	SMT 50	Shimadzu	0.5	1994
Hradec Kralove	Magnetom Expert	Siemens	1.0	1997
Rychnov n/K	Multiscan Signa	GE	1.5	2003
Ceske Budejovice	Gyroscan Intera	Philips	1.0	2001
Sokolov	Magnetom Concerto	Siemens	0.2	2002
Liberec	Gyroscan	Philips	1.0	1999
Olomouc	Magnetom Symphony	Siemens	1.5	2002
Pardubice	Multiscan Signa	GE	1.5	2002
Plzen	Gyrex	Elscint	0.5	1995
Teplice	Magnetom P8	Siemens	0.2	1991
Zlin	Gyroscan Intera	Philips	1.5	2004

Source: Czech Radiological Society, 2003

Dr Michaela Moritz
MD of ÖBIG

European Hospital correspondent **Christian Pruszinsky** examines current hospital planning that also regulates the use of large imaging devices

Major medical device planning: Austria

Since 1997, the Austrian Medical Institutions and Major Medical Devices Plan (Österreichische Krankenanstalten- und Grossgeräteplan - ÖKAP/GGP) has been an important instrument for ensuring structural quality in the framework of healthcare reform. The plan, agreed jointly between the national authorities and the authorities of federal states, is reviewed and adjusted every two years and is **binding** for medical institutions that are financed by public funds. These public and private, non-profit, acute hospitals provide almost 75% of all available Austrian hospital beds. Major medical devices for the university clinics in Vienna, Graz, and Innsbruck (exclusively research hospitals) fall under a different regulation.

Planning objectives are the maintenance of high quality of care, permanent adaptation to the hospital structure, and increased economic efficiency. IT-supported simulation models with current and prospective data about demographic and local area developments, medical and local medical technological developments, length of stay, and patient load (especially taking into account accessibility, area served, treatments offered, and minimum department size) - all serve as the basis for planning. Projects intended by each individual hospital are included.

The regulations of the ÖKAP apply accordingly to: locations - departmental structure - bed limits per hospital - total bed limits by department for each federal state, by regular care

Austrian Large Medical Device Plan - Planning Guidelines

Device Group/Procedures	Reachability/ min	Inhabitant Guidelines (Areas)	Inhabitants/ Large Device (as of January 2002)
Computer tomography	30	30,000 - 50,000	36,661
Magnetic resonance tomography (MRI)	60	60,000 - 100,000	75,378
Digital subtraction angiography	60	150,000 - 200,000	106,827
Coronary angiography	60	200,000 - 300,000	220,972
Lithotripters	120	520,000 - 780,000	537,698
Radiation therapy	90	120,000 - 200,000	224,041
Emission CT *	45	80,000 - 100,000	74.336
Positron emission tomography	60	300,000 - 400,000	645,237

**Excluding non-SPECT-capable gamma-cameras*

and intensive care - supraregional capabilities in defined areas - quality of structural criteria in defined areas.

The Plan for Large Medical Devices establishes the nature and number of registered medical/ technical large medical devices per hospital (see table). The determinations are based on the hospitals' departmental structures, and also take into consideration equipment available in hospitals not covered by the plan. Location recommendations are determied by the criterion of economic efficiency, and take into account the cooperation potential of the surrounding area, to avoid parallel installations.

Device-specific recommendations for new or reinvestments, e.g., provide for:

CT: In general multi-slice CTs, 16 lines for traumatology, neurosurgery, and stroke unit locations.

MRI: For new and replacement investments a field strength of > Tesla is desired. In-house and extramural cooperation should be increased, as in the CT area.

Lithotripter: In case of replacement investments, urology x-ray positions should be replaced by lithotripters of the newer generation.

PET: For new or replacement investments, if needed, new technological developments such as PET/CT machines should be taken into consideration.

The implementation of ÖKAP/GGP is scheduled for completion by the end of 2004 and is on track, as Dr. Michaela Moritz, managing director of the Austrian Federal Health Institute (Österreichisches Bundesinstitutes für Gesundheitswesen - ÖBIG) - which is in charge of setting up the ÖKAP (see box) - emphasised in a discussion with EH. Currently, ÖBIG is developing a follow-on plan that should be in effect by 2010, and which focuses on the transition from a traditional bed planning to capacity-oriented planning that covers frequency of stay, length of hospitalisation, and performance per treatment unit. The so-called 'detailed range of services planning' encompasses selected service areas whose costly infrastructure makes it unreasonable to locate them everywhere. Already planned are cancer services, stem cell transplants, nuclear medicine, physical therapy wards, heart surgery, paediatric cardiology, liver transplants, stroke units, haemodialysis centres, heart catheterisation laboratories, and radiation therapy. Infrastructural quality criteria are fully integrated into this planning and contain department specific production spectra and different new organisation forms of in-house treatment using day clinics.

The collected data follow international comparison standards. Currently nobody can tell if and when in view of the EU enlargement - after all, Austria borders on the new EU member states - the Czech Republic, Slovakia, Slovenia, and Hungary - cross-border components will flow into the planning. The health systems of these countries are simply too different. Dr Moritz refers to them as 'delicate plants' that are just beginning to sprout. Perhaps this foretells another 'Prague Springtime'. ■

In 1973, the Ministry of Health founded the Austrian Federal Institute for Public Health (ÖBIG). An independent scientific institute, the institute is a legal entity governed by private law. At present ÖBIG has 80 employees. About 50% of the institute's income is generated by health planning, but ÖBIG also oversees nine other important areas, e.g. care of the elderly, health occupations and professions, health economics, public health, and the environment. As a scientific service provider the institute is available to everybody and counts federal and state authorities, hospitals, public and private insurance companies, and pharmaceutical companies among its customers. ÖBIG also participates in numerous national and international health planning boards.

Electronic blind man's cane

New technology helps blind people recognize obstacles

Electronically controlled canes warn blind people of obstacles which cannot be detected with the traditional cane. According to the health magazine "Apotheken Umschau" laser and ultrasound technology is being used to chart the area around the blind person – up to his head. The obstacles are reported to the carrier via a vibrating device. Open boot lids reaching onto the pavement, chest-high barriers or similar obstacles which up-to-now presented a dangerous source of injury won't be a problem any longer for the users of the new cane technology.

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New

MRI for cardiac catheterisation of young patients

Six in 1,000 babies suffer congenital heart disease. Cardiac catheterisation is used for diagnosis and surgical planning, but this means exposure to potentially dangerous radiation levels during x-rays. The risk of developing a solid cancer tumour after x-ray guided cardiac catheterisation is 1 in 2,500 for an adult (source: UK National Radiological Protection Board) and that risk increases to 1 in 1,000 for a five-year-old - the younger the child, the greater the risk. Additionally, because a significant number of children with congenital heart disease undergo repeated x-ray guided catheterisations, the risk is probably multiplied.

Now a new technique, using magnetic resonance imaging (MRI) rather than x-ray, to diagnose/treat children with congenital cardiac abnormalities has been developed by teams led by Dr Reza Razavi, Director of Cardiac MRI at Guy's and St Thomas' Hospital NHS Trust, and Derek Hill, a Reader in Medical Imaging at the Guy's, King's and St Thomas' School of Medicine, King's College London. (Paper: *The Lancet* 6/12/03)

The team points out that MRI offers

- a reduction of potential radiation risks from x-rays
- additional information, such as accurate quantification of blood flow in heart and lungs, and 3-D heart structure
- a view of the heart during the procedure (x-rays only show the catheter).

The additional data on blood flow and cardiac wall movement enables more accurate assessment of a patient's condition and visualisation of the heart helps with catheter manipulation and tracking. Until now, imaging techniques used during these procedures have not kept up with improvements and complexities of catheters.

Since April 2002, the London team have used a Philips XMR system, for MRI in tandem with x-rays, to catheterise 33 patients - mainly children. The publication in The Lancet details the first 16.

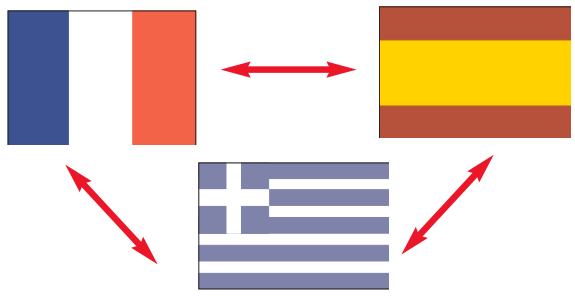
Dr Razavi, lead author of the paper - *Magnetic resonance guided cardiac catheterisation in children and adults with congenital heart disease* - said: 'MRI can overcome some of the disadvantages of x-rays, such as poor delineation of anatomical structures and radiation exposure. Performing cardiac catheterisation under MR guidance allows greater access to physiological and anatomical information. We were able to successfully visualise and manipulate catheters under MR guidance in nearly all the patients. In some of the patients the whole procedure was done without using any x-ray radiation, thus demonstrating for the first time that it is possible to perform diagnostic cardiac catheterisation entirely under MR guidance.'

Derek Hill added: 'MRI gives us fantastic pictures of the heart but it is only now that we can use it in real time during interventions. We've shown that MRI can replace x-ray imaging in assessing and treating children with heart defects, and we believe this will soon be extended to adults with heart rhythm abnormalities and coronary artery disease.'

This year, Guy's and St Thomas' Hospital NHS Trust will open a purpose-built children's hospital on the St Thomas' site, which will provide state-of-the-art care in a child-friendly environment. The Trust also plans to have an equivalent treatment facility to continue the pioneering MRI work.

Tele-echography

France • Spain • Greece



Studies have shown the potential use of echography, or ultrasound (US), scans to perform quick and efficient diagnoses for many types of pathologies. But these examinations are only performed by specialists in the main hospitals or private clinics, etc. - and ultrasound experts are also scarce. Developments in tele-radiology, using robotic assistance, can not only educate, but also save lives.

Using Eutelsat satellite links, on 7 November 2003, a robotic tele-echography live demonstration was performed between Tours, Barcelona and Nicosi, Cyprus - one of the European Community newcomers. The live world premiere demonstration was performed within the framework of the OTELO EC-funded project, by nine partners from five countries: France, Italy, Spain, the United Kingdom and Greece.

OTELO is a fully integrated end-to-end mobile tele-echography system dedicated to population groups isolated from medical facilities, either temporarily or permanently and, in particular, isolated from ultrasound experts. The system offers an alternative to medical centres that lack ultrasound specialists in-house.

A portable, ultrasound probe holder, robotic system, OTELO utilises state-of-the-art technologies to reproduce an expert's hand movements to perform an ultrasound examination though a distance away. Although held by a non-specialised paramedic on the remote site, the robotic system sends a real time, quality ultrasound image back to the expert for diagnosis.

During the demonstration, the patient was in the Nicosia General Hospital in Cyprus. The robotic system, holding a standard ultrasound probe, was positioned on the patient and maintained there by a paramedic assistant, Dr C Tziakouri from the hospital. The live demonstration ran in two phases.

During the first, Dr Tziakouri followed instructions given by ultrasound specialist Dr Conxita Bru, located in the Corporaciò Sanitaria Clinic, Barcelona, for the positioning of the robot on the patient. Then Dr Bru. remotely controlling the robot, scanned the patient as if next to her. Using ISDN line connections with 384kb/s bandwidth, he carried out the first successful diagnosis of several abdominal organs

During the second phase of the tele-echography demonstration, a satellite connection was established using Eutelsat with a 512 kb/s bandwidth. This linked Nicosia and Tours, France.

This time, Dr Tziakouri was the remote assistant to Professor Arbeille, who originated the tele-echography concept in 1995, and who was located at the University Hospital of Tours. Ultrasound investigations were successfully performed on both kidneys with the robot.

The expert centres and the patient centre were all equipped with a 384 kb/s videoconference system, allowing conversation and information exchange similarly made during a normal echography procedure.

The tele-echography examinations took no longer than a normal ultrasound scan performed next to the patient, and underlined the feasibility and reliability of this new tele-echography concept.

Report by: Pierre Vieyres, Asoc. Prof, Project Manager at the Laboratoire Vision et Robotique (LVR), Université d'Orlèans, France. (Details: Pierre.Vieyres@bourges.univ-orleans.fr)

Dynamic MRI

Christian Plathow, Christian Fink, Hans-Ulrich Kauczor, Radiology, DKFZ, Heidelberg, discuss the evaluation of lung function and therapy planning of lung cancer

Hans-Ulrich Kauczor

In many lung diseases, e.g. emphysema, lung cancer, and after radiotherapy, patients may present with dyspnoea due to impaired lung mechanics. Impairment can be due to increased (hyperinflation) or decreased lung volumes, and it can have global or local causes.

To date, impaired respiratory mechanics are indirectly evaluated by lung function testing. Results are interpreted with regard to a normal value accounting for age, gender, and body habitus. They are classified as normal if they fall within 20% of the predicted mean. Thus, these techniques are capable of detecting global changes of lung mechanics, whereas early or localised pathological changes, which might be easier to treat, are hardly detectable by these techniques.

Imaging of respiratory mechanics and image-based volumetry has received little attention in the past, although image-based analysis of global and regional movement of the lung during the breathing cycle is fundamental for the systematic understanding of pathophysiological processes. In contrast to global lung function tests, imaging has the obvious advantage of providing dynamic information on a regional basis. Thus, fast magnetic resonance imaging (MRI) is capable of visualising the respiratory motion of the chest wall and diaphragm with high spatial and temporal resolution together with the obvious advantage of lack of irradiation, superimposition and magnification.

MRI also allows for the simultaneous assessment of respiratory motion of intrapulmonary lesions, such as lung tumours and abdominal organs.

We demonstrated that dynamic MRI is a feasible technique to analyse diaphragm and chest wall motion. The results show highly significant correlations with spirometry. For MRI, a model-approach was employed to calculate absolute vital capacity (VC), which agreed with VC as measured by spirometry: MRI: 5.00 ±.1.1L vs. Spirometry 5.15 ± 0.46L. This new completely non-invasive technique also has the potential to improve structure-function evaluations of respiratory mechanics, in research and clinical arenas, because the dynamic study of respiratory motion is easily complemented by further functional MRI studies such as lung perfusion.

The information extracted from dynamic chest MRI is receiving increasing attention for high-precision radiotherapy of lung cancer. Recent major improvements in three-dimensional (3D) conformal radiotherapy of lung tumours are largely based on improved definition of target volume. Local failure in radiotherapy of stage I non-small cell lung cancer can be caused by simply missing the tumour, or at least parts of it, caused by tumour mobility. At the same time substantial non-tumourous lung volumes might receive high doses and develop pneumonitis and fibrosis as a significant side effect.

Radiotherapy is performed during smooth breathing, while imaging is performed either in inspiratory breath-holds or at random time points during the respiratory cycle with the patient breathing. Obviously, inconsistencies of the actual position of the tumour will arise. Continuous MRI-measurements of the mobility of lung tumours during the breathing cycle seem to be a milestone to solve this dilemma. Its integration into high-precision radiotherapy planning opens the way to personalised definition of target volumes, which finally might lead to a lower rate of field-border recurrences or adverse effects.

Our preliminary data from dynamic MRI show that in patients with a stage I lung cancer the tumour-bearing hemithorax is significantly less mobile than the tumour-free one. Tumour mobility is also significantly dependent on tumour localisation: the closer to the diaphragm the higher the mobility. These observations hold true for both, smooth breathing as well as to deep inhalation and expiration manoeuvres. Accurate measurements of tumour mobility will now be used for individual definition of target volumes in radiotherapy in lung cancer to the benefit of the patient.

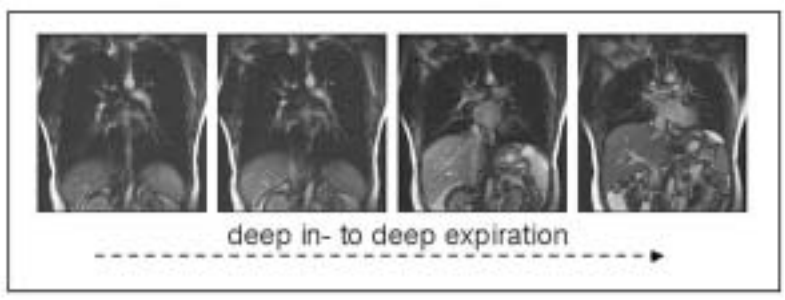


Fig 1: Dynamic MRI of deep expiration in a healthy subject

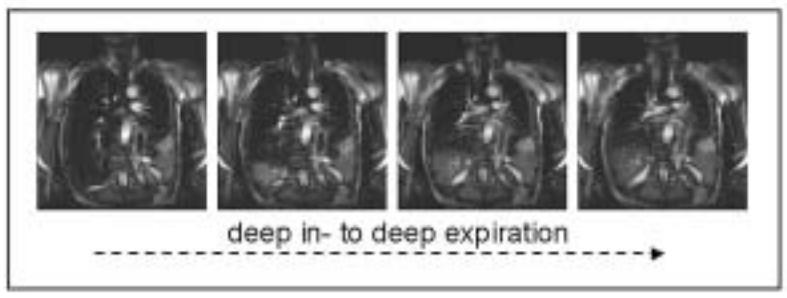


Fig 2: Patient with a tumour. There is a substantial reduction of the mobility of the left diaphragm

MRI helps predict memory loss

USA - Magnetic resonance imaging (MRI) has been used for the first time to study subtle changes in a specific area of the brain, and researchers believe this could help to predict future cognitive or memory decline in healthy adults.

Using MRI to predict the conversion from normal thought process to a condition referred to as mild cognitive impairment, Henry Rusineck, Associate Professor of Radiology at New York University School of Medicine said: 'We identified progressive brain atrophy as predictive of future cognitive decline among healthy elderly patients. We have also shown that looking at the medial temporal lobe, a specific, relatively small brain region, was much more informative than looking at the whole brain.' (The medial temporal lobe is a region near the middle of the brain that includes areas critical to forming new memories).

45 healthy patients aged 60+ were studied to determine if a medial temporal lobe atrophy rate predicted future memory decline. The patients underwent MR scans and neurological tests at the beginning of the study and had two or more follow-up examinations over a six-year period. Images and test results were compared and assessed for changes over time.

Of the 45 patients, 13 (29%) demonstrated cognitive decline. Medial temporal lobe atrophy rate was the most significant predictor of decline with overall accuracy of 89%.

'This study uses a novel approach to examine longitudinal changes in the brain, which are less subject to bias than existing approaches and are highly reproducible,' said co-author Mony J de Leon, Ed.D, Professor of Psychiatry and director of the Centre for Brain Health at NYU School of Medicine.

The first signs of memory loss are usually diagnosed as mild cognitive impairment. People with mild cognitive impairment decline to dementia at a rate of 10-15% annually, compared with 1-2% among healthy elderly individuals. Accurate and early recognition of changes in the atrophy rate could enable therapy, as well as better tracking of the progression of decline.

'I do not believe serious memory loss is a natural consequence of aging. A vast majority of elderly we see are very sharp and creative,' Dr Rusinek said. He advises those at risk for memory decline to exercise the brain as well as the body.

** Study published in the monthly scientific journal* Radiology - *December 2003. 'Regional Brain Atrophy Rate Predicts Future Cognitive Decline'. Henry Rusineck; Mony J de Leon EdD; S DeSanti PhD; D Frid BS; W-H Tsui, MS; C Y Tarshish ABD; and A Convit MD. (http://radiology.rsnajnls.org)*

Whole body MRI - the diagnostic work-up

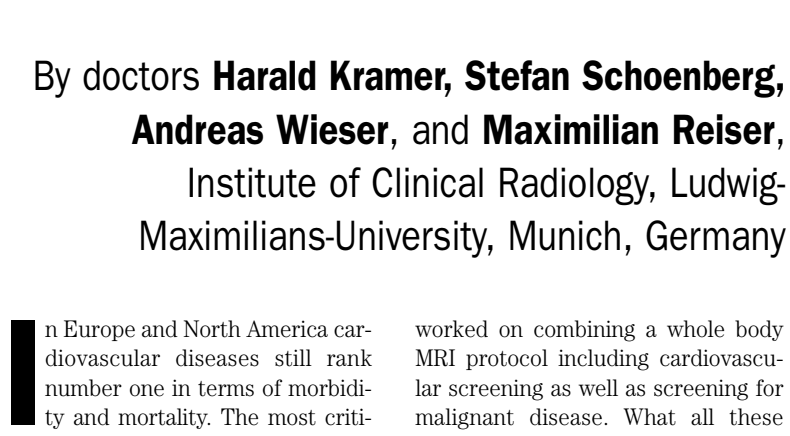
By doctors **Harald Kramer, Stefan Schoenberg, Andreas Wieser**, and **Maximilian Reiser**, Institute of Clinical Radiology, Ludwig-Maximilians-University, Munich, Germany

In Europe and North America cardiovascular diseases still rank number one in terms of morbidity and mortality. The most critical manifestations are carotid artery stenosis, coronary artery disease or renal artery stenosis with the potentially fatal consequences of stroke, myocardial infarction or renovascular hypertension. In the mortality statistics several malignant diseases, predominantly lung cancer and colon cancer, rank number two, directly behind cardiovascular disease.

Due to the lack of ionising radiation, magnetic resonance imaging (MRI) holds high potential for screening of these diseases. Other advantages of MRI include the excellence of tissue contrast as well as the ability to image both morphology and function.

worked on combining a whole body MRI protocol including cardiovascular screening as well as screening for malignant disease. What all these protocols have in common is that dedicated rolling platform systems were used so as not to reposition a patient during the scan, and to cover the entire body within a short scan time combined with fast imaging. However, this approach needs compromises in terms of spatial and temporal resolution for the different organ systems.

The goal of the latest developments in MRI was to integrate parallel acquisition techniques (iPAT) into a comprehensive whole body protocol, in order to image all relevant organ systems with comparable image quality as in standard, state-of-the-art MR imaging with no compro-



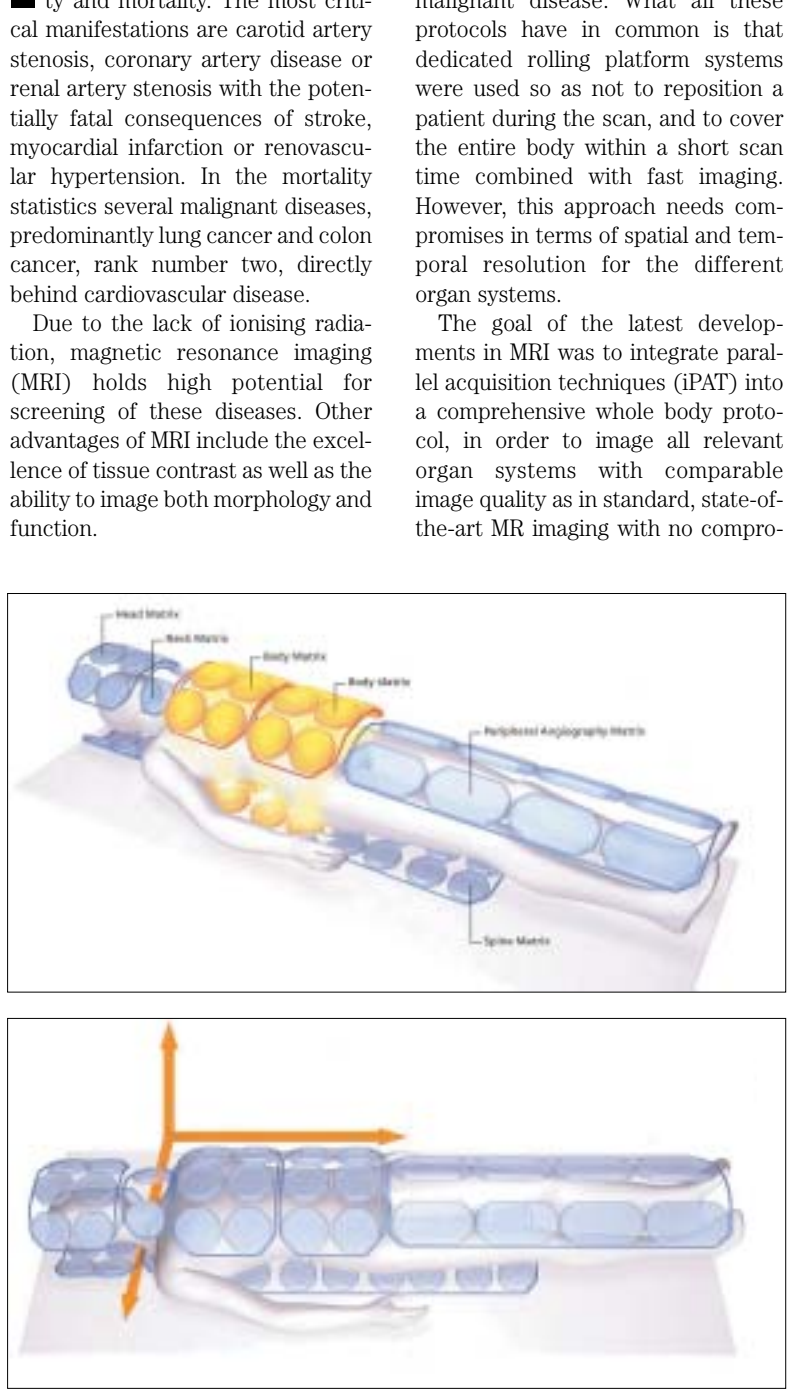


Figure 1: TIM (total imaging matrix) concept. 76 radiofrequency receiver coils in combination with integrated parallel acquisition techniques (iPAT) in all 3 directions allow fast high-resolution imaging of the entire body.

At this point, MRI has already gained a leading role in the diagnostic workup of several organ systems including MR angiography of the carotid arteries, renal arteries and peripheral arteries. In addition, MRI already is considered a new gold standard for assessment of cardiac function. Moreover, MRI is highly valuable for the functional assessment of significant coronary artery disease, using perfusion imaging. Up to now, the assessment of these organ systems by MRI is complex and time consuming. Due to the fundamentally different requirements for the different organ systems in coil set-up, slice positioning as well as contrast media application, it was not possible to integrate the state-of-art evaluation of different organ systems into one whole-body scan.

Several groups have already

mises in spatial or temporal resolution. Parallel imaging is a recently introduced technique that makes use of the spatial distribution of the MR signal received by different receiver coils with various anatomic orientations. In principle, this technique holds the potential to shorten scan time and increase spatial and temporal resolution.

While this method has already gained wide use in the clinical routine for dedicated evaluation of particular organ systems, the use for a whole body scan, so far, has been very difficult.

After successful implementation of iPAT in a protocol on a newly developed whole body MR scanner (Magnetom Avanto, Siemens Medical Solutions, Erlangen, Germany) with a an optimised rf-system and coil design allowing full

of the future?

flexibility in whole body parallel imaging (total imaging matrix, TIM, figure 1), it is now possible to image the whole cardiovascular system, together with imaging of the lungs, brain and abdomen, as a screening examination of the whole body. This allows a search for metastases in malignant disease within less than 60 minutes. The system is equipped with 32 independent receiver channels and with simultaneous connection of 76 array coil elements ('matrix coils') for complete head-to-toe coverage. All matrix coils are designed for parallel imaging in all 3 directions. The total scan range for this system is 205 cm, obviating the need for any patient repositioning during the entire examination.

Latest studies have shown, that at present dual modality PET/CT imaging has a higher accuracy in staging metastases of known malignancies than whole-body CT and MRI. In detecting metastases, MRI has the same accuracy than PET/CT. In the near future, these conditions will probably change in favour of MRI, due to higher accuracy by means of higher spatial resolution using new acquisition techniques (figure 3). The advantages of MRI nowadays are the lack of ionising radiation and ultimately lower costs. Already at this point, whole-body MRI is superior to scintigraphy for the detection of bone metastasis and by far exceeds the performance of conventional X-ray imaging for the assessment of osseous lesions in the patients with plasmocytoma.

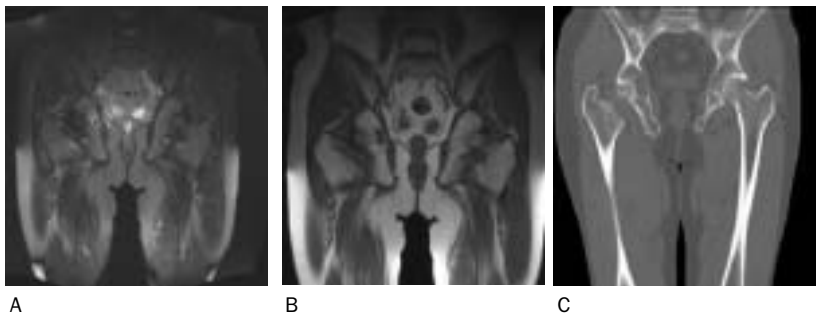
Screening for cardiovascular disease is another application of whole-body-imaging. Here it is most important to perform imaging at the highest possible quality with the lowest effects to the patients body. The advantage of MRI in this sector is that there is no effect on the patient¥s body like ionising radiation and only a little amount of a well tolerated contrast agent not containing iodine is used. Compared with current gold standard screening examinations like ECG, Ultrasound and X-ray, MRI is reader independent, well comparable to earlier examinations and can be performed in a much shorter time, covering larger anatomic areas (figure 2). Preliminary results from studies on the screening of healthy individuals show high accuracy of whole-body high-resolution MRA compared to standard-of-reference techniques.

In summary, whole-body MRI with new specially scanners will extend the possibility for a time-efficient and safe diagnostic work-up in the future for various diseases, which have major socio-economic impact. However, specific applications such as emergency imaging of trauma or assessment of tumour viability will be reserved to other modalities such as CT or PET-CT.

A B C

Figure 2: Approach for whole body screening for metastasis (a) and for cardiovascular pathologies (b) using a whole-body MR scanner (Magnetom Avanto, Siemens Medical Solutions). (c) Multifocal osseous lesions in the spine (sagittal STIR image)

Figure 3: Pathologic findings. Osseous lesions in multiple myeloma in the right acetabulum a) coronal reformat of a 16-detector multi-slice CT system, b) MRI STIR images, c) MRI T1 weighted spin echo images.



A B C

Higher sensitivities in CAD-assisted readings

Findings from research on the impact of computer-assisted detection (CAD) algorithm v. a second radiologist on reader sensitivity for detecting pulmonary nodules in MDCT scans, presented at November's Radiological Society of North America (RSNA) meeting by **Geoffrey Rubin** MD, **John Lyo** MD, and team*, working in the Department of Radiology, Stanford University, Calif.

Geoffrey Rubin

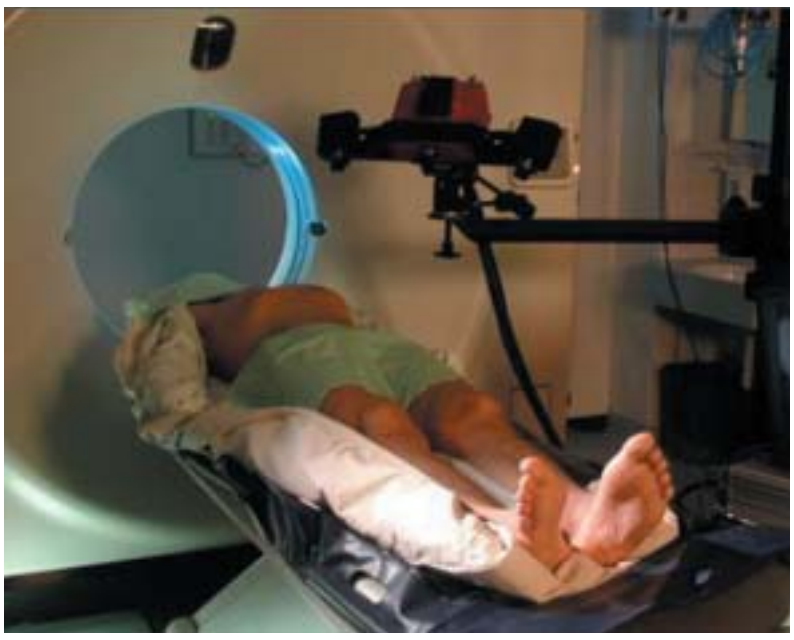
To determine whether computer-assisted detection (CAD) output could substitute as a second reader in a double reading paradigm for pulmonary nodule detection on thoracic CT scans and to determine the variability in individual nodule detection between radiologists and CAD, the team referred 20 consecutive outpatients (15-91 years, average 64 years) for chest CT scans (4-row MDCT with 1.25-mm section thickness and 0.8-mm intervals), to evaluate or establish the presence of pulmonary nodules.

Three faculty radiologists individually analysed the CT scans and recorded the loci of each nodule detection and assigned a confidence level to each observation. A CAD system was applied to the 20 scans, based upon standard cross-validation methodology. The reference standard was established by two experienced thoracic radiologists in consensus, who blindly reviewed all detections on a dedicated 3-D analysis workstation and performed a free search for any additional nodules. TP and FP results and confidence levels were used to generate free response ROC (FROC) plots, which were analysed using alternate FROC (AFROC) analysis. Double reading performance was determined, based on TP detections by either reader.

The researchers found 195 >=3mm-uncalcified nodules in the 20 CT scans. Areas under the AFROC curves were 0.54, 0.48, 0.55, and 0.36 for CAD and readers 1-3, respectively. The difference between reader 3 and CAD, reader 1 and reader 2 was significant ($p<0.05$). CAD, reader 1 and reader 2 were not significantly different. Mean sensitivity of the readers was 50% (range 41-60%). Double reading increased sensitivity to a mean of 63% (range 56-67%). CAD performing at a threshold that allowed only 3 FP detections per CT scan increased mean sensitivity to 81% (range 79-84%). CAD complemented individual readers by detecting additional nodules more effectively than other readers (CAD-reader pair weighted kappas significantly less than reader-reader weighted kappas using Wilcoxon Rank Sum Test, $p=0.05$).

Conclusion: CAD performing at a level that allows only 3 FP detections per CT scan appears to detect significantly different nodules than readers, resulting in substantially higher sensitivities for CAD assisted readings than when two readers independent interpretations are combined as a double reading. Nodules identified by CAD are significantly different from those detected by readers.

* Co-authors: David Paik PhD, Anthony Sherbondy MS, David Naidich MD, and Sandy Napel PhD



A future science

Forensic imaging

Massive filling of cardiac cavities with air causes death in many traumatic cases. In such cases during autopsy (below), small bubbles escape from the right chamber when punctured MRI image (right) shows the air within the heart impressively

Swiss researchers are partnering the latest in radiological imaging technology with forensic science to provide a bloodless, minimally invasive virtual autopsy method.

A goal of forensic medicine is to document and to translate medical findings to a language and/or visualistion, which is readable and understandable for judicial persons and for medical laymen. Therefore, in addition to classical methods, scientific cutting-edge technologies are used.

Virtopsy, the registered name for the Swiss Virtual Autopsy approach, is a research project initiated and managed by Professor Richard Dirnhofer, director of the Institute of Forensic Medicine at the University of Berne, Switzerland. The study is carried out in strong collaboration with the Institute of Diagnostic Radiology of the University of Bern (Director: Professor Peter Vock). In the past three years, the University of Berne's Institute of Forensic Medicine has performed 100 virtual autopsies, and over the years, Virtopsy has developed a transdisciplinary and international dimension with worldwide collaborations in many medical disciplines (see www.virtopsy.com).

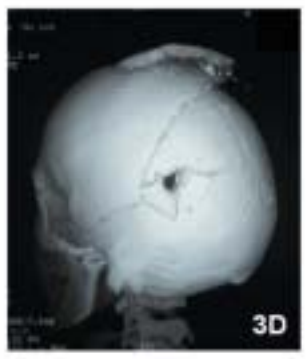
Virtual autopsy combines computed tomography (CT) and magnetic resonance imaging (MRI). CT images provide information about the general pathology and trauma injuries of the body. The multi-detector CT scanning is used like a body screening tool to locate the relevant forensic findings. Then MRI is used in those areas of interest to document the findings of soft tissue, muscles and organs in a higher tissue resolution. To determine the time of death, Virtopsy uses MR spectroscopy - a technique that measures metabolites in the brain emerging during post-mortem decomposition.

PD Dr. med. Michael Thali, a board-certified forensic doctor, who also has specialised training in radiology and is the research project manager for Virtopsy at Berne University explained: 'The virtual autopsy does not destroy key forensic evidence - which may be damaged during a classic autopsy. It can also be used in cultures and situations where autopsy is not tolerated by religion, such as orthodox Judaism, or is rejected by family members. Some people do not like the idea of a classical autopsy.'

In addition to those radiological internal body documentation tools, optical 3D body surface scanning - a technique first used by the auto industry to develop and analyse auto parts - is used to store so-called patterned injuries on the skin of a victim. Using a computer-aided design programme, investigators can then compare the virtual model of the injury with the suspected injury-causing instrument in 3D on the computer.

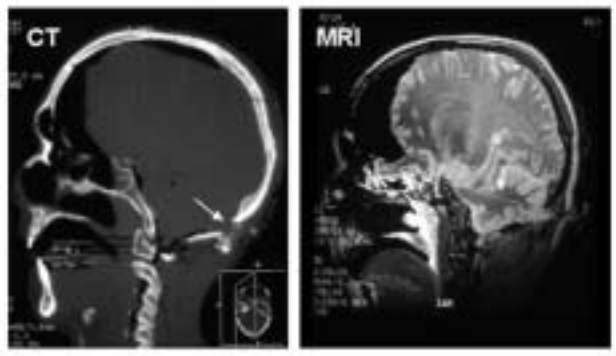
'Finally it is possible to merge all of this information from the body's inside and outside into one data set on the computer,' Michael Thali said. 'We now have 3D, non-subjective information that can easily be analysed and presented in court - without showing graphic, horrible images that may shock people.' The new, combined method of merging 3D body surface and radiology data sets creates the potential to perform many kinds of reconstructions and post-processing of (patterned) injuries in the realm of forensic medical case work. 'The combination of the methods of 3D body surface documentation and radiology has the advantage of being observer-independent, non-subjective, non-invasive, digitally storable over years or decades and even transferable over the web for second opinion. The rapid development of radiological and imaging methods will lead to new horizons in the 3D documentation and forensic examination of dead and living people,' he added.

'It may be some years before all necessary research in the Virtopsy project is done and this method is fully accepted,' said Prof. Dirnhofer and Dr Thali. 'But we believe "Forensic Imaging" will be a new and exciting science in the future.'

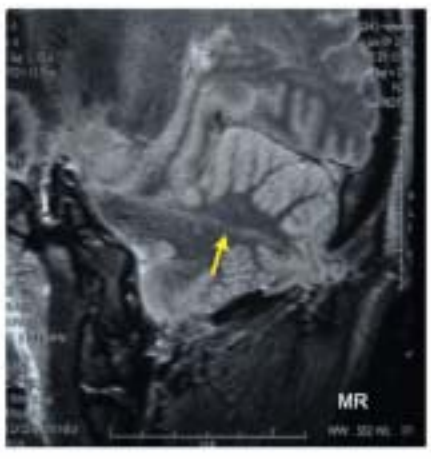


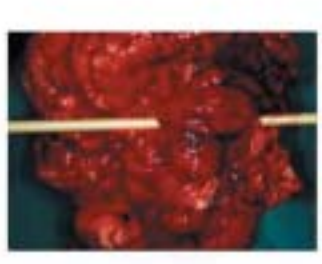
Left: 3D reconstruction of bony structures showing all forensic criteria of exit wound and fracture system of skull
Above: Traditional bony preparation/maceration in this case

3D demonstration of the finding by digital subtraction of posterior parts of the skull



Left: Visualisation of a gunshot wound through the cerebellum by showing bony details using CT. Clearly visible is the typicallly funnel-shaped exit wound
Right: Comparative visualisation of soft tissue damage along bullet track within cerebellum using MRI





Left: Detailed visualisation of MR-image makes a precise verification of bullet track within the cerebellum possible
Right: Searching the bullet track at autopsy traditionally, using a probe, is even more difficult

Customised US for breast imaging

Aloka Company Ltd, one of the world's oldest ultrasound manufacturers, has agreed that Hologic Inc, a leading US developer, manufacturer and supplier of medical imaging systems, will have exclusive distribution rights in the US for Aloka's ultrasound products, customised to Hologic's specifications, for an initial term of three years, with automatic one-year renewal options.

Aloka (worldwide revenues c. $450m) will manufacture for Hologic, under a joint label, a high performance, fully functional, diagnostic ultrasound system optimised for women's imaging, with emphasis on finding and diagnosing abnormalities within the breast. Hologic's exclusive distribution rights extend to radiology-based sales where breast-imaging systems are highly utilised and, in addition to the ultrasound system, include compatible, optional components and future technological enhancements and upgrades.

The system has been designed to incorporate Aloka's proprietary ProSound package of features including: Digital Pure Beam imaging, Tissue Harmonic Echo technologies, 3-D Colour Doppler capabilities, a 12-bit AD converter to enable higher contrast resolution, and an integrated DICOM compatible image management solution.

Jack Cumming, Hologic's Chairman and CEO, said: 'Our selection of Aloka was based on a thorough evaluation of available ultrasound technologies. Our system specifications focused on the highest image quality, a versatile feature-set, simplicity of use for technologists and physicians, and affordable pricing for women's imaging suites that are suffering from overall cost pressures. We believe the system we have customised with Aloka for breast imaging is an elegant one, which eclipses all our selection criteria.'

Hologic's products include the Lorad Selenia, the industry's only full-field, digital mammography system using direct capture technology and the M-IV and Affinity Series of screen-film mammography systems. The company also provides both upright and prone stereotactic breast biopsy systems. Additionally, a distribution agreement with R2 Technology allows the company to offer a range of Computer Aided Detection products for use with their mammography systems.

Aloka's high-end ultrasound system

New 32-slice system

and an award for 16-slice CT scanner

Toshiba Medical has received the Frost and Sullivan (F&S) Medical Imaging Product of the Year Award for its Aquilion 16 multi-slice CT scanner.

Monali Patel, industry manager at F&S, the international marketing consultancy which presents the award annually, said: 'Toshiba Medical's Aquilion 16 is perhaps the most advanced 16-slice CT scanner to date. While other 16-slice CT scanners may have been quicker to market, the Aquilion 16 has a greater number of features designed to suit customer needs and to provide a competitive advantage to Toshiba Medical in the CT market.'

It captures 16 0.5 mm slices with a 400-millisecond gantry rotation while competing 16 slice CT scanners produce slices that are 25-50% thicker and require a slightly longer gantry rotation time, the firm added. 'The extremely thin slices allow the capture of valuable anatomical information such as details of small arteries or minor abnormalities of organ tissue, providing physicians with a powerful tool for neurological and cardiac applications that require precise clinical information.

'The Aquilion's ability to capture 16 simultaneous one or two millimetre slices allows it to cover a larger area in a short time - a necessity in trauma cases where time is the essence. Another unique feature, a 32 mm detector along the patient axis, enables the Aquilion to cover a large anatomical area in a single scan, ideal for injured patients.

'The advances in the Aquilion 16 allow for new types of procedures using CT scanning. For instance, CT angiography can possibly replace traditional invasive procedures.

Additionally, the Megacool X-ray tube that virtually eliminates delays caused by tube cooling.

Launching the Aquilion 32

Toshiba Medical Systems Corporation reports this is the most advanced of its type, building on previous CT technology with a unique 64-row detector design, isotropic scanning, and patented image-reconstruction technology.

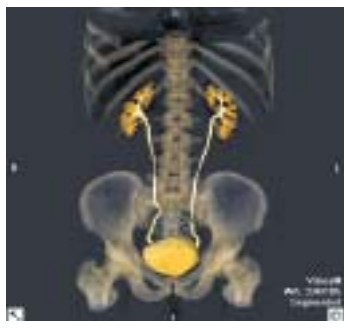
Precise Isotropic Scanning

The most important contribution of multi-slice CT scanners, Toshiba points out, is the ability to acquire isotropic volume data sets in a short time. Using 32 simultaneous 0.5 mm or 1 mm slices, the Aquilion 32 is capable of acquiring these for any region of the body within a single breath-hold. The reconstructed 3D images have essentially the same dimension in all three axes, making it possible to view data from any direction without loss of image quality.

The speed and accuracy of this scanning technology significantly reduces patient examination times, the firm adds. Traditional CT angiograms, usually taking 60 seconds, now take 15 seconds using 1mm slices. Additionally, use of these thin slices for scanning improves the accuracy of measurement and makes these scans more useful for quantitative treatment planning and calculation of volume, the firm points out.

Patented Image Reconstruction Technology

Toshiba has developed a unique, helical cone-beam reconstruction technique for the Aquilion, based on the Feldkamp method for axial image reconstruction from helical scans. By incorporating only data from views that are close to the image reconstruction plane, cone-angle effects are reduced and artefacts are virtually eliminated, resulting in better image quality, Toshiba reports. Unlike more approximate reconstruction techniques, the properties of the reconstructed axial image are constant over the full field of view, ensuring precise images.



World's 1st

64-slice CT system operates at 0.37 seconds per rotation

Siemens has introduced the world's first 64 slice computed tomography system (CT). Called Somatom Sensation 64, the system is based on Speed4D technology utilising the powerful Straton X-ray tube as a core element. After a comprehensive clinical testing phase, the firm reports that the system will replace the 16-slice CT as Siemens top model (from autumn 2004).

Needing only 0.37 seconds per rotation, this new CT system provides unprecedented speed, the firm adds. Additionally, a new detector technology developed by Siemens provides a 'previously unknown 0.4-millimeter image resolution for whole body and cardiac imaging'.

Speed4D Technology, the core of the new 64-slice system, comprises the new Straton X-ray tube, as well as software solutions WorkStream4D to improve workflow and data handling, syngo InSpace4D for evaluation of the beating heart, and CARE Dose4D for automatic, real-time dose adaptation. 'These components enable advanced use of cutting-edge multi-slice CT technology and efficient integration of sophisticated imaging applications in daily clinical practice,' explained Dr Richard Hausmann, head of the CT division of Siemens Medical Solutions.

Together with the newest Ultra Fast Ceramic (UFC) detector design developed by Siemens and integrated detector electronics, Speed4D technology enables the acquisition of up to 64 slices per gantry rotation. Straton is the first and currently only X-ray tube designed for gantry speeds of up to .37 seconds per rotation, enabling the display of smallest details of cardiac anatomy, even at higher heart rates, without motion artefacts. The X-ray tube utilises a directly cooled anode where all mechanical parts are located outside the vacuum. This results in unprecedented cooling rates of five Million Heat Units (MHU) per minute, says Siemens, and with close to zero MHUs, eliminates the need for large heat storage capacities. (Even at maximum loads, the new tube cools in under 20 seconds - far less time than needed to initiate the next scan or position a new patient). Using an advanced electromagnetic control system for X-ray focus, the Straton tube doubles the sampling density for an organ, resulting in much higher resolution.

The software reduces data volume produced during each examination. The diagnostic information from up to 2000 thin slices, acquired from a high-resolution scan, can be displayed in a pre-defined series of image planes using direct 3D reconstruction of the raw data, which results in a comprehensive, secure diagnosis with the highest possible image quality while simultaneously reducing the data volume by a tenth. Additionally, WorkStream4D eliminates manual reconstruction steps: within standardised protocols, the user selects image planes for diagnosis, and the software does the rest. Acquisition and display of oblique/double oblique body images is much faster than before, enabling faster diagnosis even for more complex anatomy.

Because syngo InSpace4D enables organs in motion to be displayed, Dr Hausmann said: 'Now double-oblique image data can be processed in real time in up to 24 phases of the cardiac cycle, enabling true dynamic 4D evaluation.'

An additional feature of Speed4D technology is enhanced CARE (Combined Applications to Reduce Exposure) - Siemens initiative to reduce radiation exposure in CT examinations. The new CARE Dose4D analyses cross-sectional anatomy for each patient in real time and adjusts the emitted X-ray dose accordingly, without user interaction. Initial clinical results with CARE Dose4D indicate an up to 66% reduction in dose for the average adult patient.

The new flat panel detector

Thomas Nordhoff, Senior Manager Europe, Shimadzu Deutschland GmbH, describes his company's newest innovative developments and global presence

Thomas Nordhoff: In the last three years, Shimadzu Medizintechnik has undergone a strategic change in its regional concentration within Europe as well as in our product development.

We have extended our activities in Eastern Europe and Russia significantly - now having six offices between St. Petersburg and Novosibirsk - and in Scandinavia and England. Scandinavia is a technology driven market, which lays emphasis not on pricing but on innovative technology that can be networked. This is why we have a particular advantage there through our recent product developments.

We have renewed our entire product range, starting with mobile X-ray equipment right down to the angio and biplan-card-angio system. As part of this technological drive we completed the development of the flat panel detector, the world's first with direct conversion, which was presented to the specialist press in Japan last autumn.

We now have four cardiological systems in clinical use, with outstanding results, particularly in terms of picture quality and reducing the radiation dose. Five further systems will be added by the end of the first quarter of this year.

To summarise: we now offer one of the most modern product ranges in radiography and this includes activity in the Eastern European and Russian markets.

Our focus is on radiography, and the existing systems in this field have been completely replaced with new ones. Let's look at the mobile X-ray machine - for which sales have doubled every year since its introduction three years ago. Worldwide we deliver around 1,000 systems a year. In the US our mobile X-ray market share climbed from 0% to 15% - significant evidence that we have recognised the users' requirements with this product. In Europe, sales figures tripled in 2003 compared with this previous year, so this is success all round.

To what does he attribute this success?

Mobility, user friendliness - these are the important factors in mobile equipment for clinical use, for example, when working between hospital beds or looking after patients who are hard to position, such as those in intensive care wards. There are some unique, very practical user elements with this equipment that are not found elsewhere, so, they are used worldwide. SARS led to a huge demand for our equipment in Asia, where it was used in the diagnosis.

We are also active in ultrasound scanning and CT. The introduction of a new product line in colour ultrasound supported the upward trend for us in this area immensely. However, conventional multi-slice CT technology, currently discussed a lot, is not something that Shimadzu has been involved in, because we now have entirely new technological opportunities, through the flat panel detector. If you let one of these detectors rotate in a C-arch of 180° you have a high-resolution set of CT volume data. I think this is the area we will specialise in.

Shimadzu retreated from MRI development. This was necessary and made sense for us. The potential that came out of this process and the success that we now see in radiography show that this was the right decision.

Based on an interview with European Hospital

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Cell-based assay to detect cancer

The Pennsylvania-based firm Immunicon has raised $25 million to fund commercialisation of its cell-based and molecular diagnostic cancer monitoring products and to develop products for indications of cancer beyond a cancer site products and to develop products for indications of cancer cells in the blood before the cancer becomes otherwise visible.

Following a study first published in the Proceedings of the National Academy of Sciences in April 1998, which showed that circulating tumour cells were significant for disease and had predictive and prognostic value, a cell-based assay, using immunomagnetic enrichment to detect epithelial cells of solid tumours, was developed then tested in clinical trials, across the US, in 180 women with metastatic breast cancer.

By Karen Dente

Dr Massimo Cristofanelli, who conducted the trial at the M.D. Anderson Centre, Texas, said he wanted to see if minimal disease in patients with metastatic breast cancer could be detected. 'The idea originated in Europe,' he explained. 'They were looking at tumour cells found in bone marrow aspirations (performed during surgery) that showed minimal cytokine positive cells - which had prognostic implications.' Again, the idea was to find these cells where collection would be easier, and it was thought that blood could be screened for circulating tumour cells, providing a good source of cancer cells from which to collect biological data. The outcome of the trial showed that the screening test helped predict a patient's response to treatment after four weeks. 'This is important in stratification: you can tailor treatment by looking at those who will respond and those who will not,' Dr Cristofanelli pointed out.

Another implication is in prognosis: patients with no secreting cells have longer survival compared with those who have a viable number of these cells. 'Essentially, the implication for those patients is that you must use more aggressive treatment in one group - or whether to give treatment to those who have a bad prognosis at all,' Dr Cristofanelli said.

Currently there is considerable discussion about the treatment strategy for patients with metastatic breast cancer - the question being: Is single-agent chemotherapy better, and is aggressive strategy valuable or not? In much of the eastern US the less toxic and less aggressive single agent approach is preferred. 'This is not based on any stratification of sites of disease, and is still a very empirical approach,' said Dr Cristofanelli. Up to now, all the studies carried out have never looked at another valuable such as secreting cells, or the site of the disease, to decide if patients have some feature that can predict whether therapy is adequate or not. 'I think this is something that should be done prospectively. It's an important marker to decide which is the appropriate treatment for a patient - and this it's what the company will pursue in the near future.'

Pointing out that immunomagnetic enrichment has been known for several hundred years, Dr Gerald Doyle DDS, MS, Director of Clinical Research at Immunicon Corp said this approach can detect iron oxide particles encased in protein to which antibodies are bound, and he believes this type of testing makes today's staging of the disease obsolete. 'Thirty percent who would not be diagnosed as having cancer according to today's standard guidelines would be diagnosed with cancer if using these cell-based screening assays that can detect circulating tumour cells very early on,' he said. Ductal Carcinoma in Situ (DCIS is considered a non-invasive stage) can be measured, he pointed out. Beyond monitoring disease, predicting outcome and tailoring treatment, he also sees the assay as useful in screening for the disease.

'The mammogram still remains the gold standard for early diagnosis of breast cancer,' said Dr Cristofanelli, adding: 'Screening for cells is still a far away modality to be used in patients, but this is where we should go, if we can prove cells in early disease, maybe not DCIS, but in stage 2 and stage 3 disease.' The test could also be used in other types of cancer, e.g. colorectal.

Indian firm steps into France

India's biggest pharmaceutical company - Ranbaxy Laboratories Limited, which manufactures and markets branded generic pharmaceuticals and active pharmaceutical ingredients - has acquired RPG (Aventis) SA, France.

As a subsidiary of Ranbaxy, RPG will retain its name, to maintain a '...strong brand equity and visibility in the French generic market'. Ranbaxy reports that it intends to invest additional resources in the French firm and further develop this business in France, where RPG has been ranked fifth in the generic market, with sales of EUR 52 million (IMS-MAT November 2003) and a market share of over 6%. A wide range of 52 molecules with 18 out of the 20 best selling molecules represents the firm's strong product portfolio, Ranbaxy points out. 'The company is acknowledged as a reputed high quality and reliable generic player and develops products strictly comparable to the original drugs (an important factor for pharmacists to convince patients to switch).'

The firm's main drug product range includes treatments for cardiovascular, gastro-intestinal and neurological disorders, plus antibiotics and rheumatoid/non-steroidal anti-inflammatory drugs.

France is the world's 4th largest pharmaceutical market, with sales of US$ 19.2 billion, growing at 4% annually and constituting 4.8% of the world pharmaceutical market. The generics market in France is about EUR 652 million and is the 5th largest after US, Japan, Germany and UK. The market has an excellent growth potential, Ranbaxy adds. 'This completes a further step in the expansion plans we have for Ranbaxy in Europe,' Dr Brian W. Tempest, Joint Managing Director and CEO designate of Ranbaxy, pointed out, following the acquisition of RPG.

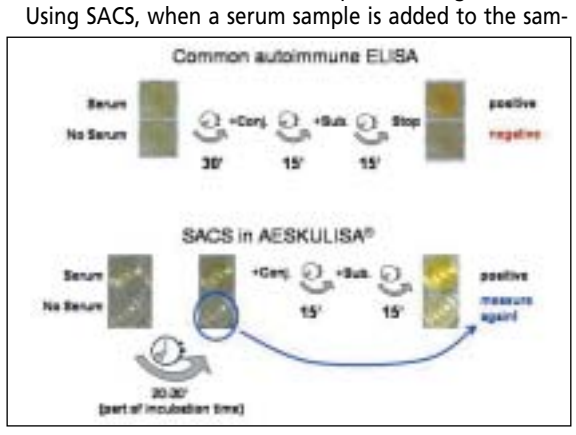
Ranbaxy also reports that its continued focus on R&D has resulted in several approvals in developed markets and significant progress in new drug discovery research.

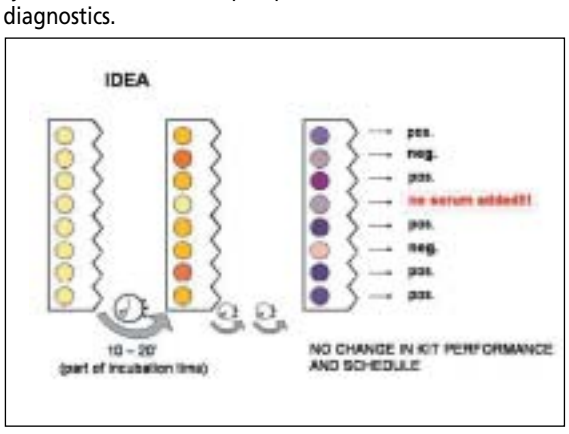
NEW Safety system for ELISA assays

False negative results can result if (accidentally) serum is not added to a sample but that sample is tested as if it had been. Given demands for high turnover plus automation, such errors can occur - with inevitably serious outcomes. To avoid the problem, Aesku Diagnostics recently launched SACS, a sample and assay check system for use with all CE-marked kits in the firm's Aeskulisa product range.

Using SACS, when a serum sample is added to the sample buffer during pre-dilution, within minutes the colour of the buffer changes from bright yellow to an intensified yellow, and this is photometrically measured. Clearly, if no change has occurred, the serum has been accidentally omitted.

The firm points out that SACS is the world's first check system for serum sample pre-dilution in autoimmune diagnostics.





TOWARDS A pain-free hospital

Criteria: courage, nerve, initiative, resilience

By Anja Behringer

'Patients expect to suffer pain in hospital and doctors never disappoint them.' That's a 20-year-old saying which may reflect the truth for not much longer. Recently a pharmaceutical company initiated a pilot project, involving five hospitals, to tackle pain among hospital patients. 'Every other hospital patient experiences pain, and every third patient suffers severe pain,' said the pilot project's advisory committee - made up of members from various medical fields.

Wolfgang M. recovered well from his knee operation, and the post-operative pain is bearable. The nurse leaves him a painkiller for the night '...just in case'. The more time passes, the worse his pain is becomes, and he cannot sleep. He finally takes the painkiller at midnight. That's wrong.

Claudia S. asks a nurse for a painkiller for the third time in one day. The nurse points out that Ms S. has already had the maximum possible dose for this period, reminds her that she still has to get through the night and promises a painkiller for the evening. This is also wrong.

Pain is not adequately treated due to a lack of knowledge not only among patients, but also doctors and nurses. Other contributing aspects include lack of time, rigid treatment routines, insufficient organisation, lack of success monitoring, badly defined distribution of competencies as well as fear of complications. Also often mentioned are high costs of certain drugs - particularly those for cancer and other severely ill patients.

Pain treatment is the single most costly factor of expenditure in healthcare. 20% of patients suffering chronic pain are suffering neuropathic pain and 40% suffer back pain. The costs are also enormous from an economic point of view. Based on US studies, Germany loses 220 million working days annually to pain, which translates into EUR 28 billion.

About six to seven million patients in Germany suffer chronic pain and about 10% of these cases continuously suffer severe pain. Experts agree that pain therapy in Germany is inadequately provided, both institutionally and in terms of drug prescriptions. About 2,000 centres for pain therapy are needed to achieve comprehensive care for problem patients. Currently Germany has 300 of these centres. Moreover, 95% of patients who need strong painkillers do not receive the necessary medication. According to a study carried out in 2000, every third patient suffering chronic pain is not happy with the therapy they received. Patients complain about the frequent change in doctors and lengthy periods of treatment that do not alleviate the pain. On average, patients suffering from skeletal and muscular pains will see seven different doctors and will have been continuously treated for an average of 12 years.

In Anglo-American countries the accreditation of hospitals and care institutions by health departments is linked to their being able to ensure effective pain relief (Osterbrink).

Pain documentation - Careful documentation prior to, during and after treatment is an important part of any pain therapy. Patients have so-called pain diaries in which they enter daily levels of pain, length of pain, effects on their well-being, ways of influencing the pain, and any other important occurrences over a period of several weeks. Pain is now measured through a visual analogue scale on which patients rate their pain on a scale from one to ten.

This pain documentation allows the doctor to check the effectiveness of his pain diagnostic and therapeutic methods and, if necessary, to adjust the dose of painkiller administered or change drugs.

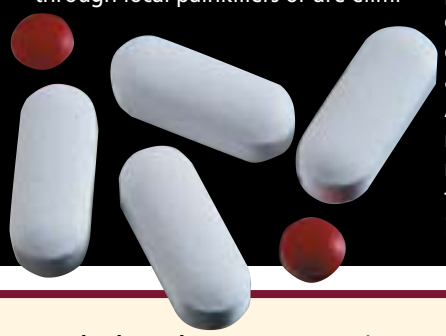
Nonetheless, a change in awareness and therapy approach does not

Pain treatments

Recommendations for pain therapy with drugs for tumour pain, developed by The World Health Organisation (WHO), are now also used for patients whose chronic pain is not caused by tumours.

The WHO recommends oral administration of drugs based on a strict timetable so ensure a constant level of drugs in the blood. Strong pain is treated with strong drugs such as opioid analgesics. Morphine is the prototype of opioid analgesics, and is still regarded as gold standard tumour pain treatment. Derivatives of morphine, e.g. hydromorphone, achieve the same effect with a lower dose for the treatment of tumour pain. These are particularly suitable for older patients who often suffer several age-related complaints. Modern opioid analgesics (e.g. oxycodone) are also increasingly used to treat non-tumour based pain, such as pain on movement or neuropathic pain. They are highly effective, well tolerated and are available as so-called retard-drugs that release active substances into the blood over a period of time. These analgesics enable effective pain control and achieve a balance between optimum pain reduction and highest possible activity for the patient. This means that patients can break free from the vicious circle of pain, actively support their recovery process and take up normal daily life.

When interventional methods of pain relief are used, nerve structures are either temporarily numbed through local painkillers or are eliminated permanently, for example through chemical destruction of nerve cells. An injection of painkilling drugs into the spinal cord is one such treatment.



The psychological types of treatment comprise relaxation methods such as autogenous training, progressive muscle relaxation, learning to cope with stress and biofeedback treatment. A psychological examination should be carried out at an early stage so that the cause of pain can be established early on, i.e. to determine the physical and psychological aspects of the pain.

In a physiotherapeutic approach, physiotherapy, massage, heat or cold therapy and transcutaneous electrical nerve stimulation (TENS) are used to treat the pain. Alternative methods of pain treatment, such as traditional Chinese medicine (acupuncture), oxone therapy and homeopathy are also increasingly used.

Care dependency, falls, incontinence & pressure ulcer

Top: Professor Theo Dassen. *Below*: Juliane Eichhorn

Regular participation in prevalence surveys is an essential part of prevention, according to a survey by **Juliane Eichhorn** RN, and **Professor Theo Dassen** PhD RN of the Department of Nursing Science, Humboldt University, Berlin

Nursing researchers at the Charité University of Medicine, Berlin, have repeatedly made nationwide prevalence surveys in which 92 institutions of the German health system have participated. Using standardised questionnaires, trained nursing personnel examined 13,002 hospital patients and nursing home residents regarding the nursing phenomena of pressure ulcer, falls, incontinence and care dependency.

The aim of the surveys was to produce a descriptive cross-section study enabling the comparison of data from hospitals and nursing homes. Additionally, a longitudinal section examination of institutions that participated more than once was of great interest.

Nursing science deals with the development and examination of nursing problems and interventions. In this connection, the investigation of prevalence is a vital task in the field of research.

Pressure ulcer, falls and incontinence were selected as nursing problems/phenomena as they are considerably relevant to nursing research. There is only little empirically examined knowledge available and the public is only rarely aware of these problems.

Based on the current situation it was intended to investigate the prevalence of the above-mentioned nursing phenomena.

Methods and Instruments - Since 2000, the project has been carried out annually by scientists of nursing of the Charité University of Medicine, Berlin. It is mainly a descriptive study. Its longitudinal section results are supported by the fact that various institutions have taken part for several years already.

The data were gathered by trained nursing personnel by means of qualifying date surveys of patients and residents who gave their informed consent.

Standardised questionnaires gathering patient relevant data (age, sex, height, medical diagnoses, etc.) as well as in-house risk scales, standards and guidelines were used as measuring instruments. Furthermore, it was possible to establish the interventions that were carried out and material used for pressure ulcer prevention and therapy.

Another essential aspect was patient assessment relevant to pressure ulcer risk. The Braden scale was a favourite instrument, having been filled in at the 'patient's bedside' after a skin inspection. The division into various phases was carried out on the basis of national and international recommendations.

Additional questions referred to fall events and the assessment of the patient's current state of care dependency.

In spring 2003, 45 nursing homes and 47 hospitals took part in the survey, which meant there was an increased number of participating nursing homes in particular compared with the previous year (table 1). Therefore, the desired data comparison of nursing homes and hospitals could be achieved in a more accurate way due to the better balance of participants.

13,002 questionnaires were evaluated (3499) nursing home residents and 9503 hospital patients). So the response was 76.6%. It was established that there was a larger share of females as well as a higher average age of female patients and residents (nursing home = 11 years, hospitals = 3.5 years).

By establishing the ICD-10-Codes main diagnoses concerning circulatory diseases (20.7%) and new formations (15.3%) were made possible in the clinical field. Treatment was mainly carried out on wards for internal medicine (36.6%) and surgery (30.8%) (diagram 1).

Further evaluation showed a higher average care dependency of female and male nursing home residents compared with hospital patients. Additionally, distinct relations were discovered between care dependency and the prevalence of pressure ulcer. The higher the care dependency the more often one or more cases of pressure ulcer were diagnosed. It was also established that, on average, patients with pressure ulcer were older than those without.

A risk assessment was carried out by applying the Braden-Scale. It helped identifying 35% of persons at risk in hospitals and 60% in nursing homes. Nevertheless, pressure ulcer prevalence in nursing homes was 12.5% compared with 24.2% in hospitals, but more than 50% of pressure ulcers developed on site. It has to be noted that more than half of the pressure ulcer patients were bedded on 'normal' mattresses without special padding. Nursing homes used fleece bedding for prevention and therapy in almost 50% of the cases whereas hospitals only used them in 10% of the cases. Hospitals also used a greater variety of wound dressings, however, they did not apply them as frequently as the nursing homes did.

Another important aspect of the prevalence survey was the examination of fall events. Especially locations and consequences of falls were investigated. 724 of all persons who fell (1938) did this whilst being in either a hospital (270) or a nursing home (454). 9.4% of severe consequences such as bone or joint fractures were established in hospitals and 23.2% in nursing homes. Unfortunately, it was revealed in this connection that standards and guidelines of fall prevention were almost non-existent.

Incontinence was also included in the study. A significant difference

automatically lead to a change in structures. However, the objective of the pilot project 'Pain-free hospital' is to establish interdisciplinary pain management for doctors, nurses and patients in Germany. The project is supported by the pharmaceutical firm Mundipharma, of Limburg, and the German Association for Interdisciplinary Medicine (DGIKM).

During the pilot phase the project will initially be limited to five hospitals with 400 - 1000 beds each (no accident or special clinics) chosen by the team of experts - applications are still being evaluated. Following the concept 'Keep it short and simple', results from three clinics will be evaluated in the autumn. Following an as-is analysis, via questionnaire, on the status of pain therapy in the hospitals, the team will make recommendations for changes. The objective is to implement improvements to pain therapy with the least possible cost and energy and to ensure that the hospital receives a quality accreditation. This is in accordance with DRGs that require trouble-free and cost-effective treatment processes in classical medicine. Apart from the obvious advantages of successful pain management for patients, further benefits include cost saving through quicker recoveries and shorter hospital stays.

Interdisciplinary, multi-professionalism and team thinking will be success factors in the future, and pain therapy is a classic example for this.

Following a discussion on this subject by Munidpharma GmbH at MEDICA, I spoke with the nursing scientist Professor Juergen Osterbrink, head of the Centre for Nursing Studies, Nuremberg, who told me that in the USA $90 billion are spent on pain therapy and 90% of patients suffer from back pain and they cause 80% of the costs. I then asked what influence the pharmaceutical company would have on the pilot project. 'They have no influence on the choice of drugs. They only support this project on the subject of freedom from pain.'

One of the main problems with managing pain in hospitals, he said, is that, 'There is not enough experience in the treatment of pain. There is a lot of prejudice against morphine, for instance, but suffering from too much pain can cause other illnesses as well.'

He pointed out that recent findings include, '... the combination of drug and non-drug therapy in treating post-operative pain, which is often not treated sufficiently - an individualised therapy. You have to differentiate pain. There are different types and intensities, which every patient reacts to in a different way. Sometimes a simple distraction, through music with headphones or breathing techniques, can alleviate pain.'

Professor Osterbrink - as Head of the Advisory Board Nursing, Head of the Centre of Nursing Studies, Klinikum Nuremberg, Guest Prof. University Witten-Herdecke, Associate Professor Florida International University, Miami, USA - brings a wealth of experience to the advisory board, which should bring us closer to better pain management.

Other eminent members of the board

Professor Christoph Maier - Speaker and Head of the Advisory Board Medicine, University Hospital Bergmannsheil, Clinic for Anaesthetics, Bochum

Professor Winfried Hardinqhaus - Medical Director Klinikum St. Georg, Franziskushospital Harderberg and St. Raphael Hospital Ostercappeln, Osnabruck, President of the German Association for Interdisciplinary Clinical Medicine (DGIKM)

Professor Eberhard Klaschik - Sackler Foundation professorship for Palliative Medicine, University of Bonn, Senior Consultant at the Department of Anaesthesiology, Intensive Medicine, Palliative Medicine and Pain Therapy at the Malteser Hospital Bonn-Hardtberg, President of the German Association for Palliative Medicine (DGP)

between nursing home residents (70%) and hospital patients (20%) was established with females suffering urine incontinence more often than males. However, more men had to get urinary catheters. Toilet training was carried out more frequently in nursing homes.

Longitudinal section comparison - 17 hospitals and 7 nursing homes were taking part for the second or third time. By comparing several years it was possible to show that there was a significant decrease in pressure ulcer prevalence in the majority of institutions. A shift in applying risk scales from the Norton-Scale to the Braden-Scale was noted. In 2003, more institutions were actually working on the development of a pressure ulcer standard, which is a success resulting from the inquiries.

Conclusion - Regular participation in prevalence surveys is an essential part of prevention concepts. Institutions aiming for a high quality of care, in terms of the investigated nursing phenomena, should make their personnel aware of this and employ experts for pressure ulcer and fall patients, because only professional advice and guidance can contribute to the prevention of any such complications.

A longitudinal section comparison should also be aimed for, to demonstrate development tendencies and successes.

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Palliative medicine

When Eberhard Klaschik became the Sackler Foundation Professor for Palliative Medicine, at the University of Bonn (details box: page 13), he was the first person in Germany to take such a role. In 2003, a second professorship in palliative medicine was set up at the University Hospital in Aachen.

'Palliative medicine is a specialist field that deals with terminally ill patients or those with a very limited lifespan', Professor Klaschick explained. 'In recent years, in Germany, the palliative approach has been not only to act in the last stage of life but also to intervene far earlier and offer help. For many terminally ill patients, this means extensive assistance in coping with their lives

'This type of care also has become more established in paediatrics, geriatrics and for neurological diseases. So patients whose life expectancy is likely to be a little longer than that of the typical palliative patient can also receive palliative care, with comprehensive treatment that takes their physical, psychological, mental and social problems into account.'

As a senior consultant in anaesthesiology, intensive medicine, and pain therapy, his own background presents a clear advantage in this work, but the professor points out that any qualified doctor can specialise in palliative care.

'You have to be able to examine therapies available for patients' physical symptoms, for example pain, shortness of breath and changes in the gastrointestinal tract, but you also need to look at psychological problems that may be present. You may be dealing with people who have very existential problems.

'You must also ask ethical questions - How do I deal with a patient who demands death? How can I turn a desire for euthanasia into a desire to receive help to cope with life? In other words, palliative medics are against active euthanasia. However, we do allow patients to die. The difference in our work lies between accepting death as the conclusion of a natural process and intervening and ending lives early.'

But what about today's many 'death delaying' therapies that hinder nature from taking its course? If possible, shouldn't patients have a chance to decide about the natural progression towards his/her death?

'This is a problem in intensive care medicine. Doctors reach a point where they must decide whether certain, life-sustaining therapies should be used - or not. Active, passive and indirect euthanasia are terms that tend to be confused in Germany. 'Active euthanasia means consciously carrying out a procedure that will result in a person's death. Passive euthanasia is different. Once a patient has started the process of dying, any therapeutic measures applied would delay death. The ethical and legal situation here is that we would not carry out nonsensical measures. The third concept is indirect euthanasia. A doctor wants to ease a patient's suffering and may choose a therapy that unintentionally leads to that patient's earlier death. This situation is difficult to gauge and can only really be assessed by the doctor involved - he/she is the only person who knows whether a therapy was only intended to ease the patient's suffering or whether he/she thought of taking this a step further. All we can see, on the outside, is that the patient died. This indirect type of euthanasia is legitimate within our ethical obligation to ease suffering - and it's now legal in some countries.

In recent years, Belgium and the Netherlands have legalised the 'implementation of life-ending measures'. Given that certain criteria are met, this allows active euthanasia - which only qualified doctors can carry out.

'This places completely new obligations on doctors,' the professor stressed. 'Actively ending life has never been a doctor's task. They are primarily committed to life, to easing suffering and to accompanying the dying throughout that process. That's why I believe active euthanasia should not be down to doctors. Perhaps a new type of job will be created. In countries using the death penalty, the killing is not done by doctors, but by a professional killer. So, here's the question: Who should carry out a life-ending measure, or if you like, the murder of a human being? Personally, as an independent person with ethical standards, and as a doctor, I cannot accept that I should have to kill.

'Great Britain and France do not allow active euthanasia, nor does Germany, where I think that Kant's declaration about the dignity of man plays an important role, and that man's autonomy must not go as far as demanding of others that they end lives.

'Switzerland leans towards legalising euthanasia, but the Swiss prefer assisted suicide, which does not have to involve a doctor. A patient takes part in a euthanasia programme, receives appropriate instructions, and a "dying companion" becomes part of the process, to accompany the patient all the way, after he/she has obtained a drug from a pharmacy that will lead to death.'

How important is the family's role in palliative care?

'Very. The level of social integration is one of the most important factors in people's decision on whether they want to carry on living. Some time ago, following a screening of a film on active euthanasia, I was a telephone expert for viewers to ring from all over the country. The most disturbing thing I found was that people who said they no longer wished to live had already died a social death - they were completely

A hollistic approach to death

'We believe we can offer a **new perspective** to patients who seem to have **given up all hope** and no longer wish to live, or do not believe they are able to **carry on living**. We try to help them to **accept life as it is**, and to find the best possible form of **pain relief**. We want **to ease suffering**; we do not want to dispatch the sufferers.'

Professor Eberhard Klaschik

Professor Eberhard Klaschik

Dr Kimsma, of the Vrije University Medical Centre, Amsterdam

Gerrit K Kimsma MD, moral philosopher, member of a Euthanasia Evaluation Committee, and Euthanasia Consultant in Amsterdam, responds to **Professor Klaschik's** concepts (above)

From a Dutch perspective, Professor Klaschik presents conservative and well-known positions and arguments regarding medical decisions at the end of life. He also presents palliative care as an organised discipline in Germany. Focusing on these, I will provide a different perspective on both the Dutch practice of euthanasia and physician-assisted suicide and its justifications. I believe it is time to inform the German public on the organisation and possibilities of palliative care in the Netherlands.

One of Prof. Klaschik's claims is that in the Netherlands (and Belgium) physicians assist in people's deaths, and that the accepted reason for such intervention is primarily fear: fear of unbearable suffering, fear of pain and of loss of self determination and dignity. His suggestion is that palliative care is a substitute for physician-assisted dying. This is incorrect and his reasoning as to why people ask for assistance is deficient and incorrect.

In Van der Wal's research (Van der Wal G, P J van der Maas, *Euthanasie en andere medische beslissingen rond het levenseinde*, Sdu uitgevers, Den Haag, 1996) the arguments found were: unbearable and hopeless suffering, prevention of further loss of dignity, prevention of further suffering, meaningless suffering, pain, death without dignity, fatigue, prevention of suffocation, not wanting to be a burden and, lastly, prevention of pain. There is never just one argument, mostly there are several and most of those are adult, well reasoned positions. Specifically and most clearly stated: fear of suffering in itself, which can be treated, is not a suffi-

isolated, no longer surrounded by others, had nobody to communicate with and so they saw no point in living. One of our most important social objectives is not to let people suffer alone, and to accept physical changes and never to question a person's dignity.

'Papers published in the Netherlands reveal the reasons why people request active euthanasia. Among the ten most commonly cited are first, the fear of unbearable suffering, already existing, unbearable suffering, or the fear of suffering becoming worse. The second set involves fear of pain and of physical changes, and the third set includes loss of self-determination, autonomy and dignity. These three sets show the most common reasons for people wanting active euthanasia. It is up to all of us to help dispel fear and ease suffering.'

At what stage does a palliative care expert become involved in care?

'We need to look at two different types of organisation. On the one hand there is interdisciplinary cooperation, where a colleague realises he can no longer achieve anything for a patient with his specialist knowledge and the types of therapy available to him. This may, for instance be a radiotherapist, who cannot sufficiently control a patient's pain levels. So he may seek the advice of a palliative specialist. There is no set stage for this to be done; in fact, sometimes a link with a palliative specialist may only be temporary, because then the therapist may feel in control again. We have some cancer patients who suffer excruciating pains, but once we have managed to ease that suffering they are happy to be referred back to an oncologist's care. All this is based on good interdisciplinary cooperation. On the other hand, we need to look at where palliative medicine is put into practice. In our opinion it should be carried out for outpatients as well as inpatients. For outpatients the general practitioner (GP) should be the first point of contact.

'There are situations where a GP can no longer deal with a case alone and needs advice. Some German cities have projects to offer support for and expertise in palliative care. For inpatients we have specialist palliative wards in hospitals and hospices. We also have palliative-medical counselling services in hospitals, whereby any department can contact in-house palliative experts, who then visit a patient in the ward and try to achieve the best possible symptom control.

How do medical insurers react to this care?

'Ah, quite a touchy subject! Apart from a few pilot projects there is no standard system of financing for the outpatient sector in Germany. When the DRGs where introduced, palliative medicine was not part of planning, so at present we are definitely in the red. However, our hospital providers consider palliative medicine so important that we can continue our work. We have lodged our concerns with all appropriate decision makers. We are not regulated through the DRGs in 2004, and if we don't manage to organise this before 2005, palliative medicine will face hard times. We must not let that happen.

'Financing is a problem, across Europe. The Dutch invest quite a lot in palliative medicine. France now has a law stipulating that investments must be made in this field. The British have their own system through the National Health Service (NHS) but that only covers part of the costs. A top-up comes from very generous donations - which would be unthinkable in Germany. The Austrians have made considerable progress, considering developments in palliative medicine started rather late there. Palliative medicine is now part of the hospital requirements plan - which is to establish 50 hospital beds per 1,000,000 inhabitants for palliative care by the year 2005. This corresponds with the situation in Great Britain. But, as I've said, the situation in Germany is not as good.

Euthanasia
the Dutch perspective

cient reason to end a patient's life, but a reason for treatment, both by medication and psychological therapy. The fundamental difference in Germany is a legal decision, made in 1974, that the ending of a patient's life by a physician is possible under certain legal conditions - a position supported by the Dutch Royal Medical Society since 1984.

Let us consider Prof. Klaschik's ideas on the philosophical background of the justification for assisted dying. He invokes Kantian concepts of autonomy and dignity as a justification to oppose assisted death, adding that this autonomy principle can never go to the length of demanding of others that they assist patients to die. This is a very interesting way of arguing and very inconsistent. Kant's principle of autonomy implies that any measure that enhances a person's autonomy is morally good, and it is difficult to see why this principle is no longer valid when a person dies, since we are all mortal. Kant's other principle is that a person should never use another person as a means: this would be the opposite of autonomy and dignity. And this really can never be and is never the case: a physician cannot be forced to end a life if that physician is opposed to such an intervention. Conscientious objection is a fundamental and accepted position. Refusals by physicians - because the conditions of voluntariness and suffering are not fulfilled - are more common than acts of euthanasia and assisted suicide. So, invoking the Kantian doctrine of autonomy to oppose assistance in dying is wrong. Both philosophically, and in practice, reality is the recognition of autonomy of both ethical actors, in conformity with Kantian doctrine.

Prof. Klaschik also suggests that accepting the goal of helping people to die with dignity, by acting to end life, is alien to medical ethics, not only today but in the past. This is not only wrong, but is one-sided and a distortion of history. It would be cheap to invoke memories of the Nazi German past in terms of euthanasia. Yet, it seems that a fear of repetition of that past is the main reason why the historical picture of medical ethics regarding assistance in dying is falsified, and so much effort is put into opposing attempts for legalisation in Germany, including the position of the German Medical Council.

It might be helpful to remind Prof. Klaschik, and others, that in all the countries that had Euthanasia Societies in the 19th and 20th centuries - e.g. Great Britain, the USA and Germany - physicians have been members, and on their boards, mainly because they wanted to legalise a practice that occurred in secrecy and remained hidden.

But, there also is an entirely different story in allowing physicians to help people die. In 1906, two US states had already attempted the legalisation of euthanasia, and in the 1950s New York State, and Great Britain, proposed the legalisation of these interventions.

Some go even further in history and claim that the Hippocratic Oath, specifically opposing euthanasia, was defined in an atmosphere that lasted until the beginnings of Christianity, where physicians did help people die through assisted suicide. (Edelstein L, The Hippocratic Oath, *Supplement to the Bulletin of the History of Medicine*, Johns Hopkins Press, Baltimore, 1943).

Prof. Klaschik also suggests that a request for an assisted death comes from a particular group of people: socially isolated, vulnerable people, a similar claim that has been expressed by American psychiatrist Hendin, who states that behind each request for assisted death is a potentially suicidal person who does not need death but needs counselling - as a psychiatric patient. (Hendin H, *Seduced by Death, Doctors, Patients and the Dutch Cure*, Norton, New York, 1997).

Now, if anything has become clear from the Dutch practice of assisted death it is that this mainly concerns cancer patients who have no further medical options, who live at home and can endure no further suffering. The suffering can no longer be adequately treated without terminal sedation - putting them into a deep sleep from which they will not wake: a choice patients do not wish to make because it contradicts their view on dignity. Mostly, these patients are intensely tended by family members, friends and home care nurses - sometimes available 24 hours a day, for weeks, if necessary - and supported and cared for by family physicians and palliative care consultants, who deliver quality care.

Compared with the few places in Germany where palliative care has become institutionalised, the Dutch picture is more developed and extensive. Prof. Klaschik's remark that 'The Dutch say they put relatively more money into palliative care,' is worded in a negative, doubting fashion, but it is correct. They not only say this, but they actually do it. (Ten Have H, R Janssens, *Palliative Care in Europe*, IOS Press, Amsterdam etc, 2001. *Verkerk M, R Hartoungh (ed.) Ethiek en Palliatieve Zorg, Koninklijke Van Gorcum, Assen, 2003*).

Since 1998 the Dutch Department of Health, Well-being and Sports has founded and financially supports six Centres for the Development of Palliative Care in universities. These not only carry out research regarding care at the end life, but also provide consultation by palliative care teams, physicians and nurses, to any family physician who needs a complex palliative care question answered. Journals have been established and professional societies of palliative care physicians have been founded.

There have been, and are, physicians who concentrate on increasing their palliative care knowledge and have decided that more options are available to patients at the end of life, postponing the moment that euthanasia or assisted suicide becomes necessary. However, it is unclear whether this increased knowledge and competence has lowered the number of requests for active assistance in dying through euthanasia or assisted suicide.

In conclusion: it would be more professional to discuss, if talking about the Dutch situation regarding euthanasia and assisted suicide, the Dutch practice and justification - more adequately than Prof. Klaschik does. Also, it would be a sign of integrity to discuss the organisation and financial structure of the Dutch palliative care practice based on the real facts.

The over 80s

Radiation is an option for prostate cancer

Prostate cancer patients aged 80+ can tolerate external beam radiation therapy, according to a study* presented by **Melvin Deutsch MD**, Raul Mercado professor of radiation oncology at the University of Pittsburgh Medical Centre, at the 89th Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA).

A group of 33 elderly men, most with advanced and aggressive forms of prostate cancer, were treated with external beam radiation therapy at the same radiation levels used to treat patients in their 50s and 60s. Dr Deutsch reported that the group, whose five-year survival rate was 61.6%, experienced no unusual or prolonged interruptions in treatment due to illness from radiation.

Thirteen of the elderly patients were alive and disease-free 23-83 months after treatment. Six patients, with evidence of cancer progression, were alive 44-98 months after treatment. Of the 14 patients who died during the 10-year study, five had no evidence of prostate cancer, four had evidence of disease progression, and five had an unknown status of the disease.

A healthy 80-year-old with prostate cancer? '*I'm going to treat him with radiation*'

'The 61% survival rate is better than the five-year survival rate for lung cancer patients, and lung cancer is aggressively treated with radiation,' Dr. Deutsch reasoned. 'So why not give elderly patients the benefit of the doubt? There's a good chance they'll live another five years.' However, he pointed out that not all elderly cancer patients are good candidates for radiation therapy - e.g. the severely ill or incapacitated - and for others, their doctors may pursue alternative treatments, such as hormone therapy or a 'watchful waiting' approach. Dr. Deutsch also added that there is a school of thought that the effort and cost of radiation therapy is not beneficial to patients in '...advanced stages of life'. But if the decision to treat elderly prostate cancer patients with radiation rests on whether they can endure it, the results from the 33 elderly men in this study show that they can, he pointed out: 'When an 80-year-old patient comes to me with prostate cancer, assuming he's otherwise healthy, I'm going to treat him with radiation. If it can keep the cancer from coming back, then I say do it.'

At *RSNA 2000*, Dr Deutsch presented data that showed women aged 80+, who had breast cancer, had a five-year survival rate of 78% after radiation treatment that followed lumpectomies. External beam radiation therapy was well tolerated in all 47 patients in the study, and the majority had good to excellent cosmetic results.

** Study co-authors: D M Heaton MD, and M M Rosenstein MD*

Madrid, 12-15 March

EAU 2004

'At EAU 2004 the whole specialist field of urology will be addressed, but this year we also will place a particular emphasis on new therapies to treat prostate cancer, the use of different therapies for tumours in general and the treatment of bladder and kidney cancer. We will also discuss functional problems in the lower urinary tract and their treatment, but in a way,' said Professor Michael Marberger, Chairman of the Board, Urology Department, University Clinic, Vienna, and 2004 President of the European Association of Urology congress. Speaking in an interview with *Denise Hennig of European Hospital*, he discussed the aim and impact of Europe's biggest gathering of urologists, including standardisation of urology treatments.

During regular meetings, held over a period of two years, a pan-European scientific committee of 30 urologists selects contributions from urologists from many nations to contribute to the programme. 'This process,' Prof. Marburger pointed out, 'is completely independent of any other structures within the world of urology. During their meetings, the committee members address those topics that they deem to be of particular interest to everyone. At the moment, the focus is on prostate cancer and other current clinical issues. Separate associations, societies and working groups within the EAU will also hold other events and presentations in parallel to the main programme. For instance, there are working groups on endo-urology and uro-gynaecology, which hold meetings apart from the main events and determine their own topics. These are supranational within the EAU.'

Will there be teaching workshops? 'There will be over 40 different courses and about 20 symposia on specialist subjects within urology, some of which are sponsored by companies. This is a large event with a comprehensive programme - from morning until evening.

How many participants are expected? '10,000!' he replied. 'The special feature of this congress is that the number of participants is increasing disproportionately, because people realise Europe is becoming a more supranational unit than initially imagined.'

So will different forms of treatment be standardised across Europe? 'Yes. From experience, whatever is discussed at the congress tends to have an immediate effect in practice. The EAU also has its own committee that establishes standard therapies and then declares them as such. There is a separate commission for this decision, and it's a very complex process. Members of the commission base their decisions on set international regulations on data evaluation to back up results - evidence-based medicine is one such international standard. They develop guidelines that are usually regarded as a minimum standard. Whether or not these are adhered to is another question. However, we do not anticipate any problems, because almost all specialist organisations - including national organisations - tend to "sing from the same hymn sheet".

Prostate cancer - the options

By Professor Bob Djavan

Bob Djavan MD PhD, Professor of Urology, Vice Chairman Department of Urology, University of Vienna, and Director of the Prostate Disease Centre, and Co-Director of the Ludwig Boltzman Institute for Prostatic Disease

Prostate cancer is one of the most common malignant diseases affecting men. It has a significant correlation with age but also affects younger patients. In the absence of a family history of the disease it is recommended that men should be regularly checked from the age of 45. If there is a family history, they should be checked from aged 40.

The prostate check should be carried out by an urologist and usually comprises a blood test (PSA - prostate specific antigen) and examination of the prostate, where the doctor feels for any suspect lesions. This check is very important if a patient is to recover from cancer of the prostate. Only early diagnosis allows a complete removal of the tumour through a radical prostatectomy, or via radiotherapy. If the prostate carcinoma is limited to the prostate the chance of a cure is about 90%. If the tumour has already spread from the organ the likelihood of a cure decreases dramatically and often makes it impossible. If there are any metastases in the lymph nodes, or other organs, the tumour can no longer be cured. However, with the help of modern hormone treatments it is often possible to prevent the tumour from growing further for several years.

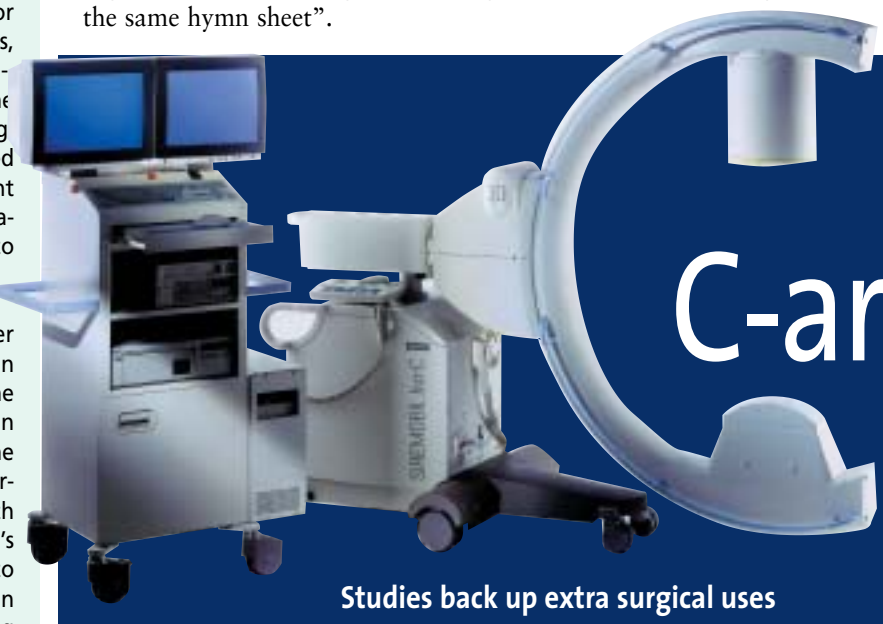
Radical prostatectomy - is an operative procedure aimed at complete removal of the prostate gland and seminal vesicles. Once the prostate (situated between bladder and urethra) is removed, the urethra is reconnected with the bladder and the patient is postoperatively fitted with a permanent catheter for a period of time. It was standard practice to also remove a patient's lymph nodes at the same time, but it is now more common not to do this if the patient's PSA is lower than 10ng/ml and if the tumour has a good level of grading (Gleason Score 2-5).

The operation can be carried out through a cut in the lower abdomen or the perineum or through laparoscopy. There have been significant improvements in maintaining patients' continence and potency, the former being achieved in 80-98% of cases and the latter - as long as the nerves on both sides have not been damaged during the operation - in 70-75% of cases.

Radiotherapy - The tumour is destroyed via X-rays directed at the prostate gland. There have been many technological advances with this treatment that have resulted in a decrease in the side effects on the intestine and bladder. If the tumour is limited to the prostate this treatment can also achieve a complete cure and the level of success is comparable to that of surgical removal.

Other methods - Because prostate carcinomas tend to grow quite slowly, so-called 'watchful waiting' is another option for treatment. However, this method of treatment should only ever be chosen by an experienced urologist and requires stringent regular check-ups.

Brachytherapy is another alternative procedure for the treatment of prostate cancer with good levels of grading.



The Siremobil Iso-C 3D mobile C-arm radiography system provides the surgical team with almost unlimited access to the patient. Its isocentric design, 190-degree orbital range, and integrated cable routing enable 3D imaging in a single motor-driven orbital sweep

Results from the latest clinical studies support the expanded use of 3D imaging during surgery. Using 3D imaging improves the quality and safety of surgical procedures and reduces the risk of repeat surgery

C-arm radiography

Studies back up extra surgical uses

The hips, pelvis, and viscerocranium may now be examined during surgery using the Siremobil Iso-C 3-D mobile C-arm radiography system, Siemens Medical Solutions reports. 'Results from the latest clinical studies support the expanded use of 3-D imaging during surgery. Previously, the C-arm was considered suitable for examinations of the upper and lower extremities as well as the entire spinal column the firm points out.

'The Siremobil Iso-C 3D provides the surgical team with significant advantages over conventional C-arm systems used during surgery. As a mobile system, it enables almost unlimited access to the patient. 3-D imaging is possible in a single motor-driven orbital sweep, due to the isocentric design, 190-degree orbital range, and integrated cable routing. A defined number of images (50 or 100) are acquired at fixed angular increments. The systems simultaneously produce a high-resolution, isotropic data volume from these individual acquisitions. When orbital movement is complete, the surgeon uses a special mouse directly at the operating theatre table on a monitor cart to select the desired images in real time,' Siemens explains.

Siemens has also introduced new configurations for the firm's Modularis Uro Plus urology system. Two new variants optimise the multiple functions and flexibility of this modular system. First, combining the system with the Siremobil Iso-C 3D mobile X-ray C-arm enables interdisciplinary use of this intra-operative 3D imaging for orthopaedic surgery and traumatology. Second, the firm reports, innovative Lithostar Modularis Vario lithotripsy module can be flexibly integrated with a wide range of mobile C-arm systems, including those of third-party manufacturers. In addition to kidney stone therapy and other urological applications, orthopaedic treatments such as ESWT (extracorporeal shock wave therapy) may be performed, resulting in optimisation of management, costs and resource allocation.

DETECTING urinary tract disease

Promising results from CT urography

Richard Cohan

Computed tomographic urography (CTU) is proving itself as a tool for detecting very subtle disease and may have better diagnostic potential than routine intravenous urography (IVU).

'There is an investigational push to make CT the only examination needed for evaluation of urinary tract, kidneys and bladder,' said Richard H Cohan MD, Professor of Radiology, University of Michigan. 'Previously, IVU was the first screening test used. However, we now know that IVU is not very sensitive for detecting renal stones or masses. CT is widely accepted as superior to IVU for those two indications.'

For now, the only remaining superiority of IVU may be in examining the renal collecting systems and ureters for small cancers and several benign conditions, e.g. renal tubular ectasia and papillary necrosis. However, Dr Cohan pointed out that researchers are now studying the ability of thin-section CT to display these and other subtle urinary tract abnormalities.

Dr Cohan said that he and his colleagues (including the lead investigator Elaine M Caoili MD, 2001 RSNA research scholar) are very encouraged by their experience with multidetector CTU (MDCTU). They found that patients tend to prefer MDCTU over IVU because they face only one diagnostic test - in many cases, patients who undergo IVU are ultimately referred for renal mass CT and then possibly retrograde pyelography or ureteroscopy. Also, patients prefer MDCTU because they need not take a preparatory laxative, usually given prior to IVU.

Dr Cohan added that referring physicians also like MDCTU because it eliminates imaging algorithms and the potential for the false-negative results seen far more often with IVU.

MDCTU and Cancer - Preliminary studies in the USA and Europe are touting the benefits of MDCTU in detecting cancer. One study, by Nigel C Cowan MD and colleagues in Oxford, England, found that MDCTU enabled detection of more upper tract cancers than retrograde pyelography did. A number of other studies are also expected to show that the MDCTU technique can detect most urinary cancers.

Dr Cohan said most radiologists performing CTU use an MDCTU technique, whereby a large number of thin section axial CT images are acquired after injected contrast material has been excreted in the renal collecting system and ureters. Axial image review is the crucial for study interpretation. While most radiologists performing MDCTU also use axial image data to create multiplanar reformatted images or 3-D reconstructions, these additional images should only be considered complementary. Preliminary data at Dr. Cohan's institution suggests that 3-D images are not as sensitive as axial images in detecting urinary tract pathology.

CT Combined with IVU - Terri J Vrtiska MD, and colleagues at the Mayo Clinic, Rochester, Minnesota, are practicing an alternative CTU technique, which uses a modified multidetector CT scanner, with tabletop; this permits acquisition of both axial CT and conventional film-screen urographic (CFSU)images, using a single injection of IV contrast material. The CFSU images are obtained using an overhead x-ray tube directed to a film-screen cassette, positioned under the patient when still on the CT table. Advantage: the technique involves acquisition of only a few immediately available radiographs in display form - traditionally viewed by radiologists and referring physicians - rather than hundreds of axial images needed for MDCTU acquisition and multiplanar reformation.

The Mayo's combined examination has been very well accepted clinically - 8,000 patients have undergone CT urography using this technique, including 10-15 CT urographic examinations performed daily. 'My colleague, Akira Kawashima MD, is leading efforts to replace the IVU image with an improved CT-scanned projection radiograph or "scout" view, which would eliminate the need for the CT tabletop modification and provide image resolution approximating the conventional IVU radiograph,' says Dr Vrtiska, assistant professor and physician director of 3-D CT at the Mayo. 'We are currently studying the sensitivity and specificity of the combined CT and IVU compared with the CT scanned projection radiograph,' she adds. This modified CT scanner includes an overhead x-ray tube and modified CT tabletop.

Dr Cohan is a little more cautious about the technique, pointing out possible limitations: 'Like IVU, we don't think you can see as much with the scout images as with thin section axial images or multiplanar reconstructions.' (Because only the axial images can show the wall of the renal collecting systems and the ureters as well as the lumen). 'We have already encountered a number of patients who had ureteral cancers visualised only on axial images that surrounded a perfectly normal-appearing ureteral lumen. Although all observations are preliminary, it is possible that MDCTU will ultimately prove to be more sensitive than CT supplemented with the CT scout view for this reason.'

Disadvantages of MDCTU - 'MDCTU generates a lot of images, so it takes more time to read,' Dr Cohan pointed out: '... but nowadays we have to work faster and are reimbursed less for the studies we read. The last thing we want is a new study where we have hundreds of images to examine. Second, MDCTU exposes the patient to more radiation than they would have received from an IVU or even a standard abdominal and pelvic CT and an IVU together.'

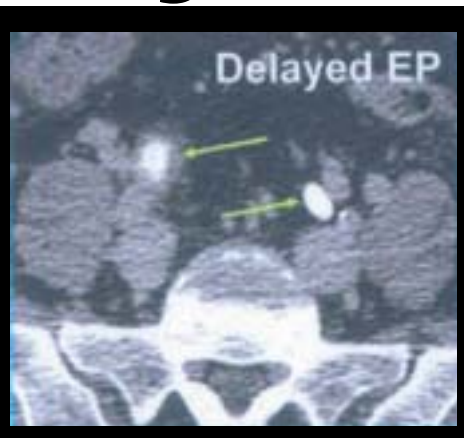
Radiation reduction efforts are under way, through CT technique alterations and advances in CT hardware and software, he added and pointed out that MDCTU is also more expensive than IVU.

At the University of Michigan Hospital, Dr Cohan estimates they have performed over 1,000 MDCTU examinations. 'It is not done at many private hospitals, but radiologists are being encouraged to pursue working on CTU protocols.' This technology, he pointed out, was first described only 5-6 years ago, and is still evolving.

Nonetheless, Dr Vrtiska expects the CT urography standard to be better defined within a year, perhaps including tailored CTU protocols for specific indications and a combination of the two approaches described

Average intensity projection image created from an excretory phase axial image data set in a patient with a normal MDCTU

Volume rendered image created from an excretory phase axial image data set in another patient with anormal MDCTU



Axial image obtained late in the excretory phase while both uretors are well opacified with excreted contrast material. The right ureter has a markedly thickened wall due to the presence of an infiltrative transitional cell carcinoma

The ureter appears to relatively normal in caliber on a volume rendered image created from the same data set. The wall thickening is not visible on this image, which only demonstrates the ureteral lumen

An IVU film, (film screen radiograph) (left) compared to the original CT scanned projection radiograph (centre) and the improved CT scanned projection radiograph (right)

Photo courtesy of Richard H Cohan, MD, and Terri J Vrtiska, MD

Urinary incontinence drug trials

The Boehringer Ingelheim Corporation reports that a large-scale study in the *British Journal of Urology International* (pub: February) shows that over one in three women suffering urinary incontinence (UI) also suffer stress urinary incontinence (SUI)

The journal also reports data, currently under regulatory review, on duloxetine, a new pharmaceutical treatment for this disorder. The first is a large cross-country study showing that 35% of the 17,080 women analysed reported having urinary incontinence (UI), and 37% of these reported had SUI, the most prevalent form of UI1. The second study, a global Phase III clinical trial comparing duloxetine versus placebo in the treatment of SUI, shows that duloxetine significantly decreased the frequency of incontinence episodes (IEF) with comparable significant improvements in quality of life (I-QOL) in women suffering from SUI2.

The 'Prevalence Study: SUI Most Common Form of Urinary Incontinence Among Women' gathered data using a postal survey to randomly selected women aged 18 years and older in France, Germany, Spain and the U.K. The prevalence of UI by type found in this study shows that SUI was the most common type of UI overall. The findings also revealed that over one-third of all women reported having experienced UI, but over two-thirds of those affected had never consulted a healthcare professional for treatment. Increasing age, severity and duration of incontinence symptoms were shown to be associated with consulting a doctor.

'Many misperceptions and social embarrassment surround SUI, making this common disorder one which unfortunately is coped with in silence. Low consultation rates signal there is a great need to raise awareness of this bothersome condition affecting millions of women worldwide,' said Professor Steinar Hunskaar, Section for General Practice, Department of Public Health and Primary Health Care, University of Bergen, Norway.

The 'Global Duloxetine Phase III Study: Reduced Frequency of Episodes of SUI' was conducted in 38 study centres, with randomised 458 women aged 27-79, from seven countries, including Argentina, Australia, Brazil, Finland, Poland, South Africa and Spain. The results showed that patients treated with 80mg of duloxetine experienced a median reduction of 54% in the frequency of incontinence episodes (IEF), a primary measure of efficacy, compared to a median reduction of 40 percent in the placebo group. This difference accounted to be both statistically and clinically significant. Besides, 59.5% of duloxetine-treated women had a 50-100% decrease in their IEF2 compared with only 43.2% of subjects in the placebo group.

Subjects in the duloxetine group also showed significant improvements in their Incontinence Quality of Life (I-QOL) scores.

Source: Boehringer Ingelheim

24th ISICEM

Brussels: 30 March - 2 April

This year over 200 physicians will present news and expertise at the International Symposium of Intensive Care and Emergency Medicine (ISICEM) to over 4,500 participants. While the focus will be on adult intensive care, several sessions will focus on aspects of intensive care for children.

A few programme highlights:

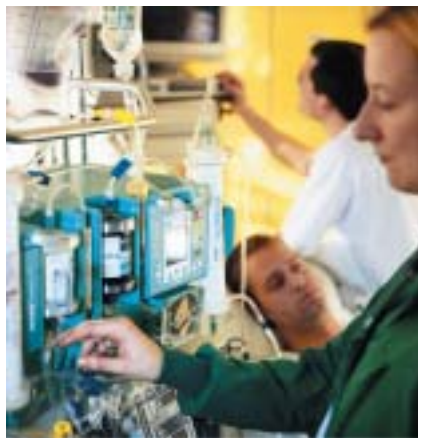
1. Debate continues regarding the 'best' mode of ventilation and the 'optimal' ventilatory settings for patients with acute respiratory failure. All aspects of mechanical ventilation will be discussed in some detail, including the use of the pressure/volume curve, recruitment manoeuvres, prone positioning, inhaled nitric oxide, high frequency ventilation, non-invasive ventilation, the use of the helmet, and how and when to attempt weaning.
2. The search for effective management strategies for sepsis continues and recent strategies that have been shown to improve outcome in patients with severe sepsis or septic shock, including drotrecogin alfa (activated), will be discussed, along with other agents still in experimental or early clinical testing.
3. Nosocomial infections are a common problem in ICUs worldwide, and several sessions will explore diagnostic and management strategies, as well as infection control and prevention procedures. Such infections are commonly associated with resistant organisms and we will also discuss how to provide adequate antibiotic coverage of infection without increasing the development of resistant micro-organisms.
4. The use of albumin in critically ill patients has raised some controversy in recent years, with a meta-analysis suggesting worse outcomes in patients receiving albumin. The results of a large randomised controlled study comparing albumin with saline infusion (the saline versus albumin fluid evaluation [SAFE] study) will be presented at the meeting. This study included some 7,000 patients from 16 ICUs in Australia and New Zealand and should provide many answers to questions concerning the safety of albumin in critically ill patients.
5. Increasingly, the effects of intensive care on patients in the longer term are being studied, concerning both physical and mental health status. Techniques to measure and monitor longer-term outcomes will be discussed, and results of studies in several groups of patients will be presented.
6. Finally, in this age of increased awareness of the threats of terrorism worldwide, important strategies in the management of mass casualties and basic approaches to biological and chemical warfare will be included.

Thus, as always, the ISICEM promises to provide a stimulating and invigorating arena in which all healthcare practitioners can discuss and debate the latest advances in this exciting and dynamic field.

__Jean-Louis Vincent__, Head, Intensive Care Dept, Erasme Hospital, Free University of Brussels,

Liver failure therapy

In cases of liver failure, albumin-bound toxins accumulate in the blood, because blood detoxification carried out by the liver is severely compromised. TERAKLIN AG reports that, since 1999, its extracorporeal liver support therapy MARS (Molecular Adsorbents Recirculating System), has been used to treat over 4,000 liver cases in over 30 countries. Indications for use: acute decompensation of chronic liver diseases; acute liver failure and liver dysfunction; poisoning of various types, e.g. drugs, mushrooms; liver transplant failure; drug-induced cholestasias; multiple organ failure; therapy-resistant pruritus due to liver diseases.



MARS - an extracorporeal liver support system

Using the system, customary extracorporeal renal substitution therapies are combined with the removal of albumin-bound substances (small or medium water-soluble and albumin-bound toxins can be removed from blood selectively and simultaneously). 'Via a catheter, a patient's blood flows into an extracorporeal circuit fitted with a MARS Dialyser containing special hollow fibres. Albumin and larger molecules do not pass through this membrane, and it allows the blood and albumin dialysate to flow past one another without contact. Special absorbents allow the albumin dialysate to be regenerated for repeated toxin transport. Thus the liver can be supported in detoxifying blood in liver failure, and the patient's prognosis and condition can be improved to a highly significant degree,' the firm reports.

Clinical efficiency

- **Hyperbilirubinaemia:** Clinically, bilirubin, which is strongly bound to albumin, is considered an indicator of the accumulation of albumin-bound substances in the case of intrahepatic cholestasis. For the first time, both bilirubin and other albumin-bound substances can be removed selectively using MARS Therapy. Present results give rise to the assumption that MARS has a direct effect on hepatic cholestasis.
- **Hepatic encephalopathy/brain oedema:** Ammonia is considered the main cause of hepatic encephalopathy (hepatic coma) and brain oedema that develop as complications in liver failure. However there is little evidence to show that standard renal substitution procedures, by removing this water-soluble substance, have a significant effect on these characteristic complications that are an important factor in prognosis. Perhaps other albumin-bound substances, such as tryptophan, manganese, false neurotransmitters, GABA, or endogenous benzodiazepines, are essential in the pathogenesis of hepatic encephalopathy. All of the substances can be eliminated from the blood using MARS Therapy. Result: the patients wake, and the degree of encephalopathy is reduced. Often, an increased intracranial pressure causes brain stem damage; it is also a frequent cause of death in cases of acute liver failure. Glutamine accumulates as a metabolic product of increased utilisation of ammonia, causing astrocytes or other cells to swell, which, in turn, results in brain oedema. As various studies have shown, MARS can stop this process and/or reduce intracranial pressure.
- **Haemodynamics:** Various vasoactive substances, such as plasma nitric oxide (NO) are thought to be responsible for the characteristic haemodynamic situation in cases of liver failure. As studies have shown, MARS removes NO from blood and reduces its production. This is considered to be the cause of significant increases in systemic vascular resistance (SVRI) and mean arterial pressure (MAP) following MARS treatment. At the same time, the heart returns to normal with a decrease in cardiac index and the local supply of blood to liver, brain and kidneys is improved; with a reduction in pressure in the portal vein.
- **Renal function:** If liver failure is accompanied by deterioration in renal function, the prognosis is poor, and failure of an additional organ system is a further step towards the development of multiple organ failure. Various studies have shown that this development can be reversed and even avoided using the therapy. This may be attributed to an improvement in the systemic and local haemodynamic situation, but also perhaps to a direct effect of MARS Therapy.
- **Protein synthesis:** Both the detoxification and the synthesis functions of the liver begin to improve on removal of albumin bound toxins in the presence of an adequate regenerative capacity in the damaged liver.

Severe sepsis — First 24 hours are critical

Sepsis causes up to 135,000 deaths in European intensive care units annually, and more people die from sepsis than from breast or colon cancer. Severe sepsis occurs when an infection (bacterial, viral, fungal or parasitic) - often due to surgery, burns, cancer or major injury - triggers a cascade of immune system responses that can lead to acute organ dysfunction and often death.

'If a patient with severe sepsis does not show improvement within those first 24 hours, the risk of death dramatically increases,' said Dr. Mitchell Levy, MD, FCCP, of Brown Medical School/Rhode Island Hospital, principle US investigator of a study presented recently at CHEST 2003, the annual meeting of the American College of Chest Physicians (ACCP). 'At that point, if treatment is failing to improve the patient's condition, it is important to think about more aggressive therapy. This study is clearly telling us that failure to improve on initial day of treatment is vital in patients with severe sepsis.'

First Day SOFA Scores Predictive of 28-Day Mortality - 1,036 patients from two separate clinical trial databases were evaluated. They met the established criteria for severe sepsis and were being treated with conventional supportive care, such as antibiotics and mechanical ventilation, but not with any investigational drugs for sepsis.

Changes from baseline to day one in sequential organ failure assessment (SOFA) scores were calculated for each patient's cardiovascular, renal, haematologic, respiratory, and hepatic organ systems. The 28-day mortality rates were also analysed. Based upon an analysis of changes in SOFA scores by day one, data indicate patients who did not demonstrate organ function improvement during the first 24 hours of therapy were significantly less likely to survive. Furthermore, during the first day of therapy for severe sepsis, the change from baseline in organ dysfunction may be a better predictor of 28-day mortality than a static baseline assessment.

Adult cases benefited from Xigris - Xigris (drotrecogin alfa [activated]) is the first and only therapy proven to improve survival in adult severe sepsis patients with multiple organ failure when added to best standard care, the maker reports. 'Based on the landmark PROWESS trial, nearly one in five patients, who would have died, survived with the addition of Xigris. Early diagnosis and aggressive management, coupled with the use of proven, efficacious medicines such as this, will enable physicians to do more to improve survival in severe sepsis.'

'Phase III clinical trial results showed that the drug reduced the relative risk of severe sepsis death by 21% in patients with two or more organ dysfunctions. Bleeding is the primary side effect observed during the 28-day study period in 3.5% of Xigris-treated patients and 2.0% of placebo-treated patients.

'Xigris is a genetically engineered version of the human activated protein C molecule, a naturally occurring protein in the body that helps balance many of the major forces behind sepsis, including coagulation (blood clotting) and suppression of fibrinolysis (the body's clot-busting system).'

Infection surveillance The German hospital infection surveillance system KISS (abbreviation for Krankenhaus-Infektions-Surveillance-System) - Annual introductory courses and a mandatory annual knowledge/experience exchange meeting for continued participation are held in Berlin. For details, plus methods and current reference data, go to: www.nrz-hygiene.de

Heart-lung interactions

By **Michael R Pinsky** MD, Dr hc

The haemodynamic effects of ventilation are multiple and complex, but can be grouped into four clinically relevant concepts:

- **Spontaneous ventilation is exercise.** In patients increased work of breathing, initiation of mechanical ventilatory support will improve O_2 delivery to the remainder of the body by decreasing O_2 consumption. To the extent that mixed venous O_2 also increases, arterial PO_2 will also increase without any improvement in gas exchange. Similarly, weaning from mechanical ventilatory support is a cardiovascular stress test. Patients who fail to wean also manifest cardiovascular insufficiency during the failed weaning attempts.

Improving cardiovascular reserve or supplementing support with inotropic therapy may allow patients to wean form mechanical.

- **Changes in lung volume** alter autonomic tone, pulmonary vascular resistance, and at high lung volumes compress the heart in the cardiac fossa, similarly to cardiac tamponade. As lung volume increases so does the pressure difference between airway and pleural pressure. When this pressure difference exceeds pulmonary artery pressure, pulmonary vessels collapse as they pass from the pulmonary arteries into the alveolar space increasing pulmonary vascular resistance. Thus, hyperinflation increases pulmonary vascular resistance, pulmonary artery pressure, impeding right ventricular ejection. Decreases in lung volume below functional residual capacity, as occurs in acute lung injury, alveolar collapse and increased pulmonary vasomotor tone by the process of hypoxic pulmonary vasoconstriction. Recruitment manoeuvres, positive-end expiratory pressure and continuous positive airway pressure may reverse hypoxic pulmonary vasoconstriction and reduce pulmonary artery pressure.
- **Spontaneous inspiration and spontaneous inspiratory efforts decrease intrathoracic pressure.** Since diaphragmatic descent increases intra-abdominal pressure, these combined effects cause right atrial pressure inside the thorax to decrease, but venous pressure in the abdomen to increase, markedly increasing the pressure gradient for systemic venous return. Furthermore, the greater the decrease in intrathoracic pressure the greater the increase in left ventricular afterload for a constant arterial pressure. Mechanical ventilation, by abolishing the negative swings in intrathoracic pressure will selectively decrease left ventricular afterload, as long as the increases in lung volume and intrathoracic pressure are small.
- **Positive-pressure ventilation increases intrathoracic pressure.** Since diaphragmatic descent increases intra-abdominal pressure, the decrease in the pressure gradient for venous return is less than would otherwise occur if the only change were an increase in right atrial pressure. However, in hypovolemic states, positive-pressure ventilation can induce profound decreases in venous return. Increases in intrathoracic pressure decreases left ventricular afterload and will augment left ventricular ejection. In patients with hypervolemic heart failure, this afterload reducing effect can result in improved left ventricular ejection, increased cardiac output and reduced myocardial O_2 demand.

Liver metastases

Laser-induced interstitial thermotherapy brings good results

After localising and penetrating the tumour, the physician guides the special 1 mm (0.04") diameter glass fibre into the centre of the tumour via a catheter developed specifically for this treatment. This is only minimally-invasive. The glass fibre routes the laser light to the tumour, where it heats up surrounding tissue within a precisely defined radius. Heat generated by the absorption of the laser light induces uniform total thermodesiccation of the cancer cells. Due to its extremely deep action, the light of the Nd:YAG laser, with a wavelength of 1,064 nm, is ideal for this application.

Prof. Vogl considers the decisive advantage of LITT to be its excellent monitoring of the course of treatment and the results of surgical intervention. All therapy monitoring can be performed with magnetic-resonance tomography (MRT). This ensures that, in every case, the entire metastasis - including a 10 mm (0.4") wide safety border - has been desiccated.

This is also where LITT is superior to radio-frequency ablation (RFA), which has also been used recently for minimally-invasive treatment of liver metastases. 'RFA leads in the MRT system to interference and image artefacts that do not permit satisfactory image evaluation,' said Prof. Vogl, when explaining why observing RFA treatment via MRT is not possible. Since 100 percent therapy monitoring can therefore not be guaranteed, local recidivations sometimes form after RF ablation. 'Many patients that we treat with LITT had been treated previously with RF ablation.'

Professor of Radiology Thomas J Vogl, and a team at Frankfurt University Hospital, have treated liver metastases with minimally-invasive laser-induced interstitial thermotherapy (LITT) since 1993 and report 'very good results' in the 1,300 patients treated.

Using MRT-guided LITT the team has also destroyed about 6,000 liver tumours. Just under 60% of the patients with liver metastases had colorectal carcinoma, the second largest number had breast-cancer - the two groups in which liver metastases is found most frequently.

The gold standard for treating these liver metastases continues to be open surgical resection. However, over 50% of these surgical patients develop new metastases (recurrences) afterwards, which require further surgery, radiation or chemotherapy, the professor reports. However, by then surgery is often no longer possible, nor is chemotherapy very promising. 'We have in LITT a gentle procedure at our disposal, with which we can offer these patients more options,' said the professor. The survival rate after LITT treatment is comparable to that of open surgery. 'Plus,' Prof. Vogl added, 'the complication rate is so low that minimally-invasive MRT-guided LITT under local anaesthesia can be considered a safe and reliable procedure. We have patients whom we treated eight to ten years ago who have remained tumour-free to this day.'

Currently, liver tumours are the most important indication for LITT. This is limited to a maximum of five lesions with a diameter of up to 50 mm (1.97"). LITT can be used, for example, to treat patients in whom, after liver resection, recidivating metastases have formed that grow despite chemotherapy, or that attack both hepatic lobes. The procedure is suitable for patients who cannot tolerate surgery for various reasons. Additionally, LITT can be used to bring patients to an operable state. Finally, LITT is an option for patients who reject surgery or chemotherapy.

Besides its application in treating liver tumours, the professor says LITT is also suitable to treat pulmonary metastases and tumours, or soft-tissue tumours that have formed recidivating tumours or lymph-node metastases in the head/neck region, the upper abdomen, or the peritoneum. Kidney and prostate tumours, as well as other soft-tissue tumours, are still special indications for LITT.

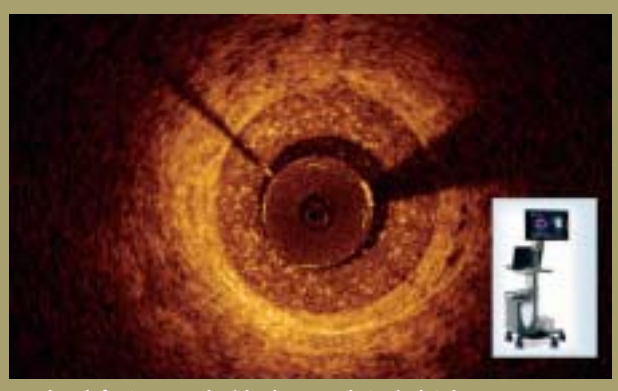
The German Society for Laser Medicine awarded the Father Leander Fischer Prize [Pater-Leander-Fischer-Preis] to Professor Vogl and his team for this pioneering work.

The equipment used by the Frankfurt team is produced by Trumpf Medizin Systeme, which reports that currently it is the only manufacturer, worldwide, to offer a complete system for laser-induced interstitial thermotherapy. This includes laser devices, catheters and glass fibres.

Endoscopy

New technologies to improve early cancer diagnosis

Integrated in the endoscope's distal end, the confocal microscope enables a thousand-fold tissue magnification



Below left: Compared with ultrasound, Optical Coherence Tomography (OCT) can improve image resolution 8-25 fold

- **Intestinal cancer**
  The second most frequent cause of cancer related deaths in Germany, for example, accounts for over 57,000 cases annually and about 30,000 deaths from the disease.
- **Barrett's oesophagus**
  A consequence of chronic gastro-oesophageal reflux disease (GERD) - has increased five-fold in the last 30 years.
- **Lung tumours**
  There are 8,100 new cases among women in Germany, annually, and about 28,900 new male cases. The survival rate is not high - roughly equal to the mortality rate.

PENTAX Europe GmbH reports that first European studies for new technologies, to simplify the diagnosis and earlier identification of cancers, are running at the Dr. Horst Schmidt Clinics, Wiesbaden, under the direction of Prof. Dr. med. Christian Ell and PD Dr. med. Thomas Rabenstein and at the Johannes Gutenberg University Clinic, Mainz, under the responsibility of Dr. med. Ralf Kiesslich and Prof. Dr. med. Markus Neurath, leading specialists in the field of gastrointestinal endoscopy and early cancer diagnosis.

Optical Coherence Tomography

Three years ago PENTAX began a co-operation with LightLab Inc, Boston, on Optical Coherence Tomography (OCT) in endoscopy, which aims to identify microstructures in gastro-enterological and pulmonological applications. OCT combines ultrasound (US) with microscopic image quality. However, unlike US, images are generated via light waves rather than sound waves. Using infrared light, image resolution can be improved eight to 25-fold over US quality. This extremely high resolution reveals even the smallest tissue changes within the mucosa.

Confocal endoscopy in gastroenterology -

Opening up this second research avenue, PENTAX formed a joint venture in 2002 with OptiScan Ltd, Melbourne.

Confocal endoscopy is used in the early detection of intestinal cancer, for example.

Laser light is applied directly via an endoscope, and microscopically accurate, real-time images of living cells can be generated in thousand-fold magnification. Bundled laser light is focused on tissue to generate those images. The light beam is reflected by a fluorescent contrast agent in the mucosa and transmitted via confocal fibre optics - which only conducts light from a specified focal plane - to the processor, where the light signals are transformed into images. Thanks to thousand-fold tissue magnification, PENTAX claims: '...microscopic images obtained enable recognition of structures down to the size of cell nuclei'.

PENTAX reports that this technology also promises a reduction in the number of specimens taken for histological analysis. 'Early detection of intestinal cancer will thus be significantly facilitated.'

These devices do not conform to the MDD and cannot be put into service until compliance is obtained.

EUROPEAN HOSPITAL

Published by: EUROPEAN HOSPITAL Verlags GmbH, Höherweg 287, 40231 Düsseldorf
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Subscription rate
12 issues: 74 Euro, single copy: 6.16 Euro. *Send order and cheque to*: European Hospital Subscription Dept

Finishing media technique jöhri, Weilerswist, Germany
Printed by Frotscher Druck, Darmstadt, Germany
Publication frequency bi-monthly
European Hospital ISSN 0942-9085

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